Final Program

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4thInternational Conference

On

Intelligence Science

February 24-27, 2021

Durgapur, West Bengal, India

Advanced Program

4th International Conference on

IntelligenceScience（ICIS2020）

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Keynotes Speakers

I Mind Modeling In Intelligence Science

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Abstract: Intelligence Science is an interdisciplinary subject which dedicates to joint research on basic theory and technology of intelligence by brain science, cognitive science, artificial intelligence and others. Mind modeling is the core of intelligence science. Here mind means a series of cognitive abilities, which enable individuals to have consciousness, sense the outside world, think, make judgment, and remember things. The mind model consciousness and memory (CAM) is proposed by the Intelligence Science Laboratory. The CAM model is a framework for artificial general intelligence and will lead the development of a new generation of artificial intelligence. This presentation will outlinethe age of intelligence, mind model CAM, brain computer integration.

Bio-Sketch: Professor at the Institute of Computing Technology, Chinese Academy of Sciences. Fellow of CCF and CAAI. IEEE senior members, AAAI, ACM members. His research interests mainly contain intelligence science, artificial intelligence, multi-agent systems, machine learning. He has been responsible for 973, 863, key projects of NSFC. He has been awarded with various honors, such as National Science and Technology Progress Award (2012), Beijing Municipal Science and Technology Award (2006), the Achievement Award of Wu Wenjun artificial intelligence science and technology by CAAI (2013), the Achievement Award of Multi-Agent Systems by China Multi-Agent Systems Technical Group of AIPR, CCF (2016). He has published 18 books, including "Mind Computation", "Intelligence Science", "Advanced Artificial Intelligence", "Principles of Machine Learning". Published more than 500 academic papers. He served as chair of the machine learning and data mining group, IFIP TC12. He served as Secretary-General of China Computer Federation, vice chair of China Association of Artificial Intelligence.

Ⅱ Interactive Granular Computing Model in Intelligent Systems

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Abstract: The problem of understanding intelligence is treated, by some prominent researchers, as the greatest problem of this century. In the recent issue of ERCIM, there is an explanation of the title of the issue Smart Things Everywhere emphasizing that it is more than Internet of Things or Industrial Internet of Things because it encompasses in particular intelligence, cognitive systems and technology, machine learning and AI. In this lecture we claim that to justify a decision support system to be intelligent there is a need for developing new reasoning tools which can also take into account the significance of sensory measurement, experience and perception of situations (i.e., understanding of situations in the physical world to a satisfactory degree for making relevant decisions). We discuss how such reasoning, called adaptive judgment, can be performed over objects interacting in the physical world using Interactive Granular Computing Model (IGrC). The basic objects in IGrC are called the complex granules. They make it possible to link the abstract and physical worlds, and help to realize the paths of judgments starting from sensory measurement and experience to perception. The IGrC model, which creates the foundation of Wisdom Technology for Intelligent Systems, is very much needed in different domains of applications.

Bio-Sketch: ECCAI and IRSS Fellow, Member EU Academy of Sciences, received the Ph. D. and D. Sci. (habilitation) from the University of Warsaw in Poland. In 1991 he received the Scientific Title of Professor. He is Full Professor in the Systems Research Institute, Polish Academy of Sciences as well as in Digital Research Center of Cardinal Stefan Wyszyński University in Warsaw. He is Emeritus Professor in Faculty of Mathematics, Computer Science and Mechanics at the University of Warsaw. Andrzej Skowron is the (co)author of more than 400 scientific publications and editor of many books and volumes of conference proceedings. His areas of expertise include reasoning with incomplete information, approximate reasoning, soft computing methods and applications, rough sets, rough mereology, granular computing, intelligent systems, knowledge discovery and data mining, decision support systems, adaptive and autonomous systems, perception based computing, and interactive computational systems. He was the supervisor of more than 20 PhD Theses. In the period 1995-2009 he was the Editor-in-Chief of FundamentaInformaticae journal. He is on Editorial Boards of many others international journals. Andrzej Skowron was the President of the International Rough Set Society from 1996 to 2000. He was serving as (co-)program chair or PC member of more than 200 international conferences. He was involved in numerous research and commercial projects including dialog-based search engine (Nutech), fraud detection for Bank of America (Nutech), logistic project for General Motors (Nutech), algorithmic trading (Adgam), control of UAV (Linköping University), and medical decision support (e.g., in Polish-American Pediatric Clinic in Cracow). Andrzej Skowron was on the ICI Thomson Reuters/ Clarivate Analytics lists of the most cited researchers in Computer Science (globally) in 2012, 2016, 2017.

III Trilevel Multi-Criteria Decision Analysis based on Three-Way Decision

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Abstract: Based on the principles of three-way decision as thinking in threes, this paper proposes a framework of trilevel multi-criteria decision analysis (3LMCDA). The main motivations and contributions are a new understanding of MCDA at three levels: 1) single-criterion-level analysis with respect to individual criteria, 2) multi-criteria-level aggregation by pooling results from many criteria, and 3) multi-methods-level ensemble of different MCDA methods. A full understanding of MCDA requires understandings at the three levels. While existing studies have been focused on the first two levels, new efforts at the third level may enable us to take advantages of many different MCDA methods**.**

Bio-Sketch: Yiyu Yao is a Professor with the Department of Computer Science, University of Regina. His research interests include Three-way Decisions, Granular Computing, Rough Sets, Artificial Intelligence, Web Intelligence, Information Retrieval, Data Analysis, Machine Learning, and Data Mining. He proposed a theory of three-way decisions, a triarchic theory of granular computing, interval sets, and decision-theoretic rough set models. He published over 300 papers. In 2015, he was selected as a Highly Cited Researcher (Thomson Reuters). In 2014, he received University of Regina Alumni Association Faculty Award for Research Excellence. In 2013, a co-authored paper was included in Frontrunner 5000 (Top Articles in Outstanding Science and Technology Journals of China). In 2010, he received the Overseas Friendship Award, Chinese Rough Set and Soft Computing Society. In 2008, he received PAKDD Most Influential Paper Award (1999-2008). He is an Area Editor of International Journal of Approximate Reasoning, an Associate Editor of Information Sciences, an Advisory Board Member of Knowledge-Based Systems, and a Track Editor of Web Intelligence. He is also an Editorial Board Member of Granular Computing, LNCS Transactions on Rough Sets, International Journal of Intelligent Information Systems, and several others. He is the elected Vice-President of International Rough Set Society.

