

# PRAI 2018

International Conference on Pattern Recognition And  
Artificial Intelligence

August 15-17, 2018

Kean University, Union, NJ, USA



KEAN  
UNIVERSITY



*robotics*

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## About PRAI 2018

2018 the International Conference on Pattern Recognition and Artificial Intelligence (PRAI 2018) is a forum for presenting excellent results and new challenges facing the field of the reliability and availability of Pattern Recognition and Artificial Intelligence. It brings together experts from industry, governments and academia, experienced in engineering, design and research.

The PRAI 2018 is sponsored by Kean University, supported by OPSS-China and Robotics Journal of MDPI.

PRAI 2018 offers a rich program, including keynote talks, regular papers, together with academic visit. We need your contribution and participation to make it a successful event. You can be encouraged by the fact that the excellent presentation and best paper award will be granted. The conference proceedings will be indexed by Ei Compendex and Scopus.

We hope that you will have a good time during PRAI 2018.

### Publication



Accepted papers will be published in **International Conference Proceedings Series by ACM (ISBN: 978-1-4503-6482-9)**, which will be archived in the ACM Digital Library, and indexed by **Ei Compendex** and submitted to be reviewed by **Scopus** and Thomson Reuters Conference Proceedings Citation Index (ISI Web of Science).



Qualified papers will be recommended to be published on the **International Journal of Machine Learning and Computing (IJMLC, ISSN: 2010-3700)** which indexed by **Scopus, Ei (Inspec, IET)**, Google Scholar, Crossref, ProQuest, Electronic Journals Library and DOAJ.

Conference Website: <http://www.prai.net>

Email: [praiconf@foxmail.com](mailto:praiconf@foxmail.com)

# Presentation Instructions

## Instructions for Oral Presenters

### **Devices Provided by the Conference Organizer:**

Laptop Computer (MS Windows Operating System with MS PowerPoint and Adobe Acrobat Reader)  
Digital Projectors and Screen  
Laser Stick

### **Materials Provided by the Presenters:**

PowerPoint or PDF Files (Files should be copied to the Conference laptop at the beginning of each session.)

### **Duration the each Presentation:**

Keynote Speech: 40 minutes including 35 minutes of Presentation and 5 minutes of Question and Answer  
Regular Oral Presentation: 15minutes including 12 minutes of Presentation and 3 Minutes of Question and Answer

## Instructions for Poster Presenters

### **Materials Provided by the Conference Organizer:**

The place to put poster

### **Materials Provided by the Presenters:**

Home-made Posters  
Maximum poster size is A1  
Load Capacity: Holds up to 0.5 kg

## Best Presentation Award

One Best Oral Presentation will be selected from each presentation session, and the Certificate for Best Oral Presentation will be award at the end of each session on August 16, 2018.

## Dress Code

Please wear formal clothes or national representative of clothing.

