Abstract of Congress Papers

9th Iranian Joint Congress on Fuzzy and Intelligent Systems

(CFIS2022), March 2-4, 2022

20th Iranian Conference on Fuzzy Systems

18th Conference on Intelligent Systems

5th Swarm Intelligence and Evolutionary Computation Conference

In the memory of L. A. Zadeh

The father of fuzzy

1921- 2017

In the memory of Dr. Bahram Sadeghpour Gildeh

Professor, Department of Statistics, Ferdowsi University of Mashhad

(1966-2021)

Time-table
9th Joint Congress on Fuzzy and Intelligent Systems
(First day)
Iran Daylight Time (GMT +03:30)

HALL 3	HALL 2	HALL 1	Wednesday March/2/2022
Opening Ceremony			08:00-10:00
Tea Break			10:00-10:30
Keynote Speech: Evolutionary Intelligence in (Big) Data Analytics and Optimization Prof. Amir H. Gandomi, University of Technology Sydney, Australia Chairman: Prof. Mashaallah Mashinchi			10:30-11:30
Lunch Break			11:30-13:00
General Meeting of the Iranian Fuzzy Systems Society			13:00-14:00
Session: **Text Processing and Social Networks**	**Special Session:** **AI for Good**	**Special Session:** **Fuzzy Optimization 1**	14:00-16:00
Tea Break			16:00-16:15
Keynote Speech: Overview of new families of fuzzy implications and their applications in fuzzy systems Prof. Michal Baczynski, University of Silesia in Katowice, Katowice, Poland Chairman: Prof. Seyyed Naser Hosseini			16:15-17:15
Tea Break			17:15-17:30
Session: **Swarm Intelligence and Evolutionary Computation**	**Special Session:** **(Fuzzy) Logical algebraic structures 1**	**Special Session:** **Fuzzy Numerical Analysis**	17:30-19:30
Keynote Speech: The Sound of Health Prof. Mohammad-R Akbarzadeh-T, Ferdowsi University of Mashhad (FUM), Iran Chairman: Prof. Kambiz Badie			19:30-20:30

Time-table: Presentations
9th Joint Congress on Fuzzy and Intelligent Systems
(Second day)
Iran Daylight Time (GMT +03:30)

HALL 3	HALL 2	HALL 1		Thursday March/3/2022
Session: Statistics and Probability in Fuzzy	**Session: Intelligent Systems and Applications 2**	**Special Session: Fuzzy automata and graphs**	08:00-10:20	08:00-10:00
Tea Break				10:00-10:30
Keynote Speech: Role of Intelligent systems in the Interpretation of Deep Neural Networks in a Post-pandemic World Prof. Saman K. Halgamuge, University of Melbourne, Australia Chairman: Prof. Mehdi Eftekhari				10:30-11:30
Lunch Break				11:30-13:00
General Meeting of the Iranian Intelligent Systems of Scientific Society		**Special Session: Copula Theory and Its Applications**	13:00-16:00	13:00-14:00
Session: Data Mining	**Session: Applications of optimization and operation research in fuzzy**			14:00-16:00
Tea Break				16:00-16:15
Keynote Speech: Data-Driven Fuzzy Modeling Prof. Irina Perfilieva, University of Ostrava, Czech Republic Chairman: Prof. Amir Daneshgar				16:15-17:15
Tea Break				17:15-17:30
	Session: Machine Learning	**Special Session: (Fuzzy) Logical algebraic structures 2**		17:30-19:30
Keynote Speech: Some recent extensions of fuzzy integrals applied to the computational brain problem Prof. Humberto Bustince, Universidad Publica de Navarra, Spain Chairman: Prof. Esfandiar Eslami				19:30-20:30

Time-table: Presentations
9th Joint Congress on Fuzzy and Intelligent Systems
(Third day)
Iran Daylight Time (GMT +03:30)

HALL 3	HALL 2	HALL 1	Friday March/4/2022
	Session: **Bioinformatics**	**Special Session:** **Fuzzy Optimization 2**	08:00-10:00
Tea Break			10:00-10:30
Keynote Speech: Possibility-Based Perception: A Reflection on Recognition of Shape Pattern Prof. Kambiz Badie, University of Tehran & ITRC, Iran Chairman: Prof. Mohammad-R Akbarzadeh-T			10:30-11:30
Lunch Break			11:30-13:00
Session: **Machine Vision and Image Processing**	**Session:** **Fuzzy Systems and Applications**	**Special Session:** **(Fuzzy) Logical algebraic structures 3**	13:00-15:00
Tea Break			15:00-15:15
Keynote Speech: Derivative of fuzzy functions and its application in fuzzy differential equations Dr. Alireza Khastan, Department of Mathematics, IASBS, Iran Chairman: Prof. Reza Saadati			15:15-16:15
Tea Break			16:15-16:30
	Session: **Intelligent Systems and Applications 2**	**Session:** **Fuzzy Mathematical and Numerical Analysis**	16:30-18:30
Tea Break			18:30-18:45
Closing Ceremony			18:45-20:45

The message of congress chair

In the name of God, the compassionate and the merciful Greetings and courtesy to all dear scholars, guests, and esteemed speakers.

I sincerely thank all for accepting our invitation and adding to the richness of this conference with their presence.

I would like to thank the Iranian Fuzzy Systems Association and the Iranian Intelligent Systems Association, which awarded the hosting privilege of this congress to the Higher Education Complex of Bam and continued supporting the 9th Joint Iranian Fuzzy and Intelligent Systems Congress.

I would also like to thank the Vice-Chancellor for Research of the Shahid Bahonar University of Kerman, scientific associations, and other esteemed contributors that have accompanied us in organizing this event.

I am grateful to my dear colleagues and professors who worked round the clock in scientific and executive committees, especially the respected scientific secretaries of the congress, Prof. Mashaallah Mashinchi and Prof. fereshteh Forouzesh, and the executive secretary of the congress, Dr. Me'raj Abdi, which I have witnessed the efforts and concerns of these colleagues in organizing this congress in recent months.

I thank God for giving me the opportunity of being with my dear colleagues in this congress. I am very sorry that the complex was deprived of the pleasure of talking and visiting all participants in person due to the Coronavirus pandemic. However, I am still proud that the Higher Education Complex of Bam hosts virtually great scholars like you. We appreciate this opportunity for further development and progress of our university.

Last year, we lost great scientists and professors, and I consider it necessary to cherish the memory of these late myths of the country: the late professor Bahram Sadeghpour Gildeh, the late professor Mahmoud Lashkarizadeh Bami, and others who said goodbye to the mortal world this year and joined immortality. The memory of these scholars will never vanish from our hearts, and their names will never disappear from the scope of science and knowledge of this region.

I would like to inform you that the Higher Education Complex of Bam, which is more than thirty years old, has always been active in promoting science and research in society. This complex successfully hosted the 12th Iranian Intelligent Systems Conference in 2013 in collaboration with the Iranian Intelligent Systems Association, the Institute of Electrical and Electronics Engineers, and the Department of Electrical Engineering of Shahid Bahonar University of Kerman. The event was a venue for convening researchers and experts as well as disseminating new findings in the field of smart systems and their applications in society.

In addition, with the contribution of the cooperation of Shahid Bahonar University of Kerman and Graduate University of Advanced Technology, this university hosted the first and third conferences in Evolutionary Computing and Collective Intelligence in 2015 and 2017.

This year we were honored to host the 9th Congress of Intelligent and Fuzzy Systems in cooperation with scientific associations and universities in Kerman province, the 20th Conference on Fuzzy Systems, the 18th Conference on Intelligent Systems, and the 5th Conference on Evolutionary Computing and Collective Intelligence. Certainly, this congress is a great opportunity to share the views and opinions of experts and technicians in fuzzy science and its application in various sciences.

Finally, I would like to express my gratitude to all who, with their financial and spiritual support, have helped Higher Education Complex of Bam to host this congress in the most glorious way possible. I am also grateful to the board of governors of the complex, the executive and the scientific committees, the panel of reviewers, the esteemed faculty members, the administrative staff of the complex, and those who contributed to organizing and hosting this conference. I am utterly thankful to the esteemed professors of the universities and students for their active presence and participation in the congress, and to the researchers, experts, and dignitaries who added to the scientific richness of the discussions by sharing an article, delivering a lecture, or participating in the talks.

I hope that, despite Covid-19 limitations, this congress was a good place to present the scientific achievements of researchers in various fields.

Mohammad Ali Nourollahi

Chair of the congress

Dean of the Higher Education Complex of Bam

Message of the Iranian Fuzzy Systems Society president

First of all, I take the holding of the 9th Joint Congress on Fuzzy and Intelligent Systems in Higher Education Complex of Bam as a good opportunity, and I express my gratitude to all of my dear colleagues who have helped in holding this congress. My deepest gratitude goes to my hard-working colleagues and managers and also the esteemed dean of the Higher Education Complex of Bam that despite the limitations caused by the COVID-19 pandemic and even financial difficulties, they tried their best to hold this congress in the best possible way; however, I consider it necessary to mention the following points:

Based on the Scopus Scientific Database, in the last ten years, the Islamic Republic of Iran has been ranked in third place in the production of the papers in the field of fuzzy systems after China and India, while the United States is ranked in fourth place. Although our country has 1% of the world's population, it has managed to account for 13% of the production of papers in the field of fuzzy systems in 2021, while the production of documents in all scientific fields has been 2%. Therefore, the role of fuzzy systems theory in the production of science and scientific papers has been very effective in promoting the scientific position of our country in the region and in the world.

It is noteworthy that despite the growth of 50% of Humanities Research Papers in the world during the last 5 years, in our country it has grown more than 200%, and also we have had the increasing growth of up to 100% in the use of the theory of fuzzy systems in materials science, up to 50% in agriculture and biotechnology, and up to 20% in pharmacy. Therefore, the above information shows that the utilization of the theory of fuzzy systems among scientists and researchers in our country is increasing, and this knowledge has been used in new fields such as intelligent systems, artificial intelligence, humanities, basic sciences and engineering sciences.

Perhaps the day Professor Lotfizadeh introduced fuzzy logic, he did not believe that this theory, after nearly six decades, was still one of the fascinating research topics in the world, which fascinated many researchers. After all these years, what still makes fuzzy logic and intelligent systems popular scientific research, has to do with its integration with the current needs of society, the human mind and also its applicability in various fields related to human life; however, we should acknowledge that our country's researchers have paid less attention to its practical aspects. Therefore, science and technology systems should be planned so that applied research can be provided and the needs of society can be met regarding the application of fuzzy and intelligent systems.

On this basis, it is suggested that based on the scientific-elite demand in this field, a scientific association called

"Science and Technology of Fuzzy and Intelligent Systems Association"

be established under the vice-presidency's supervision for Science and Technology. Therefore, as the President of the Iranian Fuzzy Systems Society, I ask all my dear colleagues and researchers who work in this field to help and guide us to provide the necessary conditions for the establishment of the association in question.

I wish for the scientific and technological self-sufficiency of our country, and thanks again to those who were involved in holding this scientific event.

Mohammad Mehdi Zahedi
The President of the Iranian Fuzzy Systems Society

The message of Scientific Secretaries of Congress

We thank God for helping us to hold the 9th Joint Congress of Iranian Fuzzy and Intelligent Systems from March 2 to 3, 2022, in cooperation with the Iranian Fuzzy Systems Association, the Iranian Intelligent Systems Association, the International Fuzzy Association, and many scientific associations related to the scopes of the congress.

We are also thankful to colleagues, students, staff, and the support of esteemed officials of the Higher Education Complex of Bam.

It is hoped that the result of the organizers' efforts will provide the satisfaction of the professors and students, and as the result, with their kindness and care, they will overlook the possible shortcomings.

Planning for the congress began in September 2020, and we faced a considerable welcome of professors, students, and researchers in the country. However, due to time constraints, we had to select a number of research articles of higher quality to present at the congress.

Applicants for the conference submitted about 260 research articles to the conference secretariat, which after a two-phase review (initial and specialized review) by at least 2 reviewers, 120 articles were accepted in the form of lectures and 20 articles in the form of posters. For each accepted lecture, 15 minutes of presentation time and 5 minutes of question and answer time were considered. The presentations were received from the authors in recorded format due to the virtual module of the congress.

In addition, eight prominent professors from inside and outside the country were invited for keynote speeches, which were presented virtually. The duration of each Keynote speech was 45 minutes along with 15 minutes of questions and answers.

There were also 4 workshops which were held virtually for 3 to 4 hours. The annual general assembly of the two associations of Fuzzy Systems and Intelligent Systems was also held alongside the congress.

Organizing this congress is the result of the cooperation of many individuals, especially the tireless efforts of the executive secretary of this congress. We would like to thank the board of governors of the Higher Education Complex of Bam, the Iranian Fuzzy Systems Association, and the Iranian Intelligent Systems Association, other supporters whose names are mentioned in this booklet.

Finally, we would like to appreciate the respected members of the Scientific Committee of the Congress, especially Prof. Arsham Boroumand Saeed and Associate Prof. Marjan Kouchaki Rafsanjani, who accompanied us in reviewing the received manuscripts round the clock.

Best regards,

Scientific Secretaries of Congress

Mashaallah Mashinchi (Ph.D.)

Fereshteh Forouzeh (Ph.D.)

The message of the Secretary of the Executive Committee of Congress

Praise be to the Glorious God who gave us existence and guided us and made us proud to be the companions of science and knowledge so that we can be blessed with this infinite ocean.

Whosoever served the creature *the world will be eternalized his nature*

After successfully holding the 12th Iranian Conference on Intelligent systems in 2014, the First and the Second Swarm Intelligence and Evolutionary Computation in 2016 and 2018, The Higher Education Complex of Bam is going to host the 9th Joint Congress on Iranian Fuzzy and Intelligent Systems (CFIS2022) with the support of the Iranian Fuzzy Systems Society and the Intelligent Systems of Scientific Society **on March 2-4, 2022**. Congress CFIS2022 includes three successful periodic conferences: the 20th Iranian Fuzzy System Conference (ICFS2022), the 18th Iranian Intelligent Systems Conference (CIS2022), and the 5th Conference on Swarm Intelligence and Evolutionary Computation (CSIEC2022).

With all due respect and honor, I would like to express my gratitude to the esteemed faculty members, students and researchers in the field of fuzzy and intelligent systems who added richness to this Congress by presenting their valuable papers.

Being supported by the Iranian Fuzzy Systems Society and the Intelligent Systems Scientific Society of Iran and being obtained a license in 2021, the executive affairs of the Congress began their activities from the beginning of Fall 2021. In the wake of the COVID-19 pandemic, and based on the decision of the Policy Council, the virtual nature of the Congress was put on the agenda of the Executive Committee, and accordingly, all matters, including site preparation for receiving papers and other matters, were done according to schedule. Sixty-two members of the Scientific Committee and about 100 reviewers with various specializations from all over the country and the world participated in explaining the general policies of the Congress and their implementation. In order to make this Congress more glorious and practical, 8 keynote speeches and 5 specialized workshops were selected to be presented in the Congress.

Here, I would like to thank the esteemed President of the Higher Education Complex of Bam as the President of the Congress, the esteemed Vice President for Education and Research, as well as the esteemed Director of Research Affairs, who always supported us in holding the Congress. I also express my gratitude for the financial and spiritual support of the Vice Chancellor for Research of the Shahid Bahonar University of Kerman and other supporters of the Congress, who supported us for the successful implementation of the Congress.

It is gratifying that I had a very valuable experience with the esteemed members of the Policy Council of the Congress, especially the kind and honorable professor, Prof. Mashaallah Mashinchi as the chair of the program committee, who transferred his many years of experience nationally and international scientific research fields and did not hesitate to convey it to the executive committee of Congress. I would also like to take this opportunity to thank Prof. Fereshteh Foruzesh as the Scientific Secretary of the Congress, Prof. Arsham Boroumand Saeed and Prof. Marjan Kouchaki Rafsanjani who have always been our assistants in decision-making over the past year, especially in managing and reviewing the papers.

It is worth mentioning that 260 paper codes were received on the Congress website, and after the initial review of the papers by at least two expert reviewers, 120 papers were selected as lectures, and 20 papers as posters.

I would like to express my sincere gratitude to all of the compassionate and hard-working colleagues of the Executive Committee of the Congress, including Ms. Mina Mirhosseini, Ms. Fatemeh Barani, Dr. Tayyebeh Askari Javaran, Dr. Mohadeseh Soleimanpour, Ms. Mahdieh Mozafari, Dr. Seyyed Hossein Mahdavi, Ms. Anahita Amirshojai, Dr. Zeinab Khatoon Pourtaheri, Ms. Mehta Bedroud, Mr. Abdul-Hamid Bahroloom, Mr. Hassan Hadidi, Ms. Nafiseh Hadidi and I humbly appreciate and thank other colleagues, visiting professors and students who have been our partners and companions in holding this glorious event.