IV Coping with Uncertainty in Knowledge Discovery using Dominance-based Rough Set Approach

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Abstract: Getting knowledge from massive data is nowadays a primary challenge for information processing. The goal of knowledge discovery from data describing decision situations is to help making better decisions. One of the difficulties in knowledge discovery is an uncertain character of data due to vagueness and inconsistency. The Dominance-based Rough set Approach (DRSA) is a methodology for reasoning about uncertain data, which handles monotonic relationships between values of condition and decision attributes, typical for data describing decision situations. The origin of the uncertainty is inconsistency due to violation of the dominance principle which requires that (assuming a positive monotonic relationship) if object *x* has an evaluation at least as good as object *y* on all condition attributes, then it should not get evaluation worse than *y* on all decision attributes. We show that DRSA is a natural continuation of the Pawlak's concept of rough set, which builds on the ideas coming from Leibniz, Frege, Boole, Łukasiewicz and Zadeh. We also show that the assumption admitted by DRSA about the ordinal character of evaluations on condition and decision attributes is not a limiting factor in knowledge discovery from data. In particular, it is an obvious assumption in decision problems, like multicriteria classification or ranking, multiobjective optimization, and decision under risk and uncertainty. Moreover, even when the ordering of data seems irrelevant, the presence or the absence of a property can be represented in ordinal terms, because if two properties are related, the presence, rather than the absence of one property should make more (or less) probable the presence of the other property. This is even more apparent when the presence or the absence of a property is graded or fuzzy, because in this case, the more credible the presence of a property, the more (or less) probable the presence of the other property. This observation leads to a straightforward hybridization of DRSA with fuzzy sets. Since the presence of properties, possibly fuzzy, is the base of information granulation, DRSA can also be seen as a general framework for granular computing. We also comment on stochastic version of DRSA, and some recent fuzzy extensions of DRSA.

Bio-Sketch: Roman Słowiński is a Professor and Founding Chair of the Laboratory of Intelligent Decision Support Systems at Poznań University of Technology, Poland. He is Vice President of the Polish Academy of Sciences and chairman of the Committee on Informatics of the Academy. Member of Academia Europaea and Fellow of IEEE, IRSS, INFORMS and IFIP. In his research, he combines Operational Research and Artificial Intelligence for Decision Aiding. Recipient of the EURO Gold Medal by the European Association of Operational

Research Societies (1991), and Doctor HC of Polytechnic Faculty of Mons (Belgium, 2000), University Paris Dauphine (France, 2001), and Technical University of Crete (Greece, 2008). In 2005 he received the Annual Prize of the Foundation for Polish Science - the highest scientific honor awarded in Poland. Since 1999, he is the principal editor of the European Journal of Operational Research (Elsevier), a premier journal in Operational Research.

V Possibility theory and possibilistic logic: Tools for reasoning under and about incomplete information

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Abstract: This brief overview provides a quick survey of qualitative possibilitytheory and possibilistic logic along with their applications to various forms ofepistemic reasoning under and about incomplete information. It is highlightedthat this formalism has the potential of relating various independently introducedlogics for epistemic reasoning**.**

Bio-Sketch: Didier Dubois received the Doctorate degree in engineering from the Ecole Nationale de la Statistique et de l'AdministrationEconomique (ENSAE), Toulouse, France, in 1977, the Doctoratd'Etat degree from Grenoble University, Grenoble, France, in 1983, and the Honorary Doctorate degree from the Faculté Polytechnique de Mons, Mons, Belgium, in 1997.,He is currently a Research Advisor at the Institut de Recherche en Informatique Toulouse (IRIT), Computer Science Department, Paul Sabatier University, Toulouse, France. He is also with the Centre National de la Recherche Scientifique (CNRS), Marseille, France, and also with the Université de Toulouse, Toulouse. He has authored or coauthored two books on fuzzy sets and possibility theory, and several edited volumes on uncertain reasoning and fuzzy sets. He was the coauthor of Handbook of Fuzzy Sets series (7 vols., Kluwer, 1998–2000) including Fundamentals of Fuzzy Sets. He has contributed about 200 technical journal papers on uncertainty theories and applications. He is the Co-Editor-In-Chief of the journal Fuzzy Sets and Systems. He is a member of the Editorial Board of several technical journals, such as the International Journals on Approximate Reasoning, General Systems, Applied Logic, and Information Sciences, among others. His current research interests include artificial intelligence, operations research and decision sciences, and risk analysis, with emphasis on the modeling, representation, and processing of imprecise and uncertain information.,Dr. Dubois is an Advisory Editor of the IEEE Transactions on Fuzzy Systems. He is a Former President of the International Fuzzy Systems Association (1995–1997). He received the 2002 Pioneer Award of the IEEE Neural Network Society and the 2005 IEEE Transactions on Fuzzy Systems (TFS) Outstanding Paper Award.(Based on document published on 31 October 2008).

Ⅵ A framework for the approximation of relations

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Abstract: In classic Rough Set Theory, and in its generalised variants as well, a binary relation R on a set of objects U is confronted with a subset X of U. The relation R usually is induced by the behaviour of the elements of U with respect to a set of attributes or properties. But X is a "datum", the Latin singular of "data", hence it is, literally, something which is "given", not produced. How X is obtained is outside the approximation procedure.The lecture, on the contrary, will consider X as the result of another relation Q. This leads to the problem of contrasting (approximating) not a set, but a relation by means of another relation. Moreover, instead of considering R and Q as relations on the set of objects U, the results of the fulfilment relation between objects in U and some set of properties P which is outside the approximating procedures, we want the set of properties P enter into the picture, too.

It follows that the most general situation is given when R, respectively Q, are relations between a set of objects A and a set of properties B, respectively a set of objects C and a set of properties D, and the domains and ranges of R and Q do not coincide. Therefore, in order to contrast (and approximate, thus) the outputs of R with the ones of Q, one now needs two additional relations, Z and W, the first connecting the range of R with the range of Q and the second connecting the domain of R with the domain of Q. This leads to a quadrilateral relational framework RF=($R \subseteq A \times B$, $Q \subseteq C \times D$, $Z \subseteq B \times D$, $W \subseteq A \times C$).

At this point approximation can be computed according to different combinations of the two quantifiers ∃ and ∀, and the modalities definable by means of binary relations. We shall consider three of them: *possibility*, *necessity* and *sufficiency*.

Approximation of relations and approximation of sets happen to be particular cases of the quadrilateral relational framework RF. Moreover, RF and its connected mathematical machinery is a starting point of one approach to the multi-agent (or multi-point-of-view) approximation problem.

Bio-Sketch: After his studies in Logic, Philosophy of Language, Philosophy of Science, Cybernetics, Calculus, Theory of Systems and Computer Science, Piero Pagliani graduated with honours in 1976 at the Faculty of Philosophy of the State University of Milan, defending a dissertation on Mathematical Logic. Piero Pagliani served multinational corporations in the field of functional programming languages, Artificial Intelligence and Knowledge Management. He was a lecturer of Model Theory at the University of Rome "La Sapienza", visiting professor at JNU, the University of Calcutta, the University of Milan, the European Joint Research Center of Ispra, and other bodies. He is the authors of tens of scientific papers. In 2008 Piero Pagliani published for Springer the monograph "A Geometry of Approximation: Rough Set Theory: Logic, Algebra and Topology of Conceptual Patterns", jointly with professor Mihir K. Chakraborty from the Department of Pure.

VII Neural Networks, Fuzzy Logic and Fractal Theory for Modeling COVID-19

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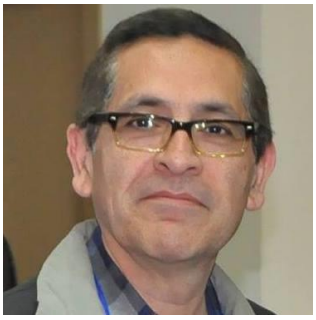

Abstract: We are presenting a fuzzy fractal approach for classification and prediction of the COVID-19 time series. In addition, self-organizing neural networks are used for spatial analysis of the COVID-19 data. Also, multiple neural networks are combined with type-1 and type-2 fuzzy aggregation of responses for time series prediction. Simulation results show the advantages of the proposed hybrid intelligent approaches in solving COVID-19 pandemic problems.

Bio-Sketch: Oscar Castillo holds the Doctor in Science degree (Doctor Habilitatus) in Computer Science from the Polish Academy of Sciences (with the Dissertation “Soft Computing and Fractal Theory for Intelligent Manufacturing”). He is a Professor of Computer Science in the Graduate Division, Tijuana Institute of Technology, Tijuana, Mexico. In addition, he is serving as Research Director of Computer Science and head of the research group on Hybrid Fuzzy Intelligent Systems. Currently, he is President of HAFSA (Hispanic American Fuzzy Systems Association) and Past President of IFSA (International Fuzzy Systems Association). Prof. Castillo is also Chair of the Mexican Chapter of the Computational Intelligence Society (IEEE). He also belongs to the Technical Committee on Fuzzy Systems of IEEE and to the Task Force on “Extensions to Type-1 Fuzzy Systems”. He is also a member of NAFIPS, IFSA and IEEE. He belongs to the Mexican Research System (SNI Level 3). His research interests are in Type-2 Fuzzy Logic, Fuzzy Control, Neuro-Fuzzy and Genetic-Fuzzy hybrid approaches. He has published over 300 journal papers, 10 authored books, 50 edited books, 300 papers in conference proceedings, and more than 300 chapters in edited books, in total more than 940 publications with h index of 77 according to Google Scholar. He has been Guest Editor of several successful Special Issues in the past, like in the following journals: Applied Soft Computing, Intelligent Systems, Information Sciences, Soft Computing, Non-Linear Studies, Fuzzy Sets and Systems, JAMRIS and Engineering Letters. He is currently Associate Editor of the Information Sciences Journal, Journal of Engineering Applications on Artificial Intelligence,

International Journal of Fuzzy Systems, Journal of Complex and Intelligent Systems, Granular Computing Journal and Intelligent Systems Journal (Wiley). He was Associate Editor of Journal of Applied Soft Computing and IEEE Transactions on Fuzzy Systems. He has been elected IFSA Fellow in 2015 and MICAI Fellow in 2016. Finally, he recently received the Recognition as Highly Cited Researcher in 2017 and 2018 by Clarivate Analytics and Web of Science.

Invited Speakers

Ⅰ Extensions of Dynamic Programming for Combinatorial Optimization and Data Mining

Mikhail Moskov
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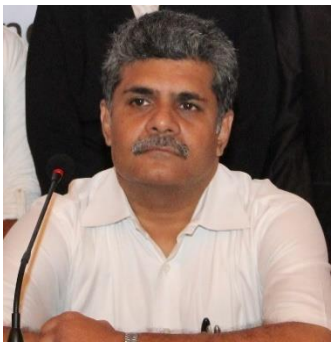
Abstract: In contrast with conventional dynamic programming algorithms that return one solution, extensions of dynamic programming allows us to work with the whole set of solutions or its essential part, to perform multi-stage optimization relative to different criteria, to count the number of solutions, and to find the set of Pareto optimal points for bi-criteria optimization problems. The presentation is based on the results considered in three books published or accepted by Springer.

Ⅱ Learning Strategies for Human-robot Collaboration

Amitava Chatterjee

Jadavpur University, India



Abstract: Human environment, in which a robot usually operates, is mostly unstructured and dynamic in nature. In such a scenario, robots operating in collaborative modes are gaining more and more prominence compared to robots operating in autonomous mode. New generation of collaborative, intelligent robots rely more and more on machine learning strategies and hence the development of suitable learning strategies for such human-robot collaboration is becoming more and more important. More sophisticated the learning strategies are, human-robot collaboration becomes more adept in producing desired repeatability and precision in operation. At the same time it involves less human workload and provides increased productivity e.g. in industrial automation, in manufacturing industries, and in many other domains. The present talk will touch upon

the main aspects of state-of-the-art human-robot collaboration and will briefly introduce some learning strategies which are employed in present-day collaborative robotics in practice.

Ⅲ Object Detection vis-à-vis Medical Image Analysis

Goutam Chakraborty
Iwate Prefectural University, Japan

Abstract: With new tools available for automatic feature selection, namely convolution neural network (CNN), a whole set of new applications in image processing is proposed. Two broad areas of applications are: (1) Object Detection, and (2) Computer Aided Diagnosis from medical images. Though in both applications deep networks are used, the aims and goals are different. In this talk, we will give a brief description of the tools and elaborate them with some of our recent works.

Bio Sketch: Prof. Chakraborty received B.Tech, M.Tech and Ph. D degrees in RadioPhysics and Electronics from Calcutta University, India and worked in Indian Statistical Institute, Calcutta, India until 1990. From 1991 to 1993 she worked as a part time researcher in Advanced Intelligent Communication Systems Laboratory in Sendai, Japan. She received another Ph. D in Information Science from Tohoku University, Sendai in 1993. From 1996 to 1998, she worked as a postdoctoral research fellow in Research Institute of Electrical Communication, Tohoku University, Japan. In 1998 she joined as a faculty in Software and Information Science department of Iwate Prefectural University, Iwate, Japan. Her main research interests are in the area of Pattern Recognition, Image Processing, Soft Computing Techniques, Biometrics, Data Mining and Online Social Media Mining. She is a senior member of IEEE, member of ACM, Japanese Neural Network Society (JNNS), Japanese Society of Artificial Intelligence (JSAI), Executive committee member of ISAJ (Indian Scientists Association in Japan), IEEE JC WIE (Women in Engineering).

Ⅳ Granulated Tables with Frequency by Discretization and Their Application

Hiroshi Sakai

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Abstract: We have coped with rule generation from tables with discrete attribute values and extended the Apriori algorithm to the DISApriorialgorithm and the NIS-Apriori algorithm. Two algorithms use table data characteristics, and the NIS-Apriori generates rules from tables with uncertainty. In this paper, we handle tables with continuous attribute values. We usually employ continuous data discretization, and we often had such a property that the different objects came to have the same attribute values. We define a granulated table with frequency by discretization and adjust the above two algorithms to granulated tables due to this property. The adjusted algorithms toward big data analysis improved the performance of rule generation. The obtained rules are also applied to rule-based reasoning, which gives one solution to the black box problem in AI.