It is worth mentioning that the ISC index license has been obtained with the cooperation and efforts of Dr. Bijan Emamipour, the esteemed director of Research Affairs, and the IEEE index license has also been the result of the efforts of Ms. Fatemeh Barani. I hereby appreciate their efforts.

I have to honor the memory of the late Professor, Dr. Bahram Sadeghpour Gildeh, for his valuable and lasting services, who always was a moral character for many students and me.

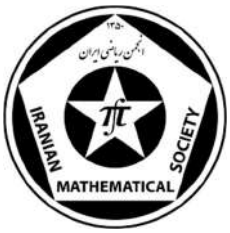
It is hoped that the round-the-clock efforts of the members of the Executive Committee will satisfy the esteemed participants and supporters of the Congress, and it is also hoped that we will take a short step in promoting the scientific research objectives of our country.

With Best Regards

Me’raj Abdi (Ph.D.)

The Secretary of the Executive Committee of Congress

Scientific and Industrial Supporters of Congress



The Executive Committee of CFIS2022

Name	Job Title
Dr. Mohammad Ali Noorolahi	General Chair
Prof. Mashaallah Mashinchi	Chairs of Program Committee
Dr. Fereshteh Forouzesh	Chairs of Program Committee
Dr. Me'raj Abdi	Chair of Executive Committee
Mina Mirhosseini	Chair of IT Committee
Dr. Tayebeh Askari Javaran	Chair of Registration Committee
Fatemeh Barani	Chair of Publishing Committee
Dr. Hamzeh Dehghani	Chair of Finance and Support Committee
Dr. Mohadese Soleimanpour-moghadam	Chair of Industrial Communication and Workshop Committee
Anahita Amirshojaei	Chair of International Relations Committee

Members of Congress Policy Council

Name	Affiliation
Dr. Me'raj Abdi	Higher Education Complex of Bam
Prof. Saeid Abbasbandy	Imam Khomeini International University
Prof. Mohammad-R. Akbarzadeh-T	Ferdowsi University of Mashhad
Prof. Arsham Borumand Saeid	Shahid Bahonar University of Kerman
Prof. Esfandiar Eslami	Shahid Bahonar University of Kerman
Prof. Behrouz Fathi-Vajargah	Gilan University
Dr. Fereshteh Forouzesh	Higher Education Complex of Bam
Prof. Mashaallah Mashinchi	Shahid Bahonar University of Kerman
Prof. Hossein Nezamabadi-pour	Shahid Bahonar University of Kerman
Dr. MohammadAli Noorollahi	Higher Education Complex of Bam
Prof. Seyed Mahmoud Taheri	University of Tehran

The Program Committee of CFIS2022

Full name	Affiliation
Prof. Saeid Abbasbandy	Imam Khomeini International University, Iran
Dr. Hamed Ahmadzade	University of Sistan and Baluchestan, Iran
Prof. Mohammad-R. Akbarzadeh-T	Ferdowsi University of Mashhad, Iran
Prof. Tofigh Allahviranloo	Bahcesehir university, Istanbul, Turkey
Prof. Mohammad Amini	Ferdowsi University of Mashhad, Iran
Dr. Mohsen Arefi	Birjand University, Iran
Dr. Alireza Askarzadeh	Graduate University of Advanced Technology, Kerman, Iran
Prof. Michal Baczynski	University of Silesia in Katowice, Poland
Prof. Kambiz Badie	University of Tehran; Iran Telecommunication Research Center, Iran
Dr. Mahmood Bakhshi	University of Bojnord, Iran
Prof. Arsham Borumand Saeid	Shahid Bahonar University of Kerman, Iran
Prof. R. A. Borzooei	Shahid Beheshti University, Iran
Prof. Amir Daneshgar	Sharif University of Technology, Iran
Prof. Bernard De Baets	Ghent University, Belgium
Prof. Vali Derhami	University of Yazd, Iran
Prof. Antonio Di Nola	University of Salerno, Italy
Dr. Mahdi Eftekhari	Shahid Bahonar University of Kerman, Iran
Prof. Esfandiar Eslami	Shahid Bahonar University of Kerman, Iran
Prof. Behrouz Fathi-Vajargah	Gilan University, Iran
Dr. Mahmood Fazlali	Shahid Beheshti University, Iran
Dr. Fereshteh Forouzesh	Higher Education Complex of Bam, Iran
Prof. Seyed Naser Hosseini	Shahid Bahonar University of Kerman, Iran
Prof. Gunther Jaeger	University of Applied Sciences Stralsund, German
Prof. Mohammad Jamshidi	The University of Texas, San Antonio, USA
Prof. Ihsan Kaya	Industrial Engineering Yıldız Technical University, Turkey
Dr. Farshid Keynia	Graduate University of Advanced Technology, Kerman, Iran
Dr. Alireza Khastan	Institute for Advanced Studies in Basic Sciences, Zanjan, Iran
Dr. Marjan Kuchaki Rafsanjani	Shahid Bahonar University of Kerman, Iran
Dr. Fatemeh Kouchakinezhad	Iranian Journal of Fuzzy Systems, Iran
Prof. Weldon Lodwick	University of Colorado Denver, USA
Pro. Nezam Mahdavi-Amiri	Sharih University of Technology, Iran

Prof. M. Mashinchi	Shahid Bahonar University of Kerman, Iran
Dr. Mohamad Reza Mashinchi	Payame-Noor University - Kerman, Iran
Dr. Radko Mesiar	Slovak University of Technology in Bratislava, Slovak
Prof. Mohammad Bagher Menhaj	Amirkabir University of Technology, Iran
Prof. Hassan Mishmast Nehi	University of Sistan and Baluchestan, Iran
Prof. Gholam Reza Mohtashami Bordazran	Ferdowsi University of Mashhad, Iran
Prof. Susana Montes	University of Oviedo, Spain
Prof. John Mordeson	Creighton University, USA
Prof. Hossein Nezamabadi-pour	Shahid Bahonar University of Kerman, Iran
Dr. Abbas Parchami	Shahid Bahonar University of Kerman, Iran
Dr. Mir Mohsen Pedram	Kharazmi University, Iran
Dr. Akbar Pad	University of Bojnord, Iran
Prof. Dan Ralescu	University of Cincinnati, United States
Dr. Reza Saadati	Iran University of Science and Technology, Iran
Prof. Nasser Sadati	Sharif University of Technology, Iran
Prof. Arash Sharifi	Science and Research Branch, Islamic Azad University, Iran
Dr. Ayyub Sheikhi	Shahid Bahonar University of Kerman, Iran
Prof. Fu-Gui Shi	Beijing Institute of Technology, China
Prof. Alexander Sostak	University of Latvua, Latvia
Prof. Seyed Mahmoud Taheri	University of Tehran, Iran
Prof. Mohammad Teshnehlab	Khajeh Nasir al-Din Toosi University of Technology, Iran
Prof. Ali Torabi	University of Tehran, Iran
Prof. Ali Vahidian Kamyad	Ferdowsi University of Mashhad, Iran
Prof, Jose Luis Verdegay	University of Granada, Spain
Dr. Zeshui Xu	Sichuan University, China
Dr. Mohammad Ali Yaghoobi	Shahid Bahonar University of Kerman, Iran

Time-table: Workshops (In Persian)
9th Joint Congress on Fuzzy and Intelligent Systems
Iran Daylight Time (GMT +03:30)

Time	Monday, Feb/28/2022
08:30-11:30	**Fuzzy and Grey Mathematical Programming** Dr. Seyyed Hadi Nasseri and Davood Darvishi, University of Mazandaran Chairman: Prof. Behrouz Fathi Vajargah
13:00-16:00	**Knowledge Graphs and their Applications in Intelligent Systems** Dr. Amin Anjomshoaa, National University of Ireland Galway Chairman: Dr. Marjan Kuchaki Rafsanjani

Time	Thursday, March/01/2022
08:30-11:30	**How can you have a successful Monte Carlo simulation in calculations?** Prof. Behrouz Fathi-Vajargah, University of Guilan Chairman: Dr. Seyyed Hadi Nasseri
13:00-16:00	**Blockchain technologies, cryptocurrencies and smart contracts** Prof. Hossein Nezamabadi-pour, Shahid Bahonar University of Kerman Chairman: Dr. Mahdi Eftekhari

Parallel Lectures

9th Iranian Joint Congress on Fuzzy and Intelligent Systems

Iran Daylight Time (GMT +03:30)

Special Session:
Fuzzy Optimization 1

Chairs: **Prof. Hasan Mishmast Nehi and Dr. Mahdi Allahdadi**

(Hall 1)
Day 1 (Wednesday, March 2, Time: 14:00-16:00, **(GMT +03:30)**)

Time	Author(s)	Title	Paper code
14:00-14:20	طاهره شکوهی، مهدی الله دادی و سمانه صردی زید	حل مسائل کنترل بهینه کسری بازه‌ای با استفاده از تبدیل لاپلاس	cfis2022-01090060
14:20-14:40	سمیرا سامانی‌فر، حسن میش‌مست‌نهی، حامد احمدزاده	الگوریتم ژنتیک برای پستچی چینی تحت شرایط نایقینی	cfis2022-00730112
14:40-15:00	شکوه سرگلزائی و حسن میش مست نهی	مسئله برنامه‌ریزی خطی فازی نوع-۲ بازه‌ای با ابهام از نوع وگنس در بردار منابع	cfis2022-00760113
15:00-15:20	Moslem Javanmard and Hassan Mishmast Nehi	Improving the Obtained Results of Monte Carlo Simulation for Interval Linear Programming Problem by Using Particle Swarm Optimization	cfis2022-00810115
15:20-15:40	Moslem Javanmard and Hassan Mishmast Nehi	Calculating the Range of Optimal Values of the Interval Linear Programming Problems: Comparing Genetic Algorithm with Monte Carlo Simulation	cfis2022-00810116
15:40-15:00	Niloofar Davoudi, Farhad Hamidi and Hassan Mishmast Nehi	Solving fuzzy bilevel linear programming problem based on interval approximation	cfis2022-00530120

Special Session:
AT for Good

Chair: **Prof. Mohammad-R Akbarzadeh-T**

(Hall 2)
Day 1 (Wednesday, March 2, Time: 14:00-16:00, **(GMT +03:30)**)

Time	Author(s)	Title	Paper code
14:00-14:20	Morteza Amini and Mir Mohsen Pedram	Application of Machine Learning Methods in Diagnosis of Alzheimer Disease Based on Fractal Feature Extraction and Convolutional Neural Network	cfis2022-02200172
14:20-14:40	Jafar A. Alzubi, AliAkbar Movassagh, Mehdi Gheisari, Hamid Esmaeili Najafabadi, Aaqif Afzaal Abbasi, Yang Liu, Zhou Pingmei, Mahdieh Izadpanahkakhk, AmirHossein Pourishaban Najafabadi	A Dynamic SDN-based Privacy-Preserving Approach for Smart City Using Trust Technique	cfis2022-00260008
14:40-15:00	محمدحسن خامه‌چیان، محمدرضا اکبرزاده توتونچی	شبکه‌های عصبی پیچشی برای تشخیص بیماریهای تنفسی	cfis2022-02020192
15:00-15:20	علی صالحی، محمدرضا اکبرزاده توتونچی، علیرضا روحانی‌منش	کنترل شبکه‌های تنظیم‌کننده ژن P53 مبتنی بر یادگیری تقویتی عمیق و کاربرد آن در بیماری سرطان	cfis2022-02060208
15:20-15:40	محمدحسن صفوی پور، محمدعلی دوستاری، حامد ساجدی	یک سیستم بیومتریک ترکیبی هایبرید مبتنی بر تلفیق ویژگیهای چهره، هر دو عنبیه و دو اثر انگشت	cfis2022-02190213
15:40-15:00	پری ناز نورمحمدی، مریم رحیمی هاشم آباد، مهسا زمانی تراشنده و محمدرضا اکبرزاده توتونچی	تشخیص گریه نوزاد از سایر صداهای محیط با استفاده از یادگیری عمیق	cfis2022-02550224

Session:
Text Processing and Social Networks

Chairs: **Dr. Mahmood Fazlali and soodeh Hosseini**

(HALL 3)
Day 1 (Wednesday, March 2, Time: 14:00-15:40, **(GMT +03:30)**)

Time	Author(s)	Title	Paper code
14:00-14:20	Mohsen Miri, Mohammad Bagher Dowlatshahi and Amin Hashemi	Feature selection for multi-label text data: An ensemble approach using geometric mean aggregation	cfis2022-01150073
14:20-14:40	Mohsen Miri, Mohammad Bagher Dowlatshahi and Amin Hashemi	Evaluation multi label fetaure selection for text classification using weighted borda count approach	cfis2022-01150075
14:40-15:00	Rashid Behzadidoost and Habib Izadkhah	An Ensembled Text-based Multi-Stacked-CNN-BILSTM for Rumor Detection on Social Media	cfis2022-01880141
15:00-15:20	وحید کیانی و مهدی رسولی	یک رویکرد ترکیبی مبتنی بر واژه‌نامه و یادگیری ماشین برای شناسایی هیجان در نظرهای کاربران فارسی زبان	cfis2022-02220179
15:20-15:40	Vahid Heidari and Seyed Mahmoud Taheri	Fuzzy Topic Modeling on Persian News	cfis2022-02650242

Special Session:
Fuzzy Numerical Analysis

Chairs: **Prof. Saeed Abbasbandy and Prof. Tofigh Allahviranloo**

(Hall 1)
Day 1 (Wednesday, March 2, Time: 17:30-19:10, **(GMT +03:30)**)

Time	Author(s)	Title	Paper code
17:30-17:50	Samira Fatemi, Ildar Sadeqi and Fridoun Moradlou	Minimizing a composite fuzzy function in terms of subgradient	cfis2022-00500054
17:50-18:10	S. Zabihi and R. Ezzati	Application of fuzzy generalized power series for the fuzzy linear inhomogeneous differential equation	cfis2022-02070167
18:10-18:30	Mohsen Miri, Mohammad Reza Balooch shahriari and Omolbanin Sedaghatfar	The fuzzy D'Alembert solutions of the fuzzy wave equation under generalized differentiability	cfis2022-01950230
18:30-18:50	Nguyen Phuong Dong, Hoang Viet Long and Nguyen Thi Kim Son	The Analysis of a Fractional Network-Based Epidemic Model with Saturated Treatment Function and Fuzzy Transmission	cfis2022-02760258
18:50-19:10	Estevao Esmi, Cristina Sacilotto, Vin´ıcius F. Wasques and Laecio C. Barros	Numerical solution for Interval Initial Value Problems based on interactive arithmetic	cfis2022-02790259

Special Session:

(Fuzzy) Logical algebraic structures 1

Chairs: **Dr. Saeedeh Zahiri and Dr. Saeed Mirvakili**

(Hall 2)

Day 1 (Wednesday, March 2, Time: 17:30-19:10, **(GMT +03:30)**)

Time	Author(s)	Title	Paper code
17:30-17:50	Mahmood Bakhshi and Mohadese Nazifi	Lattice-Valued fuzzy hyper ideals in hyper residuated lattices	cfis2022-00070166
17:50-18:10	Farideh Frasad and Arsham Borumand Saeid	Residuated lattice congruences via directed kernels	cfis2022-00860188
18:10-18:30	Farideh Frasad and Mohammad Ali Nourollahi	The Decomposition Theorems for Residuated Lattices via Directed Kernels	cfis2022-00860249
18:30-18:50	Mahta Bedrood, Farhad Sajadian and Arsham Borumand Saeid	Zero sets in MV -algebras of continuous functions	cfis2022-00470176
18:50-19:10	Simin Saidi Goraghani and Rajab Ali Borzooei	New results on prime A-ideals in MV -semimodules	cfis2022-00550039

Session:

Swarm Intelligence and Evolutionary Computation

Chairs: **Prof. Hossein Nezamabadi-pour and Dr. Mohammad Bagher Dowlatshahi**

(Hall 3)

Day 1 (Wednesday, March 2, Time: 17:30-19:30, **(GMT +03:30)**)