Bio Sketch: Hiroshi Sakai received B.S., M.S. and D.S. degrees in mathematics and computer sciences from Kyushu University, Japan. He is now working as a professor of the Department of Basic Sciences at Kyushu Institute of Technology, Tobata Campus in Kitakyushu, Japan. He is serving as an advisory board member of International Rough Set Society and an editorial board member of some journals. His primary research interests include rough sets, mathematical logic, soft computing, logic programming and data mining. He is a PC member of several international scientific conference series. He has published over 100 research articles for books, journals, and conference proceedings.

Ⅴ Logical treatment of incomplete/uncertain information relying on different systems of rough sets

Tamas Mihalydeak

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Abstract: Nowadays in the world of informatics incomplete information plays a crucial role in many different applications. A piece of information can be incomplete from the different points of view: sometimes a lack of information appears, sometimes the certainty of a piece of information is not total. In artificial intelligence, in data mining, in deep learning many processes result in pieces of incomplete/uncertain information that are used (for example) in decision making. Therefore the treatment of incomplete information/uncertainty is an important theoretical and practical task.

Pawlak's original theory of rough sets, covering systems, relying on tolerance relations, general covering systems, decision-theoretic rough set theory, general partial approximation spaces are different systems of rough set theory, and they all treat uncertainty in special ways. There is a very important common property: all systems rely on given background knowledge and we cannot say more about an arbitrary set (representing a 'new' property) or about its members then its lower and upper approximations make possible. New membership relations appear, and if one wants to use received information from AI processes precisely, then the usage of new membership relations cannot be avoided. The semantics of classical logic is based on classical set theory. An important question: Is it possible to build logical systems with semantics relying on different versions of the theory of rough sets by using new membership relations? The lecture gives an overview of logical systems with partial semantics in order to show the influence of incomplete/uncertain information in logically valid inferences.

Bio-Sketch: TamásMihálydeák is a retired professor of the Department of Computer Science, Faculty of Informatics, University of Debrecen, Hungary. By profession, he is a mathematician (master degree from Kossuth Lajos University, Debrecen Hungary, 1979). He received CSc (candidate of science/PhD) from the Hungarian Academy of Science (1990), and habilitation from the University of Debrecen (2008). He was the dean of the Faculty of Informatics from 2013 to 2019. He was the chair of the International Joint Conference on Rough Sets 2019 and he is a steering committee member of the International Joint Conference on Rough Sets 2020. As a mathematician, he has been dealing with (different systems of) logic and its possible applications in computer science. In last years logical roles of rough sets were in the focus of his research. Different systems of rough sets play a crucial role in treating the uncertain aspect of knowledge embedded in databases. From the logical point of view, an important question is how to treat incomplete information in inferences. The semantics of classical logic is based on classical set theory. An important question: Is it possible to build logical systems with semantics relying on different versions of the theory of rough sets? In his papers published in last years, he created some logical systems with partial semantics successfully in order to show the influence of incomplete/uncertain information in logically valid inferences.

Ⅵ Characterization of Orderly Behavior of Human Crowd in Videos Using Deep Learning

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Abstract: In the last few decades, understanding crowd behaviour in videos has attracted researchers from various domains. Understanding human crowd motion can help to develop monitoring and management strategies to avoid anomalies such as stampedes or accidents. Human crowd movements can be classified as structured or unstructured. In this work, we have proposed a method using deep learning technique to characterize crowd behavior in terms of order parameter. The proposed method computes features comprised of motion histogram, entropy, and order parameter of the frames of a given crowd video. The features are fed to a Long Short Term Memory (LSTM) model for characterization. We have tested the proposed method on a dataset comprising of structured and unstructured crowd videos collected from publicly available datasets and our recorded video datasets. Accuracy as high as 91% has been recorded and the method has been compared with some of the recent machine learning algorithms. The proposed method can be used for real-time applications focusing on crowd monitoring and management.

Bio-Sketch: Dr. Debi Prosad Dogra is an Assistant Professor in the School of Electrical Sciences, IIT Bhubaneswar, India. Dr. Dogra obtained his Ph.D. degree from IIT Kharagpur in 2012, M.Tech from IIT Kanpur in 2003, and B.Tech. in 2001 from HIT Haldia all in Computer Sc. & Engineering. Prior to joining IIT Bhubaneswar, Dr. Dogra was with the Advanced Technology Group, Samsung Research Institute, Noida (2011-2013), worked with ETRI, South Korea (2006-2007), and worked with HIT Haldia as a faculty member (2003-2006). Dr. Dogra has published more than 100 research papers in various international conferences and journals. His research interests include visual surveillance, intelligent transportation systems, augmented reality, human-computer interface, and sensor guided healthcare systems. He is a member of IEEE, an Associate Editor of SNCS, and a Regional Editor of JMIS.

Ⅶ Fractional fuzzy inference systems: A brief introduction

Mehran Mazandarani

Tsinghua Shenzhen International Graduate School, China

Abstract: This work presents a new machinery of compositional rule of inference called fractional fuzzy inference system (FFIS).

An FFIS is a fuzzy inference system (FIS) in which consequent parts of a rule base consist of a new type of membership functions called fractional membership functions.Fractional membership functions are characterized using fractional indices. There are two types of fractional indices. Each type can be either constant or dynamic. An FFIS intelligently considers not only the truth degrees of information included in membership functions, but also the volume of the information in the process of making a conclusion. In other words, the volume of information extracted from a membership function depends on the truth degree of information. Concretely, the higher the truth degree, the larger the volume of information that is involved in the process of making a conclusion. It is shown that typical FISs,e.g. Mamdani's or Larsen's FISs, are special cases of FFISs. Specifically, as the fractional indices approach one, the FFIS approaches a typical FIS. In addition, using two theorems proved in this paper, it is demonstrated that, independent of the problem in question, a typical FIS never leads to results which are more satisfactory than those obtained by the FFIS corresponding to the typical FIS provided that a particular set of fractional indices is taken into account. Put another way, it seems sound to expect that applying FFISalways leads to more satisfactory results than applying its corresponding FIS. It is also shown that FFISgrants a special dynamic to FIS which can be also customized according to a new concept called reaction trajectories map (RTM). Particularly, the RTM enables decision makers to select an FFIS more suitable fortheir purpose. Some more concepts such as the left and right orders of an FFIS and the fracture index arealso introduced in this work.