Time	Author(s)	Title	Paper code
17:30-17:50	سید سینا محمدی، محمد ملایی امام‌زاده، مجتبی برخورداری یزدی	آموزش شبکه‌های عصبی پیشرو با استفاده از الگوریتم بهینه‌ساز تعادل به‌منظور شناسایی سیستم غیرخطی	cfis2022-00570077
17:50-18:10	Majid Hadi, Reza Ghazizadeh	Communication-based Optimization Algorithm: A Meta-heuristic Technique for Solving Single-Objective Problems	cfis2022-00670035
18:10-18:30	Mostafa Mirzaei, Aliakbar Niknafs	A Novel Approach to Optimizing the Initial Path of Mobile Robots in Static Environments	cfis2022-01360140
18:30-18:50	حمیده فاطمی دخت، مرجان کوچکی رفسنجانی	مسیریابی مؤثر در شبکه های ویژه خودرویی براساس روش‌های پشتیبانی از هواپیماهای بدون سرنشین	cfis2022-01540111
18:50-19:10	Marjaneh Moghbeli Damaneh, Mahdieh Ghazvini, Omid Abedi, Mostafa Ghazizadeh Ahsaee	Power Allocation in CRNs based on QoS and QoE	cfis2022-02370194
19:10-19:30	Mahmoud A. El-Dabah, Salah Kamel, Mohamed Khamies, Hossein Shahinzadeh and Gevork B. Gharehpetian	Artificial Gorilla Troops Optimizer for Optimum Tuning of TID Based Power System Stabilizer	cfis2022-02440256

Special Session:
Fuzzy automata and graphs

Chairs: **Mohammad Mehdi Zahedi, Rajabali Borzooei and Arsham Broumand Saeed**

(Hall 1)
Day 2 (Thursday, March 3, Time: 08:00-10:20, **(GMT +03:30)**)

Time	Author(s)	Title	Paper code
08:00-08:20	S. H. Sadati, A. A. Talebi and H. Rashmanlou	Domination integrity in intuitionistic fuzzy graphs	cfis2022-00410033
08:20-08:40	Kh. Abolpour, M.M. Zahedi and M. Shamsizadeh	The characterization of LB-valued GFA via LB-valued operators	cfis2022-01340089
08:40-09:00	Javad Tayyebi and Hamid Bigdeli	Assignment problem on fuzzy graphs	cfis2022-01700127
09:00-09:20	Majid Khalili, Rajab Ali Borzooei	Notes on energy of matching in fuzzy graphs	cfis2022-00940139
09:20-09:40	Mohammad Mehdi Zahedi and Elham Raisi Sarbizhan	Some Properties of L-graphs	cfis2022-01670142
09:40-10:00	Elham Raisi Sarbizhan and Mohammad Mehdi Zahedi	The Behavior of L-graph Automata	cfis2022-01670148
10:00-10:20	محمدجواد عاقلی، محمد مهدی زاهدی و مرضیه شمسی زاده	اتوماتا L-فازی مردد در دسترس و هم-در دسترس	cfis2022-02000211

Session:

Intelligent Systems and its Applications 1

Chairs: **Prof. Maliheh Maghfouri and Farshid Keynia**

(Hall 2)

Day 2 (Thursday, March 3, Time: 08:00-09:40, **(GMT +03:30)**)

Time	Author(s)	Title	Paper code
08:00-08:20	Mohammad Mahdi Kalantari, Hossein Yektamoghadam and Amirhossein Nikoofard	A Fault Isolation Approach for Data-Driven Device Replacement Decision Making	cfis2022_01040052
08:20-08:40	پردیس پورسیستانی، مسعود سعید و حسین نظام‌آبادی‌پور	ارائه یک معیار شباهت ترکیبی جهت بهبود سیستم‌های مشارکت جمعی آیتم‌محور	cfis2022-01060056
08:40-09:00	Nasrin Hamiditabar, Abdolah Chalechale and Seyed Jahanshah Kabudian	Determining the Severity of Depression in Speech Based on Combination of Acoustic-Space and Score-Space Features	cfis2022-01760204
09:00-09:20	Zohreh Azani, Hossein Shahinzadeh, Shohreh Azani, Gevork B. Gharehpetian, Ersan Kabalci and Mohamed Benbouzid	An Aggregated Revenue-Driven VPP Model Based on Marginal Price Tracking for Profit Maximization	cfis2022-02440243
09:20-09:40	Tuan A. Z. Rahman, Leong Wen Chek and Nordin Ramli	Intelligent Vibration-based Anomaly Detection for Electric Motor Condition Monitoring	cfis2022-02570232

Session:

Statistics and Probability in Fuzzy

Chairs: **Dr. Abbas Parchami and Me'raj Abdi**

(Hall 3)

Day 2 (Thursday, March 3, Time: 08:00-09:00, **(GMT +03:30)**)

Time	Author(s)	Title	Paper code
08:00-08:20	Saeed Darijani and Hamid Bigdeli	Learning-based fuzzy c-means clustering using mixtures of Student's-t distributions with missing information	cfis2022-01530110
08:20-08:40	مهدیه مظفری، محمد خنجری و محمد قاسم اکبری	قابلیت اعتماد بر اساس α-شک اعداد فازی	cfis2022-01630129
08:40-09:00	Fereshteh Arad and Ayyub Sheikhi	Asymmetric distributions based on the t-copula	cfis2022-01990255

Special Meeting:
Copula Theory and Its Applications

Chairs: **Prof. Mohammad Amini and Ayyub Sheikhi**

(Hall 1)
Day 2 (Thursday, March 3, Time: 13:00-16:00, **(GMT +03:30)**)

Time	Author(s)	Title	Paper code
13:00-13:45	Fabrizio Durante	Invariant copulas under univariate truncation	Invited Speaker
13:45-14:30	Wolfgang Trutschnig	On quantifying and estimating directed dependence	Invited Speaker
14:30-14:40	Break		
14:40-15:05	Selim Orhun Susam	Improving the fit for diagonal copula based on Kendall's tau and tail dependence preserving Transformation	Invited Speaker
15:05-15:30	Elisa Perrone	Testing positive quadrant dependence with discrete copulas	Invited Speaker
15:30-15:55	Hossein Mohtashami	Multivariate ageing intensity	Invited Speaker
15:55-16:00	Closing		

Session:

Applications of optimization and operation research in fuzzy

Chairs: **Prof. Ali Torabi and Prof. Mohammad Ali Yaghoubi**

(Hall 2)

Day 2 (Thursday, March 3, Time: 14:00-16:00, **(GMT +03:30)**)

Time	Author(s)	Title	Paper code
14:00-14:20	فاطمه دلوچئی، سید میثم موسوی و احمد مینائی	یک مدل ریاضی دو هدفه فازی برای مسأله زمانبندی زنجیره بحرانی با در نظر گرفتن محدودیت بودجه و عدم قطعیت	cfis2022-00790043
14:20-14:40	Hamid Bigdeli and Javad Tayyebi	Multiobjective Zero-Sum Games in Intuitionistic fuzzy Environment	cfis2022-01700125
14:40-15:00	Salim Bavandi, Seyed Hadi Nasseri and Chefi Triki	A Fractional Multi-Commodity Network Flow Problem with Uncertain Multi-Choice Coefficients: Model Formulations and Solution Approach	cfis2022-02680250
15:00-15:20	بهنام امینی، علیرضا عیدی	مساله زمان‌بندی پروژه منابع محدود فازی با چندین تامین‌کننده	cfis2022-01200065
15:20-15:40	Moosa Darijani and Hani Fekri	Efficiency evaluation using fuzzy DEA-TOPSIS and possibility theory	cfis2022-02510220
15:40-16:00	Amirabbas Abouei Mehrizi and Tahereh Kordi Karimabadi	Location of fire station in Bam city using Fuzzy Analytic Hierarchy Process	cfis2022-01660260

Session:

Applications of optimization and operation research in fuzzy

Chairs: **Prof. Vali Derhami and Dr. Najmeh Mansouri**

(Hall 3)

Day 2 (Thursday, March 3, Time: 14:00-16:00, **(GMT +03:30)**)

Time	Author(s)	Title	Paper code
14:00-14:20	Amin Hashemi and Mohammad Bagher Dowlatshahi	An Ensemble of Feature Selection Algorithms Using OWA Operator	cfis2022-00980051
14:20-14:40	Amin Hashemi, Mohammad-Reza Pajoohan and Mohammad Bagher Dowlatshahi	Online streaming feature selection based on Sugeno fuzzy integral	cfis2022-00980219
14:40-15:00	نجمه نظری و محمدعلی یعقوبی	تغییر الگوریتم GRASP برای خوشه‌بندی داده‌ها	cfis2022-01650131
15:00-15:20	منصوره خالقی، شیما کاشف و حسین نظام آبادی پور	تحلیل الگوی مصرفی مشترکین برق با استفاده از خوشه بندی	cfis2022-01750163
15:20-15:40	الهام اسکندری و علیرضا خواستان	بررسی تاثیر بکارگیری توابع زیان مختلف بر عملکرد مدل خوشه‌بندی فازی برای داده‌های فازی در حضور داده‌های پرت	cfis2022-02330210
15:40-16:00	Reza Heydari Gharaei, Rasoul Sharify and Hossein Nezamabadi-pour	An efficient outlier detection method based on distance ratio of k-nearest neighbors	cfis2022-02520217

Special Session:

(Fuzzy) Logical algebraic structures 2

Chairs: **Dr. Akbar Rezaei and Dr. Mahmoud Bakhshi**

(Hall 1)

Day 2 (Thursday, March 3, Time: 17:30-19:10, **(GMT +03:30)**)

Time	Author(s)	Title	Paper code
17:30-17:50	Leila Shahbaz	Adjoint relations of S-fuzzy posets with some categories	cfis2022-00640137
17:50-18:10	Amin Ghodousian and Sara Zal	Latticized-Hamacher optimization problem subject to fuzzy relational equations	cfis2022-01070058
18:10-18:30	Saeide Zahiri and Arsham Borumand Saeid	Special types of NM-algebras	cfis2022-01130175
18:30-18:50	Marzieh Shamsizadeh, Mohammad Mehdi Zahedi and Khadijeh Abolpour	Intuitionistic Fuzzy Multiset finite Subautomata	cfis2022-01260093
18:50-19:10	Batoul Ganji Saffar	On P-torsion EQ-modules and P-cyclic EQ-modules	cfis2022-01300222

Session:
Machine Learning

Chairs: **Dr. Mahdi Eftekhari and Dr. Mohammad Ghasemzadeh**

(Hall 2)
Day 2 (Thursday, March 3, Time: 17:30-19:30, **(GMT +03:30)**)

Time	Author(s)	Title	Paper code
17:30-17:50	Mahvash Mohazzebi, Mahdi Eftekhari and Mahdi Shariatzadeh	How weight-sharing mechanisms affect the performance of deep Siamese networks	cfis2022-00820036
17:50-18:10	Maryam Nooraei Abadeh, Zahra Derakhshandeh and Mansooreh Mirzaie	An Efficient Collaborative Filtering for Recommendation Systems Using Differential Machine Learning	cfis2022-00970048
18:10-18:30	Habib Izadkhah	Detection of multiple emotions in texts using a new deep convolutional neural network	cfis2022-01880144
18:30-18:50	Hajar Mirzaei and Mohammad Reza Keyvanpour	Reinforcement Learning Reward Function for Test Case Prioritization in Continuous Integration	cfis2022-02080174
18:50-19:10	طه رستمی و سعید جلیلی	تابعی اکتشافی برای بهبود دقت پیش‌بینی برنامه‌های جهش‌یافته آشکار کننده خطا	cfis2022-02430201
19:20-19:30	Rasoul Sharify, Reza Heydari Gharaei and S. Mahmoud Taheri	Improved LOF Algorithm Using Random Point	cfis2022-02530218

Special Session:
Fuzzy Optimization 2

Chairs: **Prof. Hasan Mishmast Nehi and Dr. Farhad Hamidi**

(Hall 1)
Day 3 (Friday, March 4, Time: 08:00-10:00, **(GMT +03:30)**)

Time	Author(s)	Title	Paper code
08:00-08:20	Moslem Javanmard and Hassan Mishmast Nehi	A New Technique for Deciding on the Interval Type-2 Fuzzy Transportation Problem Based on Interval Linear Programming Problems	cfis2022-00810117
08:20-08:40	الناز حسینی، مهدی الله‌دادی، سمانه صردی‌زید	حل مسائل کنترل بهینه دارای عدم قطعیت	cfis2022-01270118
08:40-09:00	Hossein Jafari, Mohammad Javad Ebadi and Hamed Farahani	Weak solutions to fuzzy stochastic differential equations under sub-fractional Brownian motion	cfis2022-01430109
09:00-09:20	سیما سرگزی، حسن میش مست نهی	مروری بر انواع اعداد فازی و دسته بندی آنها با رویکرد رتبه بندی	cfis2022-01620159
09:20-09:40	امیر رحیمی، حسن میش‌مست نهی، فرانک حسین‌زاده سلجوقی	تعیین کارایی در تحلیل پوششی داده فازی با تقریب نزدیکترین بازه	cfis2022-01900165
09:40-10:00	Abazar Keikha	The new modifications of distance measures on hesitant fuzzy numbers	cfis2022-02050185

Session:
Bioinformatics

Chairs: **Prof. Mohammad-R Akbarzadeh-T and Marjan Kuchaki Rafsanjani**
(Hall 2)
Day 3 (Friday, March 4, Time: 08:00-09:40, **(GMT +03:30)**)

Time	Author(s)	Title	Paper code
08:00-08:20	حمید نصیری، غزل خیرالدین، مرتضی دری‌گیو	ارائه یک روش جدید مبتنی بر ترکیب ویژگی‌های استخراج شده از شبکه‌های عصبی عمیق DenseNet169 و MobileNet و دسته‌بندی‌کننده LightGBM به منظور تشخیص بیماری کرونا از روی تصاویر اشعه ایکس	cfis2022-00270023
08:20-08:40	مریم اله‌یاری، ولی درهمی، فاطمه جمشیدی	تشخیص اسکیزوفرنی بر اساس سیگنال الکتروانسفالوگرام با استفاده از یادگیری عمیق	cfis2022-00390026
08:40-09:00	Vida Esmaeili, Mahmood Mohassel Feghhi and Seyed Omid Shahdi	Early COVID-19 Diagnosis from Lung Ultrasound Images Combining RIULBP-TP and 3D-DenseNet	cfis2022-00830083
09:00-09:20	Hasan Hammad and Hassan Khotanlou	Detection and visualization of COVID-19 in chest Xray images using CNN and Grad-CAM (GCCN)	cfis2022-01810200
09:20-09:40	عارفه ولی اللهی، مهرداد کارگری و سید میثم علوی	ارائه یک سامانه توصیه‌گر مبتنی بر مدل برای بیماران مبتلا به پرفشاری‌خون	cfis2022-01920149

Special Session:

(Fuzzy) Logical algebraic structures 3

Chairs: **Dr. Fereshteh Forouzesh and Dr. Somayeh Motamed**

(Hall 1)

Day 3 (Friday, March 4, Time: 13:00-14:40, **(GMT +03:30)**)

Time	Author(s)	Title	Paper code
13:00-13:20	Reza Tayebi Khorami ,Arsham Borumand Saeid	Some Results in Projective System of BL-algebras	cfis2022-01470155
13:20-13:40	Fereshteh Forouzesh and Naser Hosseini	Soaker ideals in MV -algebras	cfis2022-01790132
13:40-14:00	Akbar Paad and Mahmood Bkhasi	Hyper Ideals in Hyper Equality Algebras	cfis2022-02320187
14:00-14:20	Akbar Paad and Azam Jafari	Folding Theory Applied to Integral EQ-alegbras	cfis2022-02320189
14:20-14:40	M. Mohseni Takallo, Y.B. Jun and R.A. Borzooei	True-False triangular norm and conorms and Its Application	cfis2022-02350236

Session:

Fuzzy Systems and its Applications

Chairs: **Dr. Mohammad Reza Mashinchi and Dr. Arash Sharifi**

(Hall 2)

Day 3 (Friday, March 4, Time: 13:00-14:20, **(GMT +03:30)**)

Time	Author(s)	Title	Paper code
13:00-13:20	Nazanin Zahra Joodaki, Mohammad Bagher Dowlatshahi and Mehdi Joodaki	A novel ensemble feature selection method through Type I fuzzy	cfis2022-01500114
13:20-13:40	Naser Padar, Mohammad Javad Mirzaei and Amir Abolfazl Suratgar	Adaptive TSK Fuzzy Terminal Sliding-Mode Control of Two Coupled Cart-Mounted Inverted Pendulums	cfis2022-01820162
13:40-14:00	Matine Hajyan1 and Amirhossein Nikoofard	Fuzzy Control of Autonomous Vehicle at Nonsignalized Intersection in Mixed Traffic Flow	cfis2022-01850156
14:00-14:20	Farzad Rastegar	A Novel Control Strategy Based on Fuzzy Logic in Islanded Microgrid	cfis2022-02580240