Bio-Sketch: Dr. Mehran Mazandarani received the Ph.D. degree in electrical engineering, control field, from the Mashhad University. As a researcher he joined the Division of Computational Mathematics and Engineering, Institute for Computational Science, Ton Duc Thang University, Ho Chi Minh City, Viet Nam during 2016-2017. Then, at the Harbin Institute of Technology, Shenzhen, China, he worked as a visiting researcher during 2017-2019. Subsequently, as a Postdoctoral Researcher, he has joined the Department of Information Science and Technology, Tsinghua University, International Graduate School at Shenzhen, Shenzhen, China. His interests fall within some branches of fuzzy logic. He has elaborated on using the fuzzy mathematics in control theory and introducing new frameworks in this regard. In fuzzy mathematics he has

introduced, for the first time, the type-2 fuzzy differential equations and type-2 fractional fuzzy differential equations. By introducing the granular differentiability of fuzzy number-valued functions he has made a revolution in fuzzy differential equations. In 2019, he made a framework for studying Z-differential equations and the outline of Z-calculus. More recently, a new generation of fuzzy inference system called fractional fuzzy inference system outperforming all the typical fuzzy inference systems has been invented by him. His current research work focus on some aspects of such a new fuzzy inference systems and their potential applications.

Ⅷ Development of CAD Models with AI techniques for Melanoma Diagnosis

K. S. Ravichandran

Sastra University, Thanjavur, TN, India.

Abstract: This paper presents a comparative study on different machine learning algorithms to classify retinal fundus images of glaucoma, diabetic retinopathy, and healthy eyes. This study will aid the researchers to know about the reflections of different algorithms on retinal images. We attempted to perform binary classification and multi-class classification on the images acquired from various public repositories. The quality of the input images is enhanced by using contrast stretching and histogram equalization. From the enhanced images, features extraction and selection are carried out using SURF descriptor and k-means clustering, respectively. The extracted features are fed into perceptron, linear discriminant analysis (LDA), and support vector machines (SVM) for classification. A pre-trained deep learning model, AlexNet is also used to classify the retinal fundus images. Among these models, SVM is trained with three different kernel functions and it does

multi-class classification when it is modelled with Error Correcting Output Codes (ECOC). Comparative analysis showsthat multi-class classification with ECOC-SVM has achieved high accuracy of 92%.

Bio-Sketch: Dr. K. S. Ravichandran is currently working as Associate Dean at SASTRA University, India. He obtained his Ph.D. in Information Technology from Alagappa University, India. His research interest mainly lies on the area of Soft-Computing Techniques and its Applications. He has experience of successfully guiding 8 PhD thesis. At present he is handling 5 PhD projects. His working experience includes appointed as Part-time Lecturer at National College, Trichirapalli, Lecturer, Senior Lecturer, and Assistant Professor at Shanmugha College of Engineering, Thanjavur, and Assistant Professor and Professor at SASTRA University, Thanjavur. He has published 52 research articles in national and international refereed journals, and 13 national and international refereed proceedings contributed as author/co-author. He also attended 8 national/international conferences and presented research articles.

Ⅸ Uncertainty Modeling of Epidemiological Models of Infectious Disease

Debabrata Dutta

BARC, India

Abstract: He has contributed a substantial work in the field of Uncertainty modeling, soft computing using fuzzy mathematics, risk analysis, molecular dynamics simulation of Diamond Turning Machine in the field of manufacturing, Lattice Boltzmann method to study the design of geological repository for disposal of high level radioactive waste. At present he is associated with SRM Institute of Science & Technology of India as an Adjunct Professor and Visiting Professor in the Department of Mechanical Engineering of GLA University, India. He is also a Professor of Homi Bhabha National Institute.

He has been recognized by Marquis WHO's WHO in the world continuously from 2015-2020, received an Eminent Scientist & National Award "Millennium Plaques of Honour" from Indian Science Congress Association (ISCA) in 2010, (Award received from DR. MANMOHAN SINGH, EX PRIME MINISTER OF INDIA), Group Achievement Award for Science & Technological Excellence from BARC in 2018. He has got more than 250 peer reviewed international journal publications to his credit and delivered a large number of invited talk, keynote lectures in many International and national conferences. He is also an editor, associate editor and editorial board member of many international and national journals. He is life member of many international and national scientific bodies**.**

Χ Hexagon of Intelligence

Jean-Yves Beziau

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Abstract: In this paper we discuss the nature of artificial intelligence (AI) and present a hexagon of opposition (generalization of the square of opposition) to characterize what intelligence is, its relation with computability, creativity, understanding and undecidability.

In a first part, we make some general comments about the history, development and objectives of AI. In a second part, we present two diametrically opposed ways of reasoning, one computational, one creational. In a third part, we talk about the relation between AI and logic, emphasizing that reasoning can be described or/and performed by different logical systems, mentioning the fact that non-monotonic logical systems have been promoted by AI researchers. In a fourth part, we present the theory of oppositions, with the three notions of opposition that are used to build squares and hexagons of opposition, and we then we present the hexagon of intelligence.

Bio-Sketch: Jean-Yves Beziau is a Swiss Logician, Philosopher and Mathematician, PhD in mathematics and PhD in Philosophy. He has been working in different countries: France, Brazil, Poland, California (UCLA, Stanford, UCSD) and Switzerland.

He is the originator of Universal Logic as a general theory of logical structures. He is the founder and Editor-in-Chief of the journal Logica Universalis and book series Studies in Universal Logic, both published by Birkhäuser/Springer, Basel. He is also the founder and Editor-in-Chief of the book series Logic PhDs and the logic area editor of the Internet Encyclopedia of Philosophy.

He has organized a series of events on universal logic around the world: World Congress amd School on Universal Logic, Montreux 2005, Xi'an 2007, Lisbon 2010, Rio de Janeiro, 2013, Istanbul 2015. He has made also some important contributions in paraconsistent logic, in particular he has shown that the modal logic S5 is a paraconsitent logic and that the nameless corner of the square of opposition is a paraconsistent negation. He has renewed the study of the square of opppositon organizing interdisciplinary world events on this topic (Montreux 2007, Corsica 2010, Beirut 2012, Vatican 2014, Easter Island 206) and organizing the publication of special issues of journals and books on the subject.

Ⅺ From Texts to Classification Knowledge

Shusaku Tsumoto

Osaka University, Japan
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Abstract: Hospital information system stores all clinical information, whose major part is electronic patient records written by doctors, nurses and other medical staff. Since records are described by medical experts, they are rich in knowledge about medical decision making. This paper proposes an approach to extract clinical knowledge from the texts of clinical records. The method consists of the following three steps. First, discharge summaries, which include all clinical processes during the hospitalization, are extracted from hospital information system Second, morphological and correspondence analysis generates a term matrix from text data. Then, finally, machine learning methods are applied to a term matrix in order to acquire classification knowledge. We compared several machine learning methods by using discharge summaries stored in hospital information system. The experimental results show that random forest is the best classifier, compared with deep learning, SVM and decision tree.Furthermore, random forest gains more than 90% classification accuracy.

Bio-Sketch: Shusaku Tsumoto graduated from Osaka University, School of Medicine in 1989, during which he was involved in developing medical expert system. After a resident of neurology in Chiba University Hospital, he moved to emergency division (ER room) in Matsudo Municipal Hospital from 1989 to 1991. Then, he moved to Division of Medical Informatics in Chiba University Hospital and was involved in developing a hospital information system in Chiba University Hospital from 1991 to 1993. He moved to Tokyo Medical and Dental University in 1993 and started his research on rough sets and data mining in biomedicine. He received his Ph.D (Computer Science) on application of rough sets to medical data mining from Tokyo Institute of Technology in 1997. He has become a Professor at Department of Medical Informatics, Shimane University in 2000. From this year, he is in charge of network system in Izumo Campus of Shimane University and of hospital information system in Shimane University Hospital. In 2008, he has become a visiting professor of Institute of Statistics and Mathematics. His research interests include approximate reasoning, contingency matrix theory, data mining, fuzzy sets, granular computing, knowledge acquisition, intelligent decision support, mathematical theory of data mining, medical informatics, rough sets, risk sciences and service-oriented computing (alphabetical order). He served as a president of International Rough Set Society from 2000 to 2005 and serves as a co-chair of technical committee on Granular Computing in IEEE SMC society from 2008. He served as a PC chair of RSCTC2000, IEEE ICDM2002, RSCTC2004, ISMIS2005, and IEEE GrC2007 and as a Conference chair of PAKDD 2008 and IEEE GrC 2009. He also served as a workshop chair of IEEE ICDM2006 and as a publicity chair of SIAM DM2007, 2008 and CIKM2010.

Ⅻ Computation with Democracy: An intelligent System

Sukanta Das

Institute of Engineering Science and Technology Shibpur, India

Abstract: The notion of artificial intelligence is primarily centered around functional approach where it is tested whether the machine acts intelligently.In this work, we advocate for the idea of the machine itself being intelligent. We look for some characteristics of living elements in nature, that, if incorporated in machine, it can become intelligent. The first property is self-replication, where the machine can reproduce itself indefinitely. The second is fault tolerance, which gives the machine self-healing reliable context-sensitive nature. Only a many-body system where the elements work collectively by interacting among themselves can achieve these properties. Such a machine can be computationally universal. Hence, we claim that, a democratic model of computation can be a better choice for an intelligent system.

Bio-Sketch: Dr. Sukanta Das is an associate professor in the Department of Information Technology in the Indian Institute of Engineering Science and Technology, Shibpur (formerly known as Bengal Engineering and Science University, Shibpur). Dr. Das received his Ph.D. in 2007 from Bengal Engineering and Science University, Shibpur and Masters in Engineering in 2002 from Bengal Engineering College (DU) (Currently known as IIEST, Shibpur) in Computer Science and Technology. His research area includes Cellular Automata: Theory and Applications. Currently, he is exploring the computational abilities of cellular automata, the non-uniform cellular automata, (partial) number conservation in cellular automata, and chaos and randomness in cellular automata.

XIII Beam and Ball Plant System Comtrolling Using Intuitionistic Fuzzy Control

Ozkan Atan

YüzüncüYılÜniversitesi, Turkey

Abstract: In this study, simplified “beam and ball(BNB) system” is controlled using “intuitionisticfuzzy control(IFC)” method. It is aimed to keep the ball on it in balance by applying DC voltage in different magnitudesto the DC motor of the system called "ball and beam plant", which has a beamon which a DCmotor is attached to the middle point and a ball moving without friction.In order to better observe the effect of this new generation controller applied to the system, parameters such as the torque of the motor, the mass of the beam and the ball, internal and external disturbance, friction etc. were ignored and the system is simplified. The position and velocity of the ball on the beamis taken as input for the controller, while the controller output is chosenas a DC voltage.After I-Fuzzification, I-Inference and I-Defuzzification process are performed in controller block, performance and efficiency of the system are discussedin terms of steady state error, setting time, maximum overshoot, chattering.

Bio-Sketch: Özkan ATAN is an Assistant Professor at the University of Van Yüzüncü Yıl, Turkey. He received the M.S. degree in Electrical-Electronic Engineering in 2007 on control of the electrical motors and the Ph.D. degree in 2014, on fractional order control of chaotic systems and optimization from the University of Fırat University, Turkey. He has been a student at the University of Fırat University, Turkey, in 2008 and in 2014, in the Department of Electrical-Electronic Engineering. He teaches Control Systems, Signals and Systems and Communication Systems at the University of Van Yüzüncü Yil, in the Department of Electrical-Electronic, Engineering Faculty since 2014, he assigned to Head of the Communications Department, in 2014. He has been a Visiting Lecturer at the University of Tomas Bata at Zlin Czech Republic in 2016, in the Department of Automation and Control Engineering, Faculty of Applied Informatics. In 2016, he finished project control of the twin rotor helicopter model, which supported by Van Yüzüncü Yıl University. He was assigned in Technology Transfer Office, as vice Chief in Van Yüzüncü Yıl University in 2017, then assigned Chief of the Technology Transfer Office, in 2018. He continues the Chief of the TTO, and assistant professor. His research interests are in synchronization and control of chaotic system, fractional order system, particle swarm optimization methods and intuitionistic fuzzy logic control method.

XIV Similarity-based Rough Sets with Annotation Using Deep Learning

David Nagy Kádek Tamás

University of Debrecen, Hungary

Abstract: In the authors' previous research the possible usage of correlation clustering in rough set theory was investigated. Correlation clustering is based on a tolerance relation that represents the similarity among objects. Its result is a partition which can be treated as the system of base sets. However, singleton clusters represent very little information about the similarity. If the singleton clusters are discarded, then the approximation space received from the partition is partial. In this way, the approximation space focuses on the similarity (represented by a tolerance relation) itself and it is different from the covering type approximation space relying on the tolerance relation. In this paper, the authors examine how the partiality can be decreased by inserting the members of some singletons into base sets and how this annotation affects the approximations. This process can be performed by the user of system. However, in the case of a huge number of objects, the annotation can take a tremendous amount of time. This paper shows an alternative solution to the issue using neural networks.

XV P-T Probability Framework and Semantic Information G Theory Tested by Seven Difficult Tasks

Chenguang Lu

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lcguang@foxmail.com

Abstract: To applying information theory to more areas, the author proposedsemantic information G theory, which is a natural generalization of Shannon'sinformation theory. This theory uses the P-T probability framework so that likelihoodfunctions and truth functions (or membership functions), as well as samplingdistributions, can be put into the semantic mutual information formula atthe same time. Hence, we can connect statistics and (fuzzy) logic. The rate-distortionfunction R(D) becomes the rate-verisimilitude function R(G), G is thelower limit of the semantic mutual information) when the distortion function isreplaced with the semantic information function. Seven difficult

tasks are 1) clarifyingthe relationship between minimum information and maximum entropy instatistical mechanics, 2) compressing images according to visual discrimination,3) multilabel learning for obtaining truth functions or membership functions fromsampling distributions, 4) feature classifications with maximum mutual informationcriterion, 5) proving the convergence of the expectation-maximization algorithmfor mixture models, 6) interpreting Popper's verisimilitude and reconcilingcontradiction between the content approach and the likeness approach, and7) providing practical confirmation measures and clarifying the raven paradoxThis paper simply introduces the mathematical methods for these tasks and themain conclusions. The P-T probability framework and the semantic informationG theory should have survived the tests. They should have broader applications.Further studies are needed for combining them with neural networks for machinelearning.