Session:
Machine Vision and Image Processing

Chairs: **Dr. Esmat Rashedi and Tayyebeh Askari**

(Hall 3)
Day 3 (Friday, March 4, Time: 13:00-15:00, **(GMT +03:30)**)

Time	Author(s)	Title	Paper code
13:00-13:20	Seyed Muhammad Hossein Mousavi and Seyed Muhammad Hassan Mosavi	A New Edge and Pixel-Based Image Quality Assessment Metric for Colour and Depth Images	cfis2022-00370022
13:20-13:40	Maryam Imani	Scattering and Regional Features Fusion Using Collaborative Representation for PolSAR Image Classification	cfis2022-00490029
13:40-14:00	Mobina Mosannafat, Fatemeh Taherinezhad, Hassan Khotanlou and Elham Alighardash	Farsi Text Detection and Localization in Videos and Images Based on YOLO object detection model	cfis2022-00950061
14:00-14:20	Meysam Alavi and Mehrdad Kargari	A new contrast enhancement method for Color dark and low-light images	cfis2022-01770145
14:20-14:40	Behnam Asghari Beirami	Face Recognition based on Multi-shape Morphological Profiles-based Covariance Descriptors and Log- Euclidean Kernel SVM	cfis2022-02210173
14:20-15:00	Zahra Famil Sattari, Hassan Khotanlou and Elham Alighardash	Improving Image Captioning with Local Attention Mechanism	cfis2022-02380195

Session:

Fuzzy Mathematical and Numerical Analysis

Chairs: **Prof. Reza Saadati and Prof. Azim Rivaz**

(Hall 1)

Day 3 (Friday, March 4, Time: 16:30-17:50, **(GMT +03:30)**)

Time	Author(s)	Title	Paper code
16:30-16:50	Gunther Jager	On the completeness of a quantale-valued metric space	cfis2022-00290011
16:50-17:10	R.Gholipour and H.Mazaheri	Best Proximity Point for Various Classes of Proximal Contraction Mapping in Fuzzy Metric Space	cfis2022-00440068
17:10-17:30	Safoura Rezaei Aderyani and Reza Saadati	Approximation of derivation--homomorphism fuzzy functional inequalities in matrix valued FC− ⋄-algebras	cfis2022-01720128
17:30-17:50	Samet Memiş, Serdar Enginoğlu and Uğur Erkan	Jaccard Pseudo-Similarity of Fuzzy Parameterized Fuzzy Soft Matrices and Its Application to Diagnosis of Parkinson's Disease	cfis2022-01740154

Session:
Intelligent Systems and its Applications 2

Chairs: **Dr. Mahdieh Ghazvini and Dr. Mohadese Soleimanpour-moghadam**

(Hall 2)
Day 3 (Friday, March 4, Time: 16:30-18:10, **(GMT +03:30)**)

Time	Author(s)	Title	Paper code
16:30-16:50	Seyed Aref Ayati and Hamid Reza Naji	A Secure mechanism to protect UAV communications	cfis2022-01510130
16:50-17:10	آذین ملایی درختنجانی، مرجان کوچکی رفسنجانی و آرشام برومند سعید	تحلیل بورس ایران با استفاده از اندیکاتورهای باندبولینگر و MACD	cfis2022-01600124
17:10-17:30	Mahdi Armoon, Marzie Lafouti and Amirhossein Nikoofard	Intelligent fault detection of planetary gearbox using vibration signal processing by empirical mode decomposition and an integrated artificial neural network-support vector machine classifier	cfis2022-02480207
17:30-17:50	مسعود مؤمنی کلاگری، مرجان کوچکی رفسنجانی و حمیده فاطمی‌دخت	بهبود ترافیک شهری در شبکه‌های بین خودرویی با استفاده از رویکرد پروتکل وضعیت-اتصال و شبکه‌های عصبی	cfis2022-02500226
17:50-18:10	Zahra Mohammadi	Modified Relay Node Placement in dense 3D Underwater Acoustic Sensor Networks	cfis2022-02670244

Posters:
(Panel 1)

Chairs: **Dr. Mohsen Arefi and Dr. Fatemeh Barani**

Day 1 (Wednesday, March 2, Time: 20:30-22:10, **(GMT +03:30)**)

Time	Author(s)	Title	Paper code
20:30-20:40	Mohammad Mohseni Ahad and Touba Hamoule	Intelligent Transmitter: Analysis of Effective parameters on Sensor Response of Gas Transmitter to Enhancement Measurement Accuracy by Intelligent Corrective Model Based on Artificial Neural Network	cfis2022-00400028
20:40-20:50	Zahra Moradi Pour and Mohammad Reza Yamaghani	Intelligent detection of bone fractures using data mining and image processing methods	cfis2022-00870053
20:50-21:00	معصومه صادق‌پور و افشین ابراهیمی	شناسایی بی‌درنگ حالات عاطفی چهره با روش یادگیری عمیق	cfis2022-01010055
21:00-21:10	سبا عسکری نوغانی، ناصر پریز و محمد باقر نقیبی سیستانی	پیاده سازی‌یادگیری تقویتی عمیق برای کنترل هوشمند مبدل افزاینده	cfis2022-01190063
21:10-21:20	Bahare Seifi, Mahsa Barfi and Mansour Esmaeilpour	ECG-Based Prediction of Epileptic Seizures Using Machine Learning Methods	cfis2022-00840072
21:20-21:30	سید محمد موسوی و سوده حسینی	شناسایی بیماری COVID-19 با استفاده از شبکه عصبی پیچشی	cfis2022-01640119
21:30-21:40	حمیدرضا ناجی و بهنام رضائی بزنجانی	ارائه یک روش تلفیقی مبتنی بر سیستم های چندعاملی در تصاویر ماموگرافی جهت تشخیص زود هنگام بیماری سرطان پستان	cfis2022-01350147
21:40-21:50	فرید شریف مقدم و سید علیرضا بشیری موسوی	نقش پایه‌ای اینترنت اشیا در مدیریت هوشمند فرآیندهای صنعت کشاورزی	cfis2022-02280184
21:50-22:00	محسن جعفری، ملیحه مغفوری فرسنگی	تنظیم‌کننده خودکار چندهدفه آنلاین داده‌محور برای سیستم کنترل یادگیر تکرارشونده با استفاده از الگوریتم بهینه‌یابی ازدحام ذرات	cfis2022-01380225
22:00-22:10	Keyvan Asefpour Vakilian	A Nitrate Enzymatic Biosensor based on Optimized Machine Learning Techniques	cfis2022-02590238

Posters:
(Panel 2)

Chairs: **Dr. Hamed Ahmadzadeh and Dr. Mina Mirhosseini**

Day 2 (Thursday, March 3, Time: 20:30-22:10, **(GMT +03:30)**)

Time	Author(s)	Title	Paper code
20:30-20:40	Simin Saidi Goraghani and Rajab Ali Borzooei	New results on MV-semimodules	cfis2022-00550038
20:40-20:50	Mohammad Hamidi and Marzieh Rahmati	On NEUTRO G-SUBALGEBRA	cfis2022-01020074
20:50-21:00	Parvaneh Lo′lo′ and Ehsan Movahednia	Fuzzy stability of involutions via fixed point technique	cfis2022-00930090
21:00-21:10	حسن میش مست نهی، عبدالله هادی	حل مسئله برنامه‌ریزی خطی کروی فازی	cfis2022-02700254
21:10-21:20	حمیده ایرانمنش، عباس پرچمی، مهدی جباری نوقابی و بهرام صادق‌پور گیلده	کاربردی از شبیه‌سازی مونت کارلو در آزمون کیفیت شیشه خودرو	cfis2022-02160193
21:20-21:30	Zahra Hossein-Nejad and Mehdi Nasri	Object Recognition based on Graph theory and Redundant Keypoint Elimination Method	cfis2022-01110059
21:30-21:40	یکتا نصیری‌پور ، سعیده انبایی فریمانی و مجید وفایی جهان	تشخیص اخبار جعلی مبتنی بر ترکیبی از ویژگی‌های زبانی و صفات گوینده خبر	cfis2022-01710152
21:40-21:50	Seyed Muhammad Hossein Mousavi and Atiye Ilanloo	Seven Staged Identity Recognition System Using Kinect V.2 Sensor	cfis2022-00370177
21:50-22:00	Raana Beigmohamadi	Fractional entropy and its applications in fuzzy c-means clustering	cfis2022-02470206
22:00-22:10	ساناز جراحی، صادق سلیمانی	گامی فراتر در پیشگویی پیوند: یک مرور سیستماتیک بر پیشگویی پیوند چندلایه	cfis2022-02540223

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72	A New Approach for Solving the Interval Type-2 Fuzzy Transportation Problem Based on interval Linear Programming Problems
73	Weak solutions to fuzzy stochastic differential equations under sub-fractional Brownian motion
74	The new modifications of distance measures on hesitant fuzzy numbers
75	A New Edge and Pixel-Based Image Quality Assessment Metric for Colour and Depth Images
76	Scattering and Regional Features Fusion Using Collaborative Representation for PolSAR Image Classification
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79	Face Recognition based on Multi-shape Morphological Profiles-based Covariance Descriptors and Log- Euclidean Kernel SVM
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83	An Ensembled Text-based Multi-Stacked-CNN-BILSTM for Rumor Detection on Social Media
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106	Intuitionistic Fuzzy Multiset finite Subautomata
107	On P-torsion EQ-modules and P-cyclic EQ-modules
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Domination integrity in intuitionistic fuzzy graphs

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Abstract— Among all other graph parameters, graph integrity is a well-known measure of the vulnerability of the network. The effectiveness of the network decreases with the breaking down of some vertices or links. Therefore, a less vulnerable communication network is required for greater stability. Vulnerability is the measure of the resistance of the network after the failure of communication links. A new vulnerability parameter, domination integrity of fuzzy graph is defined to study the stability and domination property of fuzzy graphs. In this paper, we studied the concept of domination integrity in IFGs and investigated some of its properties. We also introduced domination weak integrity in the IFG and studied some of the results.

Keywords— *Intuitionistic fuzzy graph, dominating set, domination integrity, domination weak integrity.*

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Notes on energy of matching in fuzzy graphs

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Abstract— In this paper, by defining algebraic structures on a matching in fuzzy graphs, we will introduce the energy of matching. These structures will begin by defining specific incidence matrices that are built on the matching. In the algebraic properties of these definitions, relationships with fuzzy numbers of a matching will be observed.

Keywords— *energy, incidence matrix, matching edge number, matching vertex number, generator sequence.*

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The characterization of L^B −valued GFA via L^B −valued operators

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Abstract— The current research work focuses on investigating L^B-valued general fuzzy automata theory on the basis of t-norm/t-conorm and general implicators and investigate their algebraic and L^B-valued topological properties. Specifically, we associate L^B-valued co-topologies/topologies for a given L^B-valued general fuzzy automaton and further apply these notions to distinguish and differentiate some concepts related to algebraic issues.

Keywords — *L^B-valued general fuzzy automata, topology, Alexandroff, continuous, operator.*

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Some Properties of L-graphs

Mohammad Mehdi Zahedi and Elham Raisi Sarbizhan

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Abstract—This paper introduces a graph built on a residual lattice called the L-graph. It determines the notion of the strong L graph. It introduces new concepts, such as direct sum and direct product of two L-graphs. The L-graphs have many applications. For instance, they help determine the minimum number of hospitals equipped with all the treatment wards needed. Accordingly, some related theorems have been proven and several examples have been provided to illustrate these new concepts.

Keywords *—L-graph, strong L-graph, direct product of two L-graph.*

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Assignment problem on fuzzy graphs

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Abstract— The assignment problem is the earliest combinatorial optimization problem, in which the decision maker has to assign some agents to some tasks in a way that the total cost is minimized. From the vision of graph theory, the problem is the same matching problem defined on a bipartite graph. This paper addresses a natural extension of the problem, in which the underlying graph is a fuzzy graph. This extension is meaningful in some applicable situations that there are one expert's opinions about the relative importance of any agent (task) and the relative satisfactory of any imputation. The goal of the decision maker is to make a decision not only regrading the costs, but also the expert's opinions. This paper concentrates on solving this problem. It first models the problem as a triobjective optimization. Then, the $\in$-constraint method is applied to propose an efficient algorithm for finding a compromise solution.

Keywords *— Assignment problem, fuzzy graphs, satisfactory solution.*

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The Behavior of L-graph Automata

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Abstract— This paper first introduces the L-graph automaton built on an L-graph using a zero-constraint set. Then, we study the behavior of the corresponding automaton when the L-graph is a path L-graph (cycle, complete, fully bipartite). These L-graph automata have some applications in various fields. One of them is the identification of drugs that have the most similar side effects. These concepts and applications have been illustrated with some examples.

Keywords *—L-graph, L-graph automaton, the behavior of the L-graph automaton.*

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Communication-based Optimization Algorithm: A Meta-heuristic Technique for Solving Single-Objective Problems

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Abstract— In this paper, a science-inspired meta-heuristic optimization algorithm is proposed and called communication-based optimization algorithm (COA). The COA originates from the power allocation policy to users in non-orthogonal multiple access (NOMA)-based wireless communication networks. Four main steps of COA such as channel gain of users, power allocation, velocity of users and movement mechanism are modeled for equipping the COA with high exploration and exploitation phases. The COA is evaluated with standard mathematical test problems and compared with PSO, GSA, MFO, SSA, and FDA. The results show that the proposed algorithm is very competitive compared to well-known algorithms and in some cases its performance outperforms other meta-heuristic techniques, significantly.

Keywords-*Meta-heuristic, communication-based optimization algorithm, power allocation, NOMA, channel gain.*

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A Novel Approach to Optimizing the Initial Path of Mobile Robots in Static Environments

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Abstract—Path planning is one of the most important tasks for autonomous mobile robots. The purpose of path planning is to find a collision-free path from a starting position to a target position due to specific criteria such as distance. This paper proposes a modified path improvement algorithm based on the former and later points. In the initial path, some points are randomly placed on the line segments that have the necessary condition. New positions of points in the path are calculated by their adjacent points. This approach explores the most optimal path between different values of angle for the different number of segments. A method is proposed in which the initial path in the line segments that contain the turns adheres to the obstacles in the way. This operation makes a shorter path. Experiments are conducted on six maps and the results indicate that the proposed method achieves a considerable optimization in the final path.

Keywords—*mobile robot, global path planning, autonomous navigation, particle swarm optimization, heuristics, motion planning.*

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Power Allocation in CRNs based on QoS and QoE

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Abstract— In Cognitive Radio Networks, secondary users have access to the channel Opportunistically. So, it must be ensured that the severe interference, that damages the main network, does not occur. Using the resource allocation methods provides the best access to the spectrum for the secondary users, increases their performance, and primary users are protected from collisions. The Underlay method is one of the methods of the Cognitive Radio Network. In this method the secondary and the primary users simultaneously present in the channel. The power allocation in an underlay Cognitive Radio Network, may ensure that the secondary users do not interfere with the primary users. Using optimization techniques is a way to improve the performance of these networks. The NSGA-III algorithm, a multi-Objective optimization method, is efficient and offers acceptable results. This paper presents a power allocation method in the Underlay Cognitive Radio Networks based on the improvement of QoS and QoE, using the NSGA-III algorithm.

Keywords- *Cognitive Radio Networks, Underlay, Power Allocation, QoS, QoE, NSGA-III.*

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Artificial Gorilla Troops Optimizer for Optimum Tuning of TID Based Power System Stabilizer

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Abstract— The artificial gorilla troops optimization (GTO) is a recently-introduced metaheuristic optimization technique for non-linear, non-convex and non-smooth problems with multiple types of variables. This algorithm, which is a nature-based technique, has been inspired by the social intelligence of gorilla troops. This study delves into how optimal can a power system stabilizer (PSS) unit be tuned incorporating GTO algorithm. The Integral Time Square Error (ITSE) was utilized as a fitness function, which desirably should be minimized. Four different controllers are employed to investigate the model of a single-machine scheme as a model for the infinite bus. The tilt-integral-derivative (TID) shows a better performance response in comparison with the PID controller, lead-lag controller, as well as fractional-order PID controller (FOPID) investigated. The results have implied that the GTO algorithm has obtained faster convergence over the other compared optimization techniques, while it has superiority in not trapping in local optimum points. It has shown also a high level of precision.

Keywords- *SMIB, Tilt-integral-derivative (TID), Artificial gorilla troops optimization (GTO), power system stabilizer (PSS), Integral Time Square Error (ITSE).*

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Learning-based fuzzy c-means clustering using mixtures of Student's-t distributions with missing information

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Abstract— In this paper is proposed a clustering algorithm, based on a fuzzy treatment of finite mixtures of multivariate Student's-t distributions, using Learning-based fuzzy c-means (LB-FCM) algorithm as well as missing data. We construct a robust LB-FCM framework for handling missing data assuming the finite mixture Student's-t distributions. Comparisons between LB-FCM and EM-type algorithms are made. Experimental results and comparisons actually demonstrate the advantage of the proposed LB-FCM.

Keywords- *Asymmetry, Fuzzy clustering, Images processing, Learning-based fuzzy clustering.*

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Asymmetric distributions based on the *t*-copula

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Abstract— Assuming that $C_{X,Y}$ is the copula function of X and Y with marginal distribution functions $F_X(x)$ and $F_Y(y)$, in this work we study the selection distribution $Z =^d (X|Y > \mu_y)$. We present some special cases of our proposed distribution, among them, skew-*t* distribution. The simulation results showed that the distribution presented in this paper works better according to the measurement criteria.

Keywords- *copula, selection distribution, skew-t, t-copula.*

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On the Completeness of a quantale-valued metric space

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Abstract— Quantale-valued metric spaces generalize both metric spaces and probabilistic metric spaces. In this paper, we study a completeness concept for quantale-valued metric spaces from the viewpoint of quantale-valued Cauchy tower spaces.

Keywords— *Quantale-valued metric space, quantale-valued Cauchy tower space, completeness.*

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Best Proximity Point For Various Classes of Proximal Contraction Mapping In Fuzzy Metric Space

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Abstract— We discuss the class of proximal contraction mappings, and we show that this singularity of best proximity point results for such mapping, is a directly concluded from its fixed-point theory.

Keywords— *Best proximity point, Fixed point, Non-Archimedean fuzzy metric space.*

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Approximation of derivation–homomorphism fuzzy functional inequalities in matrix valued FC-⋄-algebras

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Abstract— We introduce and solve two different additive-additive (α, β)−fuzzy functional inequalities. In addition, we investigate derivations and homomorphisms on matrix valued FB-algebras and unital matrix valued FC-⋄-algebras, associated to the additive-additive (α, β)−fuzzy functional inequalities. Finally, as an application, we introduce new fuzzy control functions.

Keywords— *Derivation and homomorphism, matrix valued FC-⋄-algebras, additive-additive (α, β)-fuzzy functional inequalities*.

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Jaccard Pseudo-Similarity of Fuzzy Parameterized Fuzzy Soft Matrices and Its Application to Diagnosis of Parkinson's Disease

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Abstract—This paper introduces a new similarity measure of fuzzy parameterized fuzzy soft matrices (fpfs-matrices), i.e., Jaccard pseudo-similarity of fpfs-matrices. We then provide its basic properties. Afterwards, we apply it to the diagnosis of Parkinson's Disease (PD), improving a machine learning (ML) approach. Next, we compare our approach with the well-known ML approaches, such as Naïve Bayes, ***k***-Nearest Neighbor (***k***NN), Support Vector Machine (SVM), Fuzzy ***k***NN, Decision Trees (DT), Boosted Trees (BT), Adaptive Boosting Tree (AdaBoost), and Random Forest (RF) in terms of accuracy, specificity, and sensitivity. The results manifest that the proposed approach makes a more accurate diagnosis of PD than the others.

Keywords– *soft sets; fpfs-matrices; similarity measure; Parkinson's disease; machine learning.*

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Minimizing a composite fuzzy function in terms of subgradient

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Abstract— The purpose of this paper is expression of the concepts of directional derivative, gradient and subdifferential of fuzzy mappings from $\mathbb{R}^n$ into F_0. Moreover, we study optimality conditions for the minimizing problem for the composite of fuzzy mappings.

Keywords—*Fuzzy number, Fuzzy mapping, Directional derivative, Differential, Subdifferential, Minimizing a composite fuzzy mapping.*

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The fuzzy D'Alembert solutions of the fuzzy wave equation under generalized differentiability

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Abstract— In this paper, we solve a one-dimensional homogeneous fuzzy wave equation with an analytical procedure using the fuzzy D'Alembert method by considering the generalized differentiability. Then, some definitions related to fuzzy numbers, theorems, and used lemmas are given. Additionally, the physical interpretation and dependency domain of fuzzy wave solutions are investigated by providing examples, where the fuzzy wave solutions are in the form of fuzzy standing, traveling, and recursive waves.

***Keywords*—**Generalized Hukuhara differentiability; Fuzzy partial differential equation; Fuzzy wave equation; Fuzzy D'Alembert method.

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Application of fuzzy generalized power series for the fuzzy linear inhomogeneous differential equation

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Abstract— In this paper, fuzzy linear Inhomogeneous differential equation under generalized Hukuhara differentiability with real coefficients is solved. For this purpose, we used of fuzzy generalized power series to solved this problem. Since in the discussion of fuzzy generalized power series, the concept of the fuzzy absolute convergence is one of the most important and fundamental concepts. In addition, an ordinary points, singular points and irregular singular points of the fuzzy second-order differential equation with a real coefficient is introduced. To complete the discussion, it has been shown that uniqueness of the solution of the fuzzy linear inhomogeneous second-order differential equations with real coefficients in the form of a fuzzy generalized power series by attention to the type of generalized differentiability is shown.

Keywords-*Fuzzy Analytic Function, Fuzzy Generalized Power Series, Fuzzy Absolute Convergence, Fuzzy Linear Inhomogeneous Differential Equation.*

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The Analysis of A Fractional Network-Based Epidemic Model with Saturated Treatment Function and Fuzzy Transmission

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Abstract— In this work, a fractional network-based SIRS epidemic model with saturated treatment function and fuzzy transmission are introduced to characterize the malware attacking on complex heterogeneous networks. By using next-generation method, the threshold value $\mathcal{R}_0$, namely basic reproductive ratio, is obtained, that determines not only the existence of endemic equilibrium E_* but also the asymptotic stability of the model's equilibrium points. The theoretical results indicates that the value $\mathcal{R}_0$ significantly depends on the topology structure of the underlying network and the malware load. Some graphical simulations are presented to illustrate the analytical results.

Keywords-*fractional network-based epidemic model, fuzzy transmission, basic reproduction number, malware-free equilibrium, endemic equilibrium, asymptotic stability.*

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Numerical solution for Interval Initial Value Problems based on interactive arithmetic

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Abstract— This work presents a study of Interval Initial Value Problems (IIVPs), where the derivative is given by the generalized Hukuhara derivative (gH-derivative) and the initial condition is given by an interval. The focus of the paper is to provide the numerical approximations for the solutions associated with the gH-derivative of IIVPs. This article considers the Euler numerical method, where the classical arithmetic operation presented in the method is adapted for intervals. The arithmetic considered here is obtained from the sup-J extension principle, where J is a particular family of joint possibility distributions. This family gives raise to different types of interactivity and this work shows what kind of interactivity is necessary in the numerical method, in order to approximate the solution via gH-derivative. To illustrate the results, the paper focuses in the decay Malthusian model.

***Keywords*-**Interval initial value problem, Generalized Hukuhara derivative, Euler method, Malthusian model, Interactivity

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Solving fuzzy bilevel linear programming problem based on interval approximation

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Abstract— In this paper, we propose a method for solving fuzzy bilevel linear programming problem (BLPP) that all parameters are triangular fuzzy numbers (TFNs). First, we transform fuzzy BLPP to interval BLPP. In the next step, we present an algorithm that by using it, the solution of fuzzy BLPP is obtained as TFN.

Keywords— *Bilevel linear programming problem, Fuzzy Numbers, Interval approximation.*

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Improving the Obtained Results of Monte Carlo Simulation for Interval Linear Programming Problem by Using Particle Swarm Optimization

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Abstract— In this paper, we consider interval linear programming problem with equality constraints. Since each interval linear programming problems have an infinite number of characteristic models. We are just looking for the set of all optimal values (best and worst value of the objective function). Computing the best value of the objective function is easy, but obtaining the worst value of the objective function is NP-hard. In this research, firstly, we determine range of optimal values of the objective function and then we obtain it, via particle swarm optimization method. Finally, we provide one numerical example to verify and compare the obtained results of it with the obtained results through Monte Carlo simulation and the exact optimal values.

Keywords—*exact optimal values, interval linear programming, Monte Carlo simulation, particle swarm optimization.*

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Computing the Range of Optimal Values of Interval Linear Programming Problems: Comparing Genetic Algorithm with Monto Carlo Simulation

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Abstract— In many real-world problems, system parameters or model coefficients may be bounded between lower and upper bounds due to a variety of uncertainties. Over the past decades, intensive research efforts have focused on interval problems by two sub-models to tackle such uncertainties. In most of methods, interval problems by two sub-models (best and worst models) with deterministic parameters are formulated. Computing the best value is easy, but obtaining the worst value is very complicated or even impossible. In this article, we obtain the optimal range of interval problem via genetic algorithm and present one illustrative example to verify and compare the obtained results of it with the obtained results through Monte Carlo simulation and the exact optimal values.

Keywords—*exact optimal values, genetic algorithm, interval linear programming, Monte Carlo simulation.*

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A New Approach for Solving the Interval Type-2 Fuzzy Transportation Problem Based on interval Linear Programming Problems

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Abstract— In real world problems, the parameters of the solid transportation problems (supply, demand and capacity of vehicles) are not always accurate. Therefore, in dealing with these problems due to the existence of uncertainty and ambiguity in the data should use fuzzy optimization. Hence, in the main part of fuzzy optimization, we need to model and solve fuzzy programming problems that its parameters are interval type-2 fuzzy numbers. While, the studies on model of interval type-2 fuzzy linear programming problem have been very limited. So, in this paper, we consider the solid transportation problem that its parameters are interval type-2 triangular fuzzy numbers. Then, we proposed a new approach to solve it by extension the concept of the nearest interval approximation. Finally, in special case, we explain and analyze the numerical example of interval type-2 fuzzy solid transportation problem.

Keywords—*best-worst cases; interval linear programming; interval type-2 fuzzy linear programming; solid transportation problem; nearest interval approximation.*

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Weak solutions to fuzzy stochastic differential equations under sub-fractional Brownian motion

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Abstract— In this paper, the fuzzy stochastic differential equations (FSDEs) driven by sub-fractional Brownian motion (sfBm) are considered which are applied to describe phenomena subjected to randomness and fuzziness simultaneously. The sfBm is known as an extension of the Bm that preserves numerous attributes of fractional Brownian motion (fBm), but not the stationary of the increments. This property makes sfBm a possible candidate to models involving non-stationary increments, self-similarity, and long-range dependence which is suitable for the construction of stochastic models in finance and non-stationary queueing systems. We introduce an approximation approach to the fractional stochastic integrals, and a decomposition of the sfBm to find the existence and uniqueness of the weak solutions.

Keywords—*Fuzzy sets, Sub-fractional Brownian motion (sfBm), Fuzzy stochastic integral (FSI), Stochastic differential equation (SDE), Picard iteration method.*

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The new modifications of distance measures on hesitant fuzzy numbers

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Abstract— Uncertainty as an important factor in modeling and solving practical problems, absorbed many attentions, and then many tools have been proposed to model it scientifically. Hesitant fuzzy sets are one of these tools which are suitable when the decision maker is able to expresses her/his hesitation degrees by finite number of quantities from interval [0, 1]. Hesitant fuzzy numbers are special case of hesitant fuzzy sets that have been used to solve organized complexity problems. In this paper, new types of three famous distance functions, i.e., Hamming distance, Euclidean distance, and Generalized distance functions will be defined. Then, a numerical is used to shows the impact of the new concepts comparatively with previous ones.

Keywords—*Hesitant fuzzy sets, Hesitant fuzzy numbers, Hamming distance, Euclidean distance, Generalized distance*

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A New Edge and Pixel-Based Image Quality Assessment Metric for Colour and Depth Images

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Abstract— Measuring the quality of digital image is a complicated and importance task in image processing. Pixel and edge-based metrics are so crucial in dealing with a digital image. So, combination of edge and pixel features could handle not all but, almost all aspects of an image. Most recently using edge-based image quality metrics are popular, due to weakness of traditional image quality assessment metrics such as Peak Signal-to Noise Ratio. Also, most of the image quality metrics are belonged to color images, but recently new metrics for depth images are emerged. This paper proposes a new Full-Reference image quality assessment metric for color and depth images, which works based on edge and pixel features. Proposed method is a combination of improved Edge Based Image Quality Assessments and Peak Signal-to Noise Ratio methods. Proposed method is called Edge and Pixel-based Image Quality Assessment Metric (EPIQA). The system is validated using famous and benchmark performance metrics or quality measures such as Spearman Rank-Order Correlation Coefficient (SROCC), along with comparison with other similar methods on well-known related databases. Color databases have proper and diverse number of noises, but there is no proper depth noisy database, which it is decided to make one. Proposed method returned promising and satisfactory results in different tests.

Keywords- *Image Quality Assessment (IQA) metric; Full-Reference (FR) metric; Edge and Pixel-based Image Quality Assessment (EPIQA); Depth Image Quality Metric.*

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Scattering and Regional Features Fusion Using Collaborative Representation for PolSAR Image Classification

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Abstract— While the collaborative representation has been used for classification of multi-channel images in several works, it is suggested for scattering and spatial features fusion of polarimetric synthetic aperture radar (PolSAR) images in this work. With considering a neighboring region around each pixel of the PolSAR image, its approximation is computed by its adjacent samples in the local region by solving a convex optimization problem. The samples with more similar scattering characteristics will have more important role in the pixel representation. The obtained collaborative representation can be considered as a fused polarimetric-contextual feature space, which can be given to any arbitrary classifier. The experimental results on three real PolSAR images show the good performance of the fused feature space in providing a clear and accurate classification map.

Keywords— *PolSAR, feature fusion, classification, collaborative representation.*

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Farsi Text Detection and Localization in Videos and Images Based on YOLO object detection model

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Abstract—Automatic text detection and recognition in images and videos have emerged and aroused widespread interest in recent years due to the dramatic growth of visual information. It seems that there is the lack of any effective model for Farsi text detection in images. In this paper, a new framework is proposed for the Farsi text detection and localization using the up-to-date real-time object detection framework YOLOv5 in videos and images. To evaluate the novel model, a new dataset of news videos is collected. Experimental results show that the proposed model achieves quite promising performance on the new dataset.

Keywords-*text detection; Farsi (Persian) text; YOLO.*

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A new contrast enhancement method for Color dark and low-light images

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Abstract— Image contrast enhancement is a preprocessing phase that improves the performance of image processing applications such as pattern recognition and computer vision. Many images have poor quality due to low- luminance and low-contrast, which must be changed before further processing. It is significant for medical imaging because the low-light intensity makes it challenging to diagnose and analyze specific diseases accurately. In addition, when the depth information of a low-light image is unknown, the drawback of illumination enhancement becomes very challenging. Since Contrast enhancement of low-light images with non-uniform illumination is complex, it may lead to inefficient contrast enhancement methods. In other words, in such cases, if contrast enhancement methods are used to increase the contrast of dark areas, the bright regions become over-enhanced, which may lead to the disappearance of the details of these areas. Given this problem, in this paper, a new method is proposed to increase the image contrast that can improve the contrast in both areas of the image without adversely affecting the details of the image. The result represented the efficiency of proposed methods compared to other image enhancement methods based on full-reference and no-reference metrics such as PSNR, MSE, NIQE, and BRISQUE.

Keywords- *image processing, image enhancement, contrast enhancement, low-light images.*

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Face Recognition based on Multi-shape Morphological Profiles-based Covariance Descriptors and Log-Euclidean Kernel SVM

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Abstract—Face recognition (FR) is one of the important areas of image processing that allows us to recognize individuals from gathered face images. It has been shown in the literature that contextual information of the face can improve the performance of FR algorithms. This paper proposes an efficient face recognition method based on multi-shape morphological profiles (MMPs), covariance descriptors, and log-Euclidean kernel SVM. In the first stage of this method, MMPs containing contextual information are generated from the original faces. The covariance descriptors of the MMPs are produced in the subsequent stage. Finally, these covariance descriptors are classified using log-Euclidean kernel SVM. To compare the findings, we ran our tests on ORL face dataset. The mean accuracy of the proposed method is 96.4 on the ORL face datasets, respectively, demonstrating that the proposed method outperforms some of the existing state-of-the-art FR methods.