XVI Recurrent Self-evolving Takagi–Sugeno–Kan Fuzzy Neural Network (RST-FNN) based Type-2 Diabetic

Arif Ahmed Sekh

UiT The Arctic University of Norway, TromsØ, Norway

Abstract: Diabetes mellitus affected an estimated 463 million peoplein the year 2019. The number of diabetic patients is projected to in-crease to an alarming figure of 700 million by the year 2045, out of which90 – 95% of them are expected to be type 2 diabetes mellitus (T2DM)patients. The research presented an alternative way of state-of-the-artinsulin therapy using manual insulin infusion. The T2DM model thatsimulates the body reaction of a T2DM patient has been developed usingreal human clinical data that uses insulin pump therapy. The proposedsystem uses a closed-loop control together with fuzzy gain schedulingand recurrent self-evolving Takagi–Sugeno–Kang fuzzy neural network(RST-FNN). Such a system will help the patient remove the need formanual insulin infusion. This proposed system will record the blood glu-cose level and predict the next iteration’s blood glucose level. The changein blood glucose level will help detect the food intake (carbohydrates)with reference to the gain scheduler and the controller will communicatewith the insulin pump to infuse the corresponding amount of insulin.

Bio-Sketch: Dr.Arif Ahmed Sekh is a Post Doctoral Research Fellow in the Department of Physics and Technology at the University of Tromso (UiT), Norway. From 2009 to 2019, he was an Assistant Professor of Computer Application at Haldia Institute of Technology, India. He holds invited position as Research Consultant in Imaging Media Research Center at Korea

Institute of Sciece and Technology (KIST), Korea and in School of Electrical Sciences IIT Bhubaneswar, India. Arif completed his Ph.D. at National Institute of Technology Durgapur, India and his undergraduate studies at Burdwan University. His research interests lie in the area of Computer Vision and Artificial Intelligence, ranging from theory to design to implementation. He has collaborated actively with researchers in several other disciplines of computer science, physics, biology particularly computer vision application on problems at the multi disciplinary environment. Arif has served on roughly 15 conference and workshop program committees and served as the Organizing Chair for ICITAM 2017, Publication Chair in ICITAM 2019. He has served on the ICMC 2013, 2015, and 2019 as Organizing Member. He is a member of IEEE and Digital Life Norway (DLN).

ⅩⅦ Three-way decision for handling uncertainty in machine learning

Davide Ciucci

Department of Informatics Systems and Communication, University of Milan-Bicocca
Milano, Italy

Abstract: Three-Way Decision (TWD) is a recent paradigm, emerged from Rough Set Theory, based on representing computational objects in three dimensions and it is based on the Trisection-Acting-Outcome (TAO) model. We introduce a TAO-based framework for dealing with uncertainty in Machine Learning (ML). We review several kinds of uncertainty that can arise in ML and discuss how TWD can be useful to tackle them. Some existing applications are highlighted and open problems outlined.

Bio-Sketch: Davide Ciucci received a PhD in 2004 in computer science from the University of Milan and the HdR (habilitation) from the University of Toulouse III in 2013. Since 2017, he has been an associate professor at the University of Milano-Bicocca, where he previously had a researcher position. His research activity is about uncertainty management, with particular reference to rough sets, three-way decision and non-classical logics. He is Senior Area Editor of International Journal of Approximate Reasoning, Area Editor of Array, Associate editor of Granular computing, member of the editorial board of Fuzzy Sets and System, Transactions on Rough Sets and Special Member of the editorial board of Journal of Tongji University (Natural Science). He held several positions inside the International Rough Set Society, including president in the years 2019/20, and is now chair of the PhD Committee School.

Overview of Technical Program

	February 24 Wednesday	February 25 Thursday	February 26 Friday	February 27 Saturday
9:30-10:30	Inauguration Session	**Keynote Talk-III** **Prof.Yiyu Yao**	**Keynote Talk-IV:** Prof. Roman Slowinski Shift to 12.30– 13:15.	**Keynote Talk- Ⅶ :-** **Prof. Oscar Castillo Tijuana**
10:30-11:00	Coffee Break			
11:00-12:30	Keynote Talk-I: Prof. Zhongzhi Shi Keynote Talk-II: Prof. Andrzej Skowron	**Session Ⅱ** **Machine Learning**	**Session Ⅵ** **Perceptual Intelligence**	**Session Ⅷ** **Medical Artificial Intelligence**
12:30-14:00	Lunch			
14:00-15:30	**Session I** **Brain Cognition**	**Session Ⅳ** **Language Cognition**	**Keynote Talk-V:** **Prof. Didier Dubois** **Keynote Talk-Ⅵ:** **Prof. Piero Pagliani**	
15:30-16:00	Coffee Break			
16:00-17.30	**Session Ⅲ** **Data Intelligence**	**Session Ⅴ** **VisionCognition**	**Session Ⅶ Intelligent Robot**	

Technical Program （India Time）

Wednesday February 24, 2021

9:30-10:30: ICIS2020 Opening Ceremony

Conference ID: 187 5790 8932（J-Meeting）
Chair: Mihir Chakrabarty

1. Anupam Basu Director: Welcome Adress from NIT Durgapur (General Chair of ICIS2020)
2. Mihir Chakrabarty: Greeting from ICIS2020 Conference (PC Co- Chair of ICIS2020)
3. Samarjit Kar: Welcome From Organization (OC Chair of ICIS2020)
4. Zhongzhi Shi: Grance at ICIS2020 Program (PC Chair of ICIS2020)

10:30-11:00 Coffee Break

11:00-12:30 Keynote Talk

Conference ID: 187 5790 8932（J-Meeting）
Chair: Mihir Chakrabarty

1. Zhongzhi Shi: Mind Modeling In Intelligence Science
2. Andrzej Skowron: Interactive Granular Computing Model in Intelligent Systems

12:30-14:00 Lunch

14:00-15: 30 Session Ⅰ Brain Cognition

Conference ID: 187 5790 8932（J-Meeting）
Chair: Tamas Mihalydeak

1. Some Discussions on Subjectivity of Machine and its Function
   Chuyu Xiong
2. Möbius Conjugate-Entangled Manifold of Contradictory and Mirror Manifold
   Jiali Feng and Jingjuan Feng
3. Invited Talk X Hexagon of Intelligenc**e**
   Jean-Yves Beziau