Keywords- *Face recognition, Covariance descriptor, Morphological profiles, SVM.*

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Improving Image Captioning with Local Attention Mechanism

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Abstract— Image caption generation is an interdisciplinary field of research in machine vision and natural language processing. Based on the results of studies and reported accuracy, this is a difficult task for the machine to perceive the image like a human. Most of the proposed methods in the field of image description production follow the encoder-decoder framework. In these methods, each word is generated based on the characteristics of the image and the previously generated words. Recently, the attention mechanism, which usually creates a spatial map that highlights the image areas associated with each word, is widely used in researches. In this paper, the encoderdecoder framework is used. The encoder part of the model will use ResNet to extract the global features and the decoder part consists of three important parts: Attention-LSTM, Language-LSTM, and Attention-layer. The attention mechanism uses local evidence to better demonstrate features and reasoning in the generation of image descriptions. Our method was able to improve the evaluation metrics of METEOR, ROUGH well.

Keywords-*component; deep learning; image captioning; attention mechanism; encoder-decoder.*

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Feature selection for multi-label text data: An ensemble approach using geometric mean aggregation

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Abstract—Text datasets have many terms, which decrease the classification accuracy. According to the high-dimensional text data, there are more challenges for these methods. Each classification method has strengths and weaknesses in its feature selection function. Therefore, ensembling should be used for better classifications and exploitation of strengths. In this paper, for the first time, we have presented an ensemble multi-label (ML) feature selection method for the text datasets using the Geometric-Mean (GM) aggregation approach. For this purpose, we have used four multi-label feature selection (MLFS) algorithms with different structures to achieve a good result. Then, the performance and results obtained by the GM method are compared with the four algorithms and based on the six classification criteria on three ML datasets with text domains. According to the obtained outputs, it is possible to realize the ability of the GMA (proposed method) method in using strengths and ignoring weaknesses in the path of feature selection, and be more accurate. Finally, according to experiments and obtained results, superiority of the GMA over other methods can be well seen.

Keywords- *Ensemble learning, Multi-label feature selection, Text classification, Geom-mean aggregation.*

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Evaluation multi label fetaure selection for text classification using weighted borda count approach

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Abstract—Due to the existence of text data, multi-label (ML) text classification is an essential task in machine learning. Feature selection is an essential and effective preprocess to enhance the learning process. Choosing a Multi-Label Feature Selection (MLFS) algorithm is the most basic, critical, and sensitive choice in ML classification operations. If this choice is based on a criterion, it cannot be attributed to always being sound. Choosing the best algorithm must be evaluated using several different criteria to be examined from different aspects. In this article, we turn the issue into an election and use the Weighted Borda Count method for voting. We do the voting in three stages continuously so that a subset of different features does the voting. In the second stage, voting of different methods is done with six criteria, and each criterion selects the methods in order of priority from the beginning to the end. Voting steps 1 and 2 are performed on eighteen text datasets used. Finally, in the final voting stage, the methods are evaluated and voted on by different text datasets. The final result of the voting in the third stage shows the desired MLFS methods based on their performance from beginning to end. According to the experiments performed and the results obtained, it can be seen that the selection of the algorithm based on several different criteria and considering the overall performance of the algorithm will be better than the selection based on one criterion.

Keywords- *Multi-label feature selection, Text classification, Weighted Borda Count,Voting.*

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An Ensembled Text-based Multi-Stacked-CNN-BILSTM for Rumor Detection on Social Media

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Abstract— Social networks heave became a part of people's life. Although there are many positive sides like eCommerce and easy communication through social networks, the existence of rumors is the negative side of social networks. With the least effort, a rumor can be quick to many users disseminated leading to unpleasant social phenomena. In the literature, there are some machine learning and deep learning approaches to automatically detect rumors. Most of the previous works fail to detect the rumors in high performance. In this paper, we present an ensembled multi-stacked-CNN-BILSTM model to detect rumors on social media. This deep learning model just considers the text of users and detects that whether a text message is a rumor or not. In the proposed model, each multi-stacked-CNN-BILSTM makes a prediction, and the label that voted maximum as predicted label is detected. We have evaluated the proposed model on the real public data set of PHEME. The proposed model achieved accuracy improvement over the ten state-of-the-art machine learning and deep learning models.

Keywords- *Rumor Detection, Deep Learning, Twitter, Natural Language Processing.*

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Fuzzy Topic Modeling On Persian News

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Abstract— In this paper, we investigate two versions of unsupervised clustering Latent Dirichlet Allocation (LDA) methods in original and fuzzy forms. Gibbs samplers are implemented for examining clustering performances on Persian news dataset. Our experimental results are showed that the fuzzy implementation of LDA performs better in text clustering tasks.

Keywords-Fuzzy Bag of Words, Fuzzy Latent Dirichlet Allocation (FLDA), Natural Language Processing, Text Mining.

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Intelligent Transmitter : Analysis of Effective parameters on Sensor Response of Gas Transmitter to Enhancement Measurment Accuracy by Intelligent Corrective Model Based on Artificial Neural Network

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Abstract— As we may know, H2S is a toxic and dangerous gas that mainly can be found in oil fields, drilling rigs, gas separators, petrochemicals etc. It is so dangerous that if it exceeds a specified amount, it will cause physical and respiratory complications or death in some cases. For the time being, a transmitter is used to detect and measure the concentration of H2S gas which the most significant part of it, is the gas sensor. We used an electrochemical sensor to construct the transmitter. Neural networks have been used to investigate the effect of environmental parameters such as temperature and humidity. The network consists of an input layer, a hidden layer and an output layer. The results show that the output of the neural network is well able to follow the actual output. Therefore, changes in temperature and humidity affect the response of the hydrogen sulfide gas transmitter, and this change reduces the accuracy measured by the device. Furthermore, high-precision hydrogen sulfide detection sensors are generally expensive. This finding has important implications for developing robust gas sensors. By using the achieved relationship and considering the effect of temperature and humidity changes, the accuracy of the low-cos sensors can be greatly increased and the cost of producing a hydrogen sulfide transmitter can be greatly reduced.

Keywords— *Artificial Neural Network, Intelligent Transmitter, Sensor response, Temperature and Humidity Effect.*

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ECG-Based Prediction of Epileptic Seizures Using Machine Learning Methods

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Abstract— Epilepsy is a type of neurological disorder that is associated with recurrent seizures. This study aimed to present three machine learning methods for predicting epileptic seizures using the features of electrocardiogram (ECG) signals. First, the ECG data set consisting of 13 people were pre-processed. Then, 13 features were extracted. SVM, KNN, and Naive Bayes were used to classify the interictal and preictal sections of each patient's ECG signal. The prediction interval of 15 minutes was selected. The results show that the Naive Bayes is a suitable choice to predict epileptic seizures.

Keywords- *Electrocardiogram, Epilepsy, K-nearest neig.*

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Intelligent detection of bone fractures using data mining and image processing methods

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Abstract—Today, X-ray machines produce high-quality images for radiologists and physicians to interpret images and detection the disease. Bone fractures are a relatively common event. Each type may require specific treatment, and it is important to determine the type of bone fracture in the fracture treatment phase. It may be a little difficult for a doctor to detect all types of fractures from X-rays and treatment methods. Therefore, an effective and accurate solution is needed to accelerate this procedure. This paper uses data mining and image processing methods which creates a reliable system that automatically and intelligently detects bone fractures with high accuracy and classifies bone fractures using classification models. The results show that not only the presented approach reduces time, effort and cost features, but also according to the experiments the system is able to detect more than 95% of bone fractures, which is an acceptable result.

Keywords- *intelligent detection; bone fracture; data mining methods; image processing; x-ray images; classification models.*

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A Nitrate Enzymatic Biosensor based on Optimized Machine Learning Techniques

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Abstract—Many enzymatic biosensing devices have been developed for specific and selective nitrate detection over the last two decades. They generally use the nitrate-nitrite redox reaction to measure the nitrate. Since the activity of the enzyme used in the structure of the biosensor reduces over time, the operator should replace the enzyme immobilized on the working electrode frequently, which increases the detection costs and limits their commercialization capabilities. In this study, artificial neural networks (ANNs) have been used for nitrate concentration prediction in the samples considering both electrochemical data and enzyme activity decrement over time. Genetic algorithm (GA) and particle swarm optimization (PSO) were used to optimize the architecture of the ANNs used for the decision-making of the biosensor. This study showed that both GA-ANN and PSO-ANN learning algorithms resulted in promising nitrate prediction performance with coefficients of determination (R2) higher than 0.93 and 0.94, respectively. Moreover, the biosensor could be used up to two weeks after the enzyme immobilization for nitrate determination in more than 500 samples after each time of electrode preparation. Finally, a comparison between the findings of this study and former studies that used support vector machines and fuzzy inference systems revealed that ANNs optimized with evolutionary and swarm intelligence techniques can provide more reliable prediction results.

Keywords-*artificial neural networks; genetic algorithm; nitrate detection; particle swarm optimization.*

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Seven Staged Identity Recognition System Using Kinect V.2 Sensor

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Abstract— By employing artificial intelligence techniques and algorithms such as color and depth image processing, signal processing, machine learning, evolutionary algorithms and fuzzy systems, an identity recognition expert system with approximate recognition accuracy of 99% is proposed. Available identity recognition systems mostly are in three stages which may lead to some security problems, so it is decided to make a robust system. Proposed system uses Kinect Version 2 sensor in order to conduct 7 main stages of recognition. The system includes following stages of recognition and estimation which are, face and voice recognition, finger print recognition, iris recognition, gesture recognition, sex detection and age estimation. By adding macro lens to the sensor, recognition accuracy for fingerprint and iris increases significantly. All efforts on this project were to achieve the highest potential out of available techniques. The system is learning based and has high precision and could be well used in industrial purposes. By installing macro lens on Kinect sensor, the system could compete with other expensive identification systems. It has to be mention that proposed system works well in the pure darkness ass Kinect sensor supports the infrared spectrum.

Keywords- *Expert system, Security, Kinect sensor, Identity recognition, Image and signal processing, Macro lens.*

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New results on MV -semimodules

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Abstract— Recently, we introduced a new definition of MV -semimodules. In this paper, we study A-ideals in MV -semimodules and Q-ideals in semirings. Then we verify the relationship between ideals of semirings and ideals of MV -algebras. Finally, we obtain some results on A-ideals that could be proved by the old definitions only under certain conditions.

***Keywords*-**MV -semiring, MV -algebra, MV -semimodule, Q-ideal, A-ideal.

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Fuzzy stability of involutions via fixed point technique

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Abstract— In this paper, we estabilish the generalized Hyers-Ulam-Rassias stability of involutions on fuzzy Banach algebras. Moreover, we show that under some conditions on an approximate involution, the fuzzy Banach algebra has a fuzzy C^* -algebra structure.

Keywords-*fuzzy Banach $\star$-algebra, fuzzy C^* -algebra, Hyers-Ulam-Rassias stability.*

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On NEUTRO G-SUBALGEBRA

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Abstract— The aim of this paper is to present a study about recent progressions in the study of neutrosophic algebraic structures. This paper introduces the novel concept of neutro-G-algebra and shows that neutro-G-algebra are different from G-algebra. More precisely, we present several results from the study of certain properties of neutro-G-algebras.

Keywords-*G-algebra, neutro-G-algebra.*

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Object Recognition based on Graph theory and Redundant Keypoint Elimination Method

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Abstract—Object Recognition System is widely used in different real-life applications such as content-based image retrieval, object detection, etc. In this article, we suggest a novel technique for object detection using Redundant Keypoint Elimination method SIFT- Graph Transformation Matching (RKEMSIFT-GTM). This proposed approach deletes redundant points and eliminates false matches. The proposed improved region-growing, which is a powerful method, is used for the final detection stages. The suggested approach is evaluated on datasets such as COIL-100 and obtained a good recognition rate compared to other detection methods.

Keywords— *Object Recognition, matching, SIFT, GTM.*

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Fractional entropy and its applications in fuzzy c-means clustering

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Abstract— In this work, a novel fuzzy clustering method based on fuzzy c-means clustering is introduced. Indeed, in order to maximize the dissimilarity between clusters a fractional entropy, as a regularization function, is added to its objective function. Then, an explicit expression to update the partition matrix is presented.

Keywords—*Fractional entropy, Fuzzy clustering, Fractional entropy fuzzy clustering.*

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An Ensemble Of Feature Selection Algorithms Using OWA Operator

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Abstract—This article tries to deal with the problem of ensemble feature selection as a rank aggregation procedure. As our proposed algorithm, EFS-OWA first constructs a decision matrix based on the rank of features obtained by different feature selection algorithms. To aggregate the results of different feature selection methods, we used Ordered Weighted Averaging (OWA) aggregation operator. This will allow the features that have the most satisfactory by feature selection algorithms assigned highest ranks. Some ensemble feature selection algorithms that use rank aggregation procedures are compared with EFS-OWA to prove the performance of the proposed method. Also, another comparison is conducted between EFS-OWA and basic feature selection algorithms. All these comparisons are made based on classification accuracy and the runtime of algorithms. Based on the experiment results, we can see that EFS-OWA outperforms competitive methods.

Keywords-*component; Ensemble feature selection; Ordered weighted averaging; Rank aggregation; Decision matrix.*

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Online streaming feature selection based on Sugeno fuzzy integral

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Abstract—Feature selection is a step in which an optimal subset of features is selected for the learning process. This step is applied to high-dimensional data, so that irrelevant and redundant features are removed from the data. Traditional feature selection methods require the entire feature space. At the same time, in many real-world applications such as online social networks, it is impossible to acquire or wait to get the whole feature space. Therefore, online feature selection methods are considered to handle this challenge. In this paper, we present an online feature selection method based on the concept of Sugeno fuzzy integral. According to this method, the streaming features are examined based on several measures, and these measures are combined based on the Sugeno operator. If the aggregated value reaches a pre-defined threshold, the desired feature is selected; otherwise, it is not considered. To prove the performance of the proposed method, comparisons have been made with five online feature selection methods based on two classifiers. We show that the proposed method outperforms competitive methods based on the experimental results.

Keywords-*component; Online feature selection; Sugeno fuzzy integral; streaming features; high-dimensional data.*

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An efficient outlier detection method based on distance ratio of k-nearest neighbors

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Abstract—Outlier detection is an important topic, which has been investigated in different theoretical and applied sciences. So far, numerous methods and algorithms have been proposed for outlier detection; each of these methods has found a use in some fields and has advantages and disadvantages. The present study presents an efficient method for detecting outliers based on the distance ratio of the k-nearest neighbors. In this method, both criteria of density and distance between objects have been included. Contrary to a large number of the previous methods, the density of each object is measured in relation to each neighbor independently, and after considering the distance criterion, the outlierness score of each object is measured collectively. Another feature of this method is its resistance to the k parameter. The proposed method has been evaluated in two-dimensional synthetic and multi-dimensional real datasets and compared with other significant algorithms in this field. The results of the experiments proved the efficiency of the proposed method.

Keywords—*outlier detection; distance-based method; density-based method; outlier; k-nearest neighbor*

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Lattice-Valued fuzzy hyper ideals in hyper residuated lattices

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Abstract—In this paper, lattice-valued (strong) hyper RL-ideals in a hyper residuated lattice are introduced and several properties are given and some characterizations of them are obtained. Index.

***Keywords*-**Hyper residuated lattice, lattice-valued hyper ideal, lattice-valued strong hyper ideal

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Zero sets in MV −algebras of continuous functions

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Abstract— In this article, we study MV −algebra of continuous functions C(X) and their zero sets in X. In particular, the properties of zero sets of complemented element in C(X) have been investigated. We study interior of zero sets and examine their relationship with minimal prime ideals of C(X). Also, a topological basis for X is introduced by the interior of zero sets. In addition, we obtain the condition that the union of two zero sets is equal to topological space X.

Keywords- *MV −algebra, zero set, zero divisor, complemented element.*

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New results on prime A-ideals in MV - semimodules

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Abstract— Recently, we introduced a new definition of MV -semimodules. In this paper, we study prime A-ideals in MV - semimodules, and we obtain some results that could be proved by the old definitions only under certain conditions. Finally, we present some equivalent conditions for having prime A-ideals in MV - semimodules.

Keywords- *MV -semiring, MV -semimodule, Q-ideal, prime A-ideal.*

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Residuated lattice congruences via directed kernels

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Abstract— To study the quotient of algebras, like residuated lattices, whose algebraic structures is determined by a partial order, it is often more common to think about directed kernels of homomorphisms between such algebras. So, in this paper, we first introduce the concept of a pre-congruence on a residuated lattice and then characterize them as the directed kernels of the residuated lattice homomorphisms. Second, we characterize the residuated lattice congruences as the intersection of a pre-congruence and its inverse.

Keywords-*Pre-congruence, Residuated lattice congruence, Residuated lattice, quotient.*

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The Decomposition Theorems for Residuated Lattices via Directed Kernels

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Abstract— The isomorphism theorems are those that describe the relationship between quotients, homomorphisms, and subobjects. Also, to construct the quotient of residuated lattices, whose algebraic structures is determined by a partial order, it is more useful to consider directed kernels of homomorphisms between such algebras. So, in this paper, we use the concept of directed kernel of a resituated lattice homomorphism and that of a pre-congruence. Finally, we prove the decomposition and isomorphism theorems for residuated lattice homomorphisms.

Keywords- *Pre-congruence, Residuated lattice congruence, Residuated lattice, Decomposition Theorems.*

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Adjoint relations of S-fuzzy posets with some categories

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Abstract— In this paper, recalling the category FPos-S of all S-fuzzy posets, and action and order preserving maps between them, some categorical properties of the category FPos-S is studied. In particular, we characterize products, coproducts, equalizers, coequalizers, pullbacks and pushouts in this category. Also, all forgetful functors between the category FPos-S and the categories FPos of fuzzy posets, Pos-S, Pos, Act-S and Set are considered, and the existence of left and right adjoints of all mentioned forgetful functors are studied.

***Keywords*-**fuzzy poset, S-fuzzy poset, free, cofree, adjoint relations.

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Latticized-Hamacher optimization problem subject to fuzzy relational equations

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Abstract— Hamacher family of t-norms is a parametric family of continuous strict t-norms, whose members are decreasing functions of the parameter. In this paper, we study a latticized optimization problem constrained by special system of fuzzy relational equations (FRE) in which fuzzy t-norms are considered as the members of the Hamacher family. First, the resolution of the feasible solutions set is investigated when it is defined with max-Hamacher composition and a necessary and sufficient condition is presented for determining the feasibility. Then, based on some theoretical properties of the problem, an algorithm is presented for solving this nonlinear problem. It is proved that the algorithm can find the exact optimal solution and an example is presented to illustrate the proposed algorithm.

Keywords - *Fuzzy relational equations, Nonlinear optimization, Hamacher t-norm, Latticized programming.*

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Special types of NM-algebras

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Abstract— The main goal of this paper is to investigate (strong) NM-algebras and study some properties of them. Firstly, we define the notion of perfect NM-algebras and perfect filters on NM-algebras and give some theorems that characterize these algebraic structures. Therefore, the relations between proper NM-algebras and some filters, such as perfect filters and maximal filters have been established. Additionally, we introduce the notion of local NM-algebras and propose the theorems that characterize these algebraic structures.

Keywords - *NM-algebra, Filter, Perfect NM-algebra, Local NM-algebra.*

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Intuitionistic Fuzzy Multiset finite Subautomata

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Abstract— In this note, we first present the notion of intuitionistic fuzzy multiset finite automata. After that, we present the notion of successor with threshold (a, b) for every state q, where a, b ∈ [0, 1] and $0 \leq a + b \leq 1$. Also, by considering the concept of successor, we introduce the notion of intuitionistic fuzzy multiset finite subautomata (IFMFSA). Furthermore, we show that the union and intersection intuitionistic fuzzy multiset finite subautomata is an IFMFSA, too.

Keywords – *Automata, Intuitionistic, Multiset Automata, Fuzzy Automata*.

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On P-torsion EQ-modules and P-cyclic EQ-modules

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Abstract— We applied the module theory the same as ring theory on EQ-algebras. With the concept of the maximal ideal on EQ-algebras, we introduce notions of P-torsion EQ-modules and P-cyclic EQ-modules, for each maximal ideal of E. Then, we gain relations between these notions and multiplicative EQ modules.

Keywords *–EQ-algebras, EQ-modules, maximal ideal, P-torsion EQ-modules, P-cyclic EQ-modules, multiplicative EQ-modules.*

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Some Results in Projective System of BL-algebras

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Abstract— In this paper, we introduce the definition of inverse limit of a projective system of BL-algebras and study some basic properties. Also, we consider the set of congruences of a BL-algebra as the poset, then we construct a quotient inverse system and quotient inverse limit on it.

Keywords- *BL-algebra, inverse limit, projective system.*

Soaker ideals in MV -algebras

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Abstract— In this paper, we define soaker ideals in an MV -algebra, and study the relationships between soaker ideals and the other ideals in an involutive MV -algebras.

Keywords- *finitely meet-irreducible, involutive, (soaker, join-soaker) ideal.*

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Hyper Ideals in Hyper Equality Algebras

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Abstract—In this paper, the concept of (strong) hyper ideals in bounded hyper equality algebras which is a generalization of ideals in bounded equality algebras are introduced. Also, the relations between strong hyper ideals and hyper deductive systems in good bounded hyper equality algebras are studied and in the follow, the notion of involutive hyper equality algebras are introduced. Moreover, A regular hyper congruence relation via a strong hyper ideal in good involutive hyper equality algebras are constructed and finally, the quotient hyper equality algebras via hyper strong hyper ideals are provided.

Keywords- *(Involutive) Hyper equality algebra, (strong, weak) hyper ideal, hyper congruence.*

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Folding Theory Applied to Integral EQ-alegbras

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Abstract—In this paper, In this paper, the notion of n-fold integral EQ-algebras and n-fold integral prefilters are introduced and several characteristics of them are presented. Moreover, relation among n-fold integral prefilters and some type of other prefilter such n-fold positive implicative and n-fold obstinate prefilters in EQ-algebras are studied. Finally, it is proved that a filter of a EQ-algebra L is an n-fold integral filter if and only if L/F is an n-fold integral EQ-algebra.

Keywords-*EQ-algebra, n-fold integral prefilter, n-fold integral EQ-algebra.*

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True-False triangular norm and conorms and It's Application

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Abstract— In this article, we introduced triangular norm T (briefly t-norm) and triangular co-norm S (briefly s-norm) of combination a fuzzy set and an interval-valued fuzzy set and proposed T-representable and S-representable of them. By using T-representable and S-representable, we suggested (T, S)-representable of true-false sets (TFS). We defined the TF implication, the residuated TF implication and considered property between residuated TF implication with Lukasiewicz t-norm and Hamming distance, Hausdorff distance, Chebyshev distance and Moore distance. Also, we defined the degree of similarity between two TFS and considered property between the degree of similarity with some type of distance. Later on, we extended the TOPSIS method based on TFS. Finally, we applied proposed the TOPSIS method solve the decision-making problem.

Keywords-*T-representable, S-representable, (T, S)-representable of TFS, TF implication, Residuated TF implication, True-False Topsis.*

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A novel ensemble feature selection method through Type I fuzzy

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Abstract— These days, one of the needed methods in machine learning is feature selection. In other words, in this manner, the most fitting features are picked. Nevertheless, there are various feature selection methods, getting the most suitable features still is a complex problem. Lately, applying several feature selection methods rather than a unique feature selection method is more efficient. In this paper, a new ensemble feature selection method based upon fuzzy Type-I named EFSF is presented. First, three different individual feature selection methods are applied to determine the rank of features separately. Next, Type-I fuzzy handles feature selections' uncertainty and decrease noise to give each feature the best rank. To validate the act of EFSF, it is compared with some ensemble methods and several advanced feature selection methods. EFSF is assessed based on Accuracy, Precision and Recall, metrics. The outcomes verify that the EFSF is better than its competitors. The source code of EFSF is here.

Keywords- *Feature selection, Type-I fuzzy, Ensemble feature selection, High-dimensional datasets.*

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Adaptive TSK Fuzzy Terminal Sliding-Mode Control of Two Coupled Cart-Mounted Inverted Pendulums

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Abstract— Inverted pendulum and its variants, including two connected inverted pendulum on carts (TCIPC), are suitable benchmarks to study various control methods of underactuated systems. This work will use an adaptive fuzzy terminal sliding mode controller (AFTSMC) to investigate the stabilization problem of the TCIPC system. First, two finite-time sliding manifolds are proposed, and then a controller law is designed to drive the system states to the manifolds within a finite time, assuring the whole process to be finite-time. A Sugeno (TSK) type fuzzy controller is employed to address the chattering problem of the sliding mode controller. Simulation results show that the proposed AFTSMC method effectively stabilizes the error states and mitigates the chattering.

Keywords*- terminal sliding mode control, two connected inverted pendulum on carts TCIPC, finite-time convergence, Sugeno TSK fuzzy tuner, chattering reduction.*

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Fuzzy Control of Autonomous Vehicle at Non-signalized Intersection in Mixed Traffic Flow

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Abstract— This paper presents a control design methodology for autonomous vehicles at urban intersections based on fuzzy logic in mixed traffic flow. We have assumed there is no cooperation between an autonomous vehicle and the human-driven vehicle for passing the intersection. The autonomous vehicle is responsible for speed adaptation to prevent potential collisions using the fuzzy controller to guarantee a safe intersection crossing maneuver according to the human-driven vehicle position. We have also proposed MPC and PID controllers to simulate path tracking and evaluated both speed and turn controllers at the same time and results of these simulations show positive effects of AV in intersection control and according to RMSE results MPC controller performs effectively better than PID in path tracking.

Keywords- *Autonomous vehicle, Non-signalized intersection, Mixed traffic flow, Fuzzy control, PID, MPC*

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A Novel Control Strategy Based on Fuzzy Logic in Islanded Microgrid

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Abstract— In order to correctly share active power across distributed generation (DG) units, this paper uses frequency and active power control in a microgrid consisting of two distributed generation units. The frequency recovery from the microgrid is controlled by an interval type-2 fuzzy logic control with double input, which returns the frequency oscillations in an appropriate range of standard magnitude. The fuzzy controller extends by providing multiple control levels by modifying a customizable membership function that modifies system uncertainty. The output responses for the presence and also absence of the fuzzy control are evaluated to ensure the efficiency of the suggested controller. For examining the influence of output loads on an experimental microgrid, total harmonic distortion has been recognized as a harmonic criterion. Finally, the performance of the suggested architecture is confirmed by the results of the microgrid simulation in island mode.

Keywords— *microgrid, Interval type 2 fuzzy control, distributed generation, frequency control*

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A Fault Isolation Approach for Data-Driven Device Replacement Decision Making

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Abstract— Despite the ubiquity and the prominence of device replacement decisions, the process is not always as simple as it seems. Especially as data-driven approaches are becoming more vital and intelligent systems have recently outperformed the classical techniques. The objective of this paper is to propose a solution to provide the set of decisions for replacing a whole asset. To accomplish this, first, we translate the deterioration level into the monetary scale via a data-driven approach. This is done by modeling the aging effects via fault occurrences; then utilizing fault isolation techniques for the determination. Finally, the set of decisions can be made by the optimization procedure. In the end, to implement the proposed solution, an actual fault isolation data set is reproduced to form a pertinent data set for a fictitious firm. Then an ANN is exploited for the fault isolation, and a game-theoretic approach comprising GA is utilized for the decision-making part.

Keywords—*Device replacement, data-driven, ANN, GA, decision making, game theory.*

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An Aggregated Revenue-Driven VPP Model Based on Marginal Price Tracking for Profit Maximization

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Abstract— Today, the benefits of using distributed generation (DG) sources at different voltage levels in smart grids cannot be ignored. DGs play a vital role in increasing the flexibility of operation in electricity grids. In addition, Dispatchable DGs can help to efficiently compensate for the imbalance caused by the uncertainty of renewable sources. On the other hand, renewable DGs can help to mitigate the final electricity price considering the impacts of emission. The benefits presented in most studies by researchers focus on the independent use of these resources. The negative facets associated with distributed generation sources, such as small-scale and intermittent generation capacity, cause hurdles in participating in the electricity market. This study aims to provide a solution to deal with these problems. In addition, a new energy management system is introduced and actions that can maximize the profit of the virtual power plant are evaluated. Then, the objective function and constraints related to maximizing the profit of the virtual power plant are introduced, and the proposed model is simulated using the Gravitational Search Optimization Algorithm (GSA) in MATLAB software. Finally, the simulation results for the 18-bus IEEE test distribution system are analyzed and the advantage of integrating distributed generation resources with the virtual power plant scheme is determined and discussed.

Keywords- *Virtual Power Plant, Bilateral Contract, Maximum Profit, Distributed Generation Resources, Energy Management System.*

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Intelligent Vibration-based Anomaly Detection for Electric Motor Condition Monitoring

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Abstract— The health state of rotating machinery can be represented by its vibration signal. With the help of machine learning approaches, the condition of rotating machinery such as electric motors can be diagnosed accurately. Thus, equipment down-time can be minimized and catastrophic accidents can be avoided. This paper presents an intelligent anomaly detection method for electric motors based on vibration signals. Due to lack of damage conditions information, only the normal condition data were employed to generate an unsupervised learning model for two different types of motor within the same class, which are the new laboratory motor and old industrial ones. The performance of the model to detect anomalies for both motors was studied, extensively. The results show that the model generated possesses the highest capability to detect anomalies for both motors as the normalized and mapped features were used.

Keywords—*anomaly detection, benchmarking, condition monitoring, machine learning, population-based.*

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Determining the Severity of Depression in Speech Based on Combination of Acoustic-Space and Score-Space Features

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Abstract—Mental diseases like depression create disorders in vocal limbs and artificial intelligence researchers believe that they can help psychologists and psychiatrists to measure depression level based on voice features in the patient's speech. The proposed method in this paper combines acoustic-space and score-space features to estimate Beck's Depression Index (BDI-II) using several regression techniques. To this end, Mel Frequency Cepstral Coefficient (MFCC) features and glottal waveform, pitch, perceptual linear predictive cepstral coefficients (PLPC), IIR-CQT Frequency Cepstral Coefficients (ICMC), Minimum-Variance Distortionless Response (MVDR), Gabor filter bank features (GBFB), and separated Gabor filter bank features (SGBFB) along with the scores obtained from each and all of them was used individually and in combination. The results indicated that combining Long-Term ICMC and Long-Term MFCC features and their GMM-based scores led to the best estimate. In addition, based on the AVEC2014 open-access database, the approach adopted here outperformed those of many other studies so that a lower mean absolute error (MAE) was obtained.

Keywords- *Speech depression detection, acoustic-space features, score-space features, effects of depression on human's voice.*

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A Secure mechanism to protect UAV communications

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Abstract— This paper presents a novel authentication method based on a distributed version of Kerberos for UAVs. One of the major problems of UAVs in recent years has been cyber-attacks which allow attackers to control the UAV or access its information. The growing use of UAVs has encouraged us to investigate the methods of their protection especially authentication of their users. In the past, the Kerberos system was rarely used for authentication in UAV systems. In our proposed method, based on a distributed version of Kerberos, we can authenticate multiple ground stations, users, and controllers for one or more UAVs. This method considers most of the security aspects to protect UAV systems mainly in the authentication phase and improves the security of UAVs and ground control stations and their communications considerably.

Keywords- *UAV, UAV Communication Network, Internet of Drones, Internet of Things, Smart Cities, IoT, Internet Security, Cryptography, Kerberos, Access Control, Distributed Systems.*

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Intelligent fault detection of planetary gearbox using vibration signal processing by empirical mode decomposition and an integrated artificial neural network-support vector machine classifier

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Abstract— Nowadays, automatic intelligent maintenance in fault detection in industry, transportation, airspace, and automation industry is one of the most significant issues. Reliability and availability of the systems are important to agricultural and industrial organizations. The main goal is to increase the time of the system without fault and decrease maintenance costs. As human sources are decreased and equipment has become sophisticated, intelligent maintenance should be replaced with old typical methods. Using novel methods in various applications such as using vibration analysis in monitoring, has given wide information about the operation of instruments which leads engineers in programming, control, navigation, and optimization to the best way. In this paper, an effective method based on vibration analysis for fault detection of planetary gearboxes is presented. The signals are taken from the final reducer of Massey Ferguson tractor 285 with healthy and faulty gears. Vibration signals were processed by empirical mode decomposition (EMD). Characteristics of the decomposed signals were provided statistically for the conditions of the gearbox. By using the integrated classification of artificial neural network-support vector machine (ANN-SVM), the classification of different conditions of gearboxes is given. This algorithm can solve the problem of Multi-layer perceptron which is getting into local minima and SVM method turns the problem into a global optimization problem. The accuracy of the proposed classifier for train and test data is reported at 97.14% and 91.11% respectively.