15:30-16:00: Coffee Break

16:00-17:30 Session Ⅲ Data Intelligence

Conference ID: 187 5790 8932（J-Meeting）
Chair: Arif Ahmed Sekh

1. Invited Talk III Object Detection vis-à-vis Medical Image Analysis

Goutam Chakraborty

2. Invited Talk ⅩⅦ Three-way decision for handling uncertainty in machine learning
   Davide Ciucci
3. Person Authentication by Gait Data from Smartphone Sensors using Convolutional Autoencoder
   Ashika Ramesh Kothamachu, Kavya SreeGajjala, Kotaro Nakano and Basabi Chakrabort
4. Ground deformation due to sudden interaction of finite faults in Burger's Rheology
   Piu Kundu Kundu and Seema Sarkar Mondal
5. Research on Personal Credit Risk Assessment Model Based on Instance-based Transfer Learning
   Maoguang Wang and Xing Yang

Thursday February 25, 2021

9:30-10:30: Keynote Talk III

Conference ID: 187 5790 8932（J-Meeting）
Chair: Zhongzhi Shi

Yiyu Yao: Trilevel Multi-Criteria Decision Analysis based on Three-Way Decision

10:30-11:00 Coffee Break

11:00-12:30 Session Ⅱ Machine Learning

Conference ID: 187 5790 8932（J-Meeting）
Chair: Piero Pagliani

1. Invited Talk XIV Similarity-based Rough Sets with Annotation Using Deep Learning
   Dávid Nagy, Kádek Tamás
2. Invited Talk XV P-T Probability Framework and Semantic Information G Theory Tested by Seven Difficult Tasks
   Chenguang Lu
3. Invited Talk XVI Recurrent Self-evolving Takagi–Sugeno–Kan Fuzzy Neural Network (RST-FNN) based Type-2 Diabetic
   Arif Ahmed Sekh
4. Invited talk Ⅳ Granulated Tables with Frequency by Discretization and Their Application
   Hiroshi Sakai

12:30-14:00 Lunch

14:00-15: 30 Session Ⅳ Language Cognition

Conference ID: 187 5790 8932（J-Meeting）
Chair: Sukanta Das

1. Invited Talk Ⅶ Fractional fuzzy inference systems: A brief introduction
   Mehran Mazandarani
2. Invited Talk XI From Texts to Classification Knowledge
   Shusaku Tsumoto
3. ANAS：Sentence similarity calculation based on automatic neural architecture search
   GaqiongLiu, ShiWang, Hua-YuWang and JingZhang
4. Fully interval integer transhipment problem- A solution approach
   Sudha G., Ramesh G., Datta D. and Ganesan K

15:30-16:00: Coffee Break

16:00-17:30 Session Ⅴ Vision Cognition

Conference ID: 187 5790 8932（J-Meeting）
Chair: K. S. Ravichandran

1. Invited Talk Ⅵ Characterization of Orderly Behavior of Human Crowd in Videos Using Deep Learning
   Debi Prosad Dogra
2. Lightweight FaceNet based on MobileNet
   Xinzheng Xu, Meng Du and Huanxiu Guo
3. Novel image compression and deblockingapproach using BPN and Deep neural network architecture
   Rajsekhar Reddy, R Sivagami, R Krishankumar, V Sangeetha, K. S. Ravichandran and Samarjit Kar

Friday February 26, 2021

12:30-13:15: Keynote Talk-IV:-

Conference ID: 187 5790 8932（J-Meeting）
Chair: Mihir Chakrabarty

Roman Slowinski: Coping with Uncertainty in Knowledge Discovery using Dominance-based Rough Set Approach

10:30-11:00 Coffee Break

11:00-12:30 Session Ⅵ Perceptual Intelligence

Conference ID: 187 5790 8932（J-Meeting）
Chair: Debi Prosad Dogra

1. Invited Talk Ⅰ Extensions of Dynamic Programming for Combinatorial Optimization and Data Mining
   Mikhail Moskov I
2. Invited Talk Ⅴ Logical treatment of incomplete/uncertain information relying on different systems of rough sets
   Tamás Mihálydeák

3. Stability Analysis of Imprecise Prey-Predator Model
   Anupam De, DebnarayanKhatua, KalipadaMaity, Goutam Panigrahi and ManoranjanMaiti
4. Comparative Performance Study on Human Activity Recognition with Deep Neural Networks
   Kavya SreeGajjala, AshikaKothamachu Ramesh, Kotaro Nakano and Basabi Chakraborty

12:30-14:00 Lunch

14:00-15: 30 Keynote Talks

Conference ID: 187 5790 8932（J-Meeting）
Chair: Andrzej Skowron

Keynote Talk V : Didier Dubois: Possibility theory and possibilistic logic: Tools for reasoning under and about incomplete information
Keynote Talk VI : Piero Paglian: A framework for the approximation of relations

15:30-16:00: Coffee Break

16:00-17:30 Session Ⅶ Intelligent Robot

Conference ID: 187 5790 8932（J-Meeting）
Chair: Shusaku Tsumoto

1. Invited Talk Ⅱ Learning Strategies for Human-robot Collaboration
   Amitava Chatterjee
2. Invited Talk XII Computation with Democracy: An intelligent System Computation with Democracy: An intelligent System
   Sukanta Das
3. Invited Talk XIII Beam and Ball Plant System Comtrolling Using Intuitionistic Fuzzy Control
   Ozkan Atan
4. Application of pinching method to quantify sensitivity of reactivity coefficients on power defect
   Subrata Bera
5. Fuzzy Based Algorithm for Stage-I of Cascaded Intelligent Relaying
   SoumyadeepSamonto, Samarjit Kar, Sagarika Pal, Arif Ahmed and Bishal Sarkar

Saturday February 27, 2021

9:30-10:30: Keynote Talk-VII:-

Conference ID: 187 5790 8932（J-Meeting）
Chair: Samarjit Kar

Oscar Castillo: Neural Networks, Fuzzy Logic and Fractal Theory for Modeling COVID-19

10:30-11:00 Coffee Break

11:00-12:30 Session Ⅷ Medical Artificial Intelligence

Conference ID: 187 5790 8932（J-Meeting）
Chair: Debabrata Dutta

1. Invited Talk Ⅷ Development of CAD Models with AI techniques for Melanoma Diagnosis
   K. S. Ravichandran
2. Invited Talk Ⅸ Uncertainty Modeling of Epidemiological Models of Infectious Disease
   Debabrata Dutta
3. Economy and Unemployment Due to COVID19: Secondary Research
   Moitri Chakraborty, Akash Maity, Madhumita Ghosh, Dipanwita Dutta, Sayan Chatterjee and Mainak Biswas
4. Optimal Control of Dengue-Chikungunya Co-infection: A mathematical Study
   Anupam De, Kalipada Maity, Goutam Panigrahi and Manoranjan Mait
5. Comparative analysis of machine learning algorithms for categorizing eye diseases
   Premaladha Jayaraman, R Krishankumar, K S Ravichandran, Ramakrishnan Sundaram, Samarjit Kar

Notes

1. **Schedule time: India local time**

2. **Present Duration**

   Keynote Speakers: 45 minutes
   Invited Speakers: 20 minutes
   Papers: 15 minutes

3. The online conference Platform: J-Meeting Client

The J-Meeting Handbook can download from

http://jishicloud.com/client.html

4. **Join ICIS2020 Conference**

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