Keywords-*component; Gearbox; Planetary; Vibration signal; Empirical mode decomposition; Decision integration.*

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Modified Relay Node Placement in dense 3D Underwater Acoustic Sensor Networks

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Abstract— The internet of underwater things (IoUTs) is regarded as one of the most technologies in smart oceans that Underwater acoustic sensor networks (UASNs) have recently emerged to support the concept of IoUT. Network lifetime is a vital requirement in UASNs because underwater sensors are supplied with batteries that are difficult to recharge. Relay node placement (RNP) is investigated in recent years to increase the network lifetime that the relay node plays an intermediate node between the critical node and one of its neighbors (i.e., line segment RNP). Due to the tiny feasible region in the line segment RNP, avoiding the redundant relay nodes is a challenging task, especially in the dense UASNs that the distance between nodes is short. In this paper, we design an efficient RNP by defining a threshold distance d_ε. Our objective is to make good tradeoffs between the performance of 3D UASN and complexity in relay- assistance networks. To do this, we introduce a modified difference convex approach (MoDCA). To evaluate our proposed method, we compare it with previous DCA and RIA in terms of the average number of relay nodes (NoRa) and network lifetime through two simulation scenarios.

Keywords-Underwater acoustic sensor network, Relay node, Network lifetime, Difference convex approach, dense deployment.

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Location of fire station in Bam city using Fuzzy Analytic Hierarchy Process

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Abstract—Creating new urban facilities necessitates an in-depth examination of the optimal location of these facilities within a city. To properly allocate urban facilities, the first fundamental step is to determine the optimal location based on a variety and sometimes contradictory conditions. This issue becomes critical when critical factors such as saving human lives are considered. As a result, the optimal location of fire stations is a critical issue, given the value placed on the lives of those at risk. This is especially evident in Bam, which is a garden city. To locate fire stations in this paper, the situation was first examined, and based on the existing stations, the radius of operation for each station was determined using the standard of Bam Standard Institute and population of the city, Number 6430. As a result, the city requires another station. After selecting a few suitable locations, pairwise comparison tables with triangular fuzzy numbers were completed and the proposed locations were prioritized using the expert's opinion. Finally, the optimal location was determined through the use of the fuzzy analytic hierarchy process (FAHP) method.

Keywords—*Location, Fire Station, Bam, Fuzzy Hierarchical Analysis (FAHP).*

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Multiobjective Zero-Sum Games in Intuitionistic fuzzy Environment

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Abstract— The aim of this paper is to develop a methodology for solving a multiobjective zero-sum game with fuzzy payoffs. It is assumed that the payoffs of game matrices are expressed with triangular intuitionistic fuzzy numbers. The two programming problems are introduced to obtain the efficient strategies of the players. These problems are obtained by the concept of cuts of intuitionistic fuzzy sets. Finally, the validity and applicability of the proposed method is illustrated with a numerical example. Index

***Keywords*—**Zero-sum game, Intuitionistic fuzzy sets, Multiobjective optimization, Game theory, Fuzzy numbers.

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Efficiency evaluation using fuzzy DEA-TOPSIS and possibility theory

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Abstract—Only possible solution for classical data envelopment analysis (DEA) model is using accurate data. Also, in this model, efficiency evaluation is calculated from the perspective of best relative efficiency. But in evaluations, when we will evaluation, may encounter ambiguous and inaccurate numbers. Also, will measure efficiency from the perspective of the worst relative efficiency. So, in the present study, simultaneously inaccurate data and the best and worst efficiency evaluation approach are used. In the following, the theory of possibility and necessity are proposed to solve the model in optimistic and pessimistic respectively, then, the RC value is used to rank Decision Making Units (DMU's). Finally, a practical example is used to test the model.

Keywords— *evaluation; DEA, TOPSIS, necessity, possibility.*

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A Fractional Multi-commodity Network Flow Problem with Uncertain Multi-Choice Coefficients: Model Formulations and Solution Approach

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Abstract— In this article, a Fractional Multi-Commodity Network Flow (FMCNF) problem under uncertainty conditions will be studied. due to increasing competition in the business world, which makes decision-makers deal with multiple options/ information for optimal decisions on a single task, we will look at multi-choice programming in a hybrid fuzzy random environment. The main objective of the present research is to provide the decision-maker with a model with the help of which he/she can manage unknown factors across a multi-commodity network. Given that this problem is herein investigated in a hybrid fuzzy-stochastic environment and includes multi-choice parameters, we used the probability–possibility approach, Lagrange interpolating polynomial, and the Charnes-Cooper variable transformation technique to convert the problem into a deterministic one. Finally, the efficiency of the proposed model will be evaluated by presenting a numerical instance.

Keywords—*Multi-choice programming, fuzzy random variable, fractional programming, probability–possibility approach, multi-commodity network flow problem.*

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Invariant copulas under univariate truncation

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Abstract—We consider the class of copulas that are invariant under truncation with respect to one variable. We provide their characterization and present their main properties. Moreover, various results about bounds for this class under special constraints are hence considered, with particular emphasis on the case when either the associated Spearman's rho or Kendall's tau is known.

Keywords— Invariant copulas, univariate truncation

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On quantifying and estimating directed dependence

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Abstract— Considering that a (random) variable X may provide more information about a (random) variable Y than vice versa it is natural that dependence measures, i.e., notions quantifying the extend of dependence, are not necessarily symmetric. Working with Markov kernels (regular conditional distributions) allows to construct the measure which assigns every copula a value in [0,1], which is 0 exactly in the case of independence, and 1 exclusively for Y being a function of X. More importantly, given samples of X and Y and considering so-called checkerboard estimators it is possible to derive a strongly consistent estimator for the dependence measure which also exhibits a good performance for small and medium sample sizes. After sketching the background on the dependence measure and its checkerboard estimator, and illustrating its performance in terms of a small simulation study we discuss how the studied approach can be generalized to the multivariate question of quantifying the extend of dependence of a random variable Y on an ensemble of random variables.

***Keywords*—**Copula, dependence measure, Markov kernel, linkage

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Testing positive quadrant dependence with discrete copulas

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Abstract—In this talk, we propose a new test for positive quadrant dependence based on discrete copulas. To define the test statistic, we exploit the geometric representation of discrete copulas as a polytope. We compare the proposed method with existing tests in various simulated scenarios. We conclude by discussing the advantages and limitations of the proposed method.

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Improving the fit for diagonal copula based on Kendall's tau and tail dependence preserving transformation

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Abstract—This study proposed the method for improving the goodness of fit for diagonal copula utilizing Kendall's tau and tail dependence preserving transformation implemented on the diagonal section of the diagonal copula. We investigate the performance of our methodology on real data examples. The findings indicate that the model fitting is improved by using τ and tail dependence preserving transformation.

Keywords—Diagonal copula, tail dependence, Kendall's tau

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Multivariate ageing intensity

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Abstract— In reliability, the ageing intensity function (AIF) characterize the intensity of ageing for lifetime variable. Here, he bivariate and multivariate version of this measure is presented via the copula function. Since, the copula function extracts the raw dependence between random variables, the bivariate and multivariate AIF measures are estimated via copula function.

Keywords—*Reliability, Ageing intensity, Lifetime distribution, Failure rate*

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A Dynamic SDN-based Privacy-Preserving Approach for Smart City Using Trust Technique

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Abstract—A smart city is an Internet-based application of things that automates city management with no need for human interference. Exchanging data via devices obviate some challenges in intelligent cities. In a smart city, Internet-of-Things (IoT) devices may detect sensitive data, posing a risk of privacy violation and system harm. We discover that existing solutions are either too expensive or ineffective at limiting unintended disclosure of sensitive data to build a dependable, smart city. The fact that they create static surroundings is the fundamental reason behind this. Software-Defined Networking (SDN) technology has recently evolved to configure the network for performance and monitoring improvement. This study offers a work-in-progress that uses the SDN to protect the privacy of IoT devices by creating a dynamic SDN-based privacy-preserving ecology. The mechanism of the SDN controller performs under the nodes' mutual trust; it chooses various routes from the IoT device to the Cloud space destination dependent on the level of confidence. The packet is re-routed if the SDN controller identifies a device that does not trust its neighbor. Then it instructs the owner to deliver data over a different path. To demonstrate its improved performance, we are currently evaluating it from the perspective of overhead criteria in the future.

Keywords-*Internet of Things; Trust, Smart City*

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Application Of Machine Learning Methods in Diagnosis of Alzheimer Disease Based on Fractal Feature Extraction and Convolutional Neural Network

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Abstract— Alzheimer's disease impairs one's capacity to make sound strategic and operational decisions in authentic settings. It may be harder to adhere efficiently to ordinary concerns such as a stove that is burning or unexpected driving scenarios. Alzheimer's disease is characterized by memory loss. The inability to recall recent events or discussions is one of the first indicators. Memory problems intensify as the disease develops, and additional symptoms emerge. This research presents a CNN-based architecture with specific processes starting with image acquisition and ending with AD-classification to categorize scanned MRI images in order to predict whether or not they contain Alzheimer's disease utilizing a machine learning application and digital image processing. Six machine learning algorithms for identifying and segmenting MRI scans of patients' brains are presented in this paper. Six machine learning approaches were used to identify and segment ultrasound pictures in order to determine the illness or tumor kind. First, the fractal approach is used to extract the picture characteristics. The photos of the individuals were then classified using KNN, SVM, DT, and NB classification algorithms. The suggested high-potential CNN methodology may be utilized to identify AD using MRI scans, according to the results of this study.

Keywords- *Alzheimer's disease, Deep learning, Classification, Diagnosis.*

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How weight-sharing mechanisms affect the performance of deep Siamese networks

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Abstract—Siamese networks usually consist of two parallel networks and each network is made of a backbone and some fully connected layers. The entire Siamese structure is trained by a loss function, while the similarity of the latent spaces of the two networks is decisive at the inference time. The weights of the network can be shared in Siamese networks. Therefore, in this paper, four weight-sharing mechanisms are proposed, and their effects on the performance of Siamese networks are investigated. These methods are named ”full weight sharing” , ”partial weight sharing in FC” , ”partial weight sharing in CNN” , and ”without weight sharing”. In this paper, four network backbones are examined and trained by employing the four aforementioned weightsharing methods; two losses (proxy anchor loss and contrastive loss) are utilized for training. According to the obtained results,”partial weight sharing in FC” combined with contrastive loss has the best result on all backbones.

Keywords—*Siamese network, weight sharing, proxy anchor loss, contrastive loss.*

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An Efficient Collaborative Filtering for Recommendation Systems Using Differential Machine Learning

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Abstract—Utilizing deep learning, in contrast to standard recommendation models, is capable of successfully capturing non-linear and non-trivial user-item connections and codifying extremely complex abstractions as data representations in higher layers. Differential machine learning as a type of supervised learning trains models based on the twin networks that consider inputs and labels and differentials of labels to inputs. This paper proposes an efficient collaborative filtering method for recommendation systems using differential machine learning, called Differential Collaborative Filtering (DiffCF). DiffCF integrates the cost of derivatives and errors in values, which increases accuracy remarkably. The experiments are performed to train recommender system models on various datasets with different feature dimensions, while a significant reduction in errors and regularization penalties is obtained in comparison to standard machine learning.

Keywords-*component; collaborative filtering; recommendation system; differential machine learning; deep learning.*

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Detection of multiple emotions in texts using a new deep convolutional neural network

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Abstract— Identifying emotions from the texts can be used in almost every aspect of our daily lives, such as improving computer human interactions, monitoring people's mental health, or modifying/improving business strategies based on customers' emotions. Deep learning techniques have performed well compared to other machine learning methods in all learning problems. All existing machine learning methods for recognizing emotions are taught on datasets that includes single-emotional and multi-emotional samples. Our observations of working with these techniques show that these systems tend to learn more single-emotion samples than multi-emotion samples in a dataset. We also looked at a large number of texts and found that the number of texts from which only one emotion can be deduced is very small compared to texts from which more than one emotion can be deduced. Therefore, in general, the accuracy of existing methods is low. To deal with these two limitations, in this paper, we first created a dataset using all available data so that all texts have at least two emotions. To improve accuracy, because the convolutional neural network (CNN) has performed so well in image processing, we have then proposed a new CNN architecture for extracting emotions from texts. To find semantic, syntactic, and word similarity, we have used fast text and GloVe to embed text data into numeric representation. We have also improved the accuracy of the proposed architecture by using the attention property. The results demonstrated that the proposed model is more accurate compared to the existing methods.

Keywords-*Natural language processing (NLP), Deep learning, Convolutional neural network, Emotions.*

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Reinforcement Learning Reward Function for Test Case Prioritization in Continuous Integration

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Abstract— Given that software systems are constantly changing at a fast rate during the software development process, Continuous integration testing that a cost-effective software development practice is characterized by constantly evolving test cases, rapid return, and limited performance time. Regression test is performed after any change in the software, so we must seek to optimize the regression test methods. One of the methods that have attracted a lot of attention today is the prioritization of the test using reinforcement learning. The aim of this study is to review and compare reinforcement learning reward functions, which are used to test case prioritization. We divided these reward functions into two categories: reward functions that depend on current information and reward functions that depend on historical information. The reward functions based on current information rely only on the information of a previous implementation and the historical information-based reward functions rely on the whole information of the past. Each of these functions has the strengths and weaknesses that we have discussed in this study. Among the reward functions of these two categories, the HFCW reward function has better performance both in terms of fault detection and usage time.

Keywords— *Continuous integration, Test Case Prioritization, Reinforcement learning, Machine Learning, Reward function.*

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Improved LOF Algorithm Using Random Point

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Abstract— In the present study, Local outlier factor (LOF), the most popular and widely used density-based algorithm for outlier detection, is improved using a new idea. In the proposed idea, a random point in the neighborhood of all objects is used. This method improved the efficiency of the LOF algorithm to an acceptable level. Moreover, the results of the improved LOF indicated the competitiveness of the new algorithm in some real datasets. The comparisons are done based on two criteria: precision and AUC (Area Under the ROC Curve).

Keywords— *outlier, outlier detection, random point, LOF algorithm, density-based methods.*

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Early COVID-19 Diagnosis from Lung Ultrasound Images Combining RIULBP-TP and 3D-DenseNet

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Abstract—the pandemic of COVID-19 has affected the world with the high deaths rate. Early diagnosis of this disease is the bottleneck to the patient's health recovery. Its symptoms appear through the wide range of experiments especially accompany with the severe lung lesions. These lesions could be spotted on the lung ultrasound data. Being non-intrusive, low cost, portable, and accurate enough are among the main pros of ultrasound imaging. However, this imaging modality most often contain variety of noises. In order to overcome this challenge, we propose a novel approach combining Rotation Invariant Uniform LBP on 3 Planes (RIULBP-TP) and 3D-DenseNet. These methods are proved to be robust against various noises. Accordingly, our method reaches outstanding results comparing to related most state-of-the-art methods.

Keywords- *COVID-19, lung ultrasound data, RIULBP-TP, 3D-DenseNet.*

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Detection and visualization of COVID-19 in chest X-ray images using CNN and Grad-CAM (GCCN)

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Abstract— The quick and early detection of COVID-19 infection is very important in the fight against the pandemic. Deep learning can be considered as a helpful method to provide help and assist the medical staff to detect the infection of COVID-19, which will definitely have a positive effect in controlling the outbreak of COVID-19. In this paper, we will propose a simple CNN based deep learning model called Grad-CAM CNN (GCNN), for the purpose of detecting the infection of COVID-19 disease from chest X-ray images and visualizing a heat map with the help of the Grad-CAM technique in order to determine which area in the X-ray image of the chest has COVID-19. Since CNN is a very powerful method in processing images, we use it to build the model. We evaluated the performance of the proposed method on public online available datasets of X-ray images of the chest from Kaggle. The proposed method is able to achieve an accuracy score of 97.78 % using a learning rate of 0.003 with the Adam optimizer. In the light of the promising results obtained from this method, it is possible to say that the proposed method can be helpful in the early diagnosis in the upcoming waves of COVID-19.

Keywords-*GCNN, Deep Learning, Grad-CAM, Convolutional Neural Network (CNN), Medical Images, COVID 19, Chest X-ray.*