# Committee Members

## **General Chair**

George Chang, Kean University, USA

## **Local Chair**

Chingyu Huang, Kean University, USA

## **Program Chair**

Chingsong Wei, City University of New York, USA

Juan J Li, Kean University, USA

## **Technical Committee Member**

Alfredo Cuzzocrea, University of Trieste & ICAR-CNR, Italy

Ali Dewan, Athabasca University, Canada

Antonio Celesti, University of Messina, Italy

Atishay Jain, Adobe Systems, USA

Cristina Portales Ricart, Universitat de València, Spain

Daochuan Hung, New Jersey Institute of Technology, USA

Hyunbum Kim, University of North Carolina at Wilmington, USA

Jingchiou Liou, Kean University, USA

Kenji Suzuki, Tokyo Institute of Technology, Japan

Limin Liu, Shih Hsin University, Taiwan

Luis Paulo Reis, University of Minho, Portugal

Mariofanna Milanova, University of Arkansas at Little Rock, USA

Nik Bessis, Edge Hill University, UK

Patricia Morreale, Kean University, USA

Sasa Arsovski, City, Universtity of London, Malaysia

Sebastián Ventura, Sebastián Ventura

Silvia Biasotti, Consiglio Nazionale delle Ricerche, Italy

Stephen Westland, University of Leeds, UK

Teresa A. Oliveira, Open University in Lisbon (UAb), Portugal

Yudong Zhang, University of Leicester, UK

Yuliya Tarabalka, INRIA Sophia Antipolis, France

# Keynote Speakers

## Keynote Speaker I



**Mehmet Celenk**

**School of Electrical Engineering & Computer Science, Ohio University, OH, USA**

Mehmet Celenk received the B.S. and M.S. degrees from Istanbul Technical University, in 1974 and 1976, in Electrical and Communications Engineering, and the Ph.D. degree from Stevens Institute of Technology in Electrical Engineering and Computer Science (EECS), in 1983, where he was the Robert Crook Stanley Graduate Fellow in 1985. He served on the Turkish Army in 1984-85 as a lieutenant and joined Ohio University (OU) in 1985, where he is currently a Professor of the School of EECS. He has published 300 articles, received \$600K hypercube processor grant, participated in \$450K Tubitak Autonomous Vehicle Design and Development grant, and secured \$120K fund for visiting scholars' R&D projects. He directed 35 MS/Ph.D. theses/dissertations in the School of EECS of OU. He received the distinguished service award from the Signal School in Ankara in 1984 for his R&D work and launching the Communications Journal. He was the recipient of the 1988 Fritz & Dolores Russ Research Award of the Russ College of ENT of OU, and awarded the OU Avionics Academic Challenge Faculty Fellowship in 1988-92. He has been an active reviewer for numerous professional societies (e.g., IEEE, IEE, IET, SPIE, IS&T, IAPR), journals/transactions, publishers, and funding agencies (NSF, NYSTAR 2002-07). He has been an Associate Editor (AE) of the IEEEET on SMCA (currently SMC: Systems) since 2005, an AE of the Electronic Letters of the IET since 2015, an AE of EURASIP J. on Advances in Signal Processing since 2015, and the recipient of the Best Associate Award of the IEEE SMC Society in 2010. He has served on the Editorial Board of the J. Recent Patents on Signal Proc. 2008-14, on the Editorial Board of J. of Biometrics and its Applications in 2014-15, and on TCM of numerous international conferences. He is selected to be an IEEE Life Member (Jan.1, 2018), IEEE Senior member (March 7, 2018), a member of Eta Kappa Nu, and former member of SPIE, IS&T, ACM, ASEE, OE. He was awarded Certificate of Appreciation by SPIE's Electronic Imaging J. and Optical Engineering for his review services in 2012-17 and by INSTICC&ICPRAM for his review services in 2015-17. His research area includes image/video processing, computer-vision, pattern

recognition and machine learning, multi-sensory networking, data fusion, distributed computing, medical imaging, and digital systems.

**Speech title: Autonomous Vehicle Guidance**

**Abstract**—The aim of this paper\* is to investigate a novel method for detection of road lane markers in conjunction with the determination of positioning of the self-driving vehicle relative to lane markers and road boundaries during travel in inclement weather conditions continues to be of paramount importance. This research considers the detection performance and associated parameters using experimental data that demonstrates the accurate results during various conditions. This work presents an investigation and associated results where road land boundary markers are detected in conjunction with the ability decipher the horizon when the front view of the vehicle’s path is degraded. Degradation of driving scenes can be attributed to such weather conditions as heavy rain, fog, snow or dust storms. The detection of lane markers and road boundaries is especially important for roads that exhibit severe curves, aggressive uphill slopes and downhill valleys, respectively. We present a model to predict deviations from reference distances associated with roads with such design constraints. To address self-driving objectives a method is proposed based on the Least Mean Square (LMS) optimization and the orthogonality principle. The paper also presents a design methodology of the concepts to address autonomous operation of passenger vehicles with some promising experimental results. Specifically, error curves are computed and presented for the actual verses predicted lane markers by integrating salient features of the Principal Component Analysis (PCA) and Gradient Specturm Matching (GSM) methods. Multi IR-sensory based fusion is selected as an implementation test bed for the development of an embedded system for autonomous convoy guidance with promising experimental results.

\*H. B. Riley, A. Parajuli, and M. Celenk, “Autonomous Vehicle Guidance,” IEEE Trans. on ITS, (submitted on Jan. 20, 2018)

## Keynote Speaker II



**Patrick Shafto**

**Department of Mathematics and Computer Science, Rutgers University - Newark, NJ, USA**

Dr. Patrick Shafto is the Henry Rutgers Term Chair in Data Science and Associate Professor of Mathematics and Computer Science at Rutgers University - Newark. Research in his lab focuses on understanding learning from the perspective of humans and machines, with a specific focus on leveraging our understanding of perception, cognition, and social reasoning to facilitate human-computer cooperation. He has published papers and presented research at conferences across fields, including Computer Science, Cognitive Science, Cognitive and Developmental Psychology, Vision, Education, and Philosophy. He has received numerous honors and awards including an NSF CAREER award and his research has formed the basis for a successful data science start-up companies. His research is supported by NSF and DARPA programs.

**Speech title: Is there a Science of Data Science?**

**Abstract**—Data science has emerged largely driven by changes in industry. Common definitions of data science, based on intersections of different fields or the skills required by industry, do not necessarily inform what research academics in this field should pursue. Is there even a science of data science? If so, what differentiates it from related research areas? What are the core questions that data science needs to answer? In this talk, I will argue that there are, in fact, questions that are of unique interest to data science that are not covered by other fields. I will give examples from recent research, and discuss challenges and future directions.

## Keynote Speaker III



**Godfried T. Toussaint**

**New York University Abu Dhabi, the United Arab Emirates**

**McGill University, Canada**

Dr. Godfried Toussaint is the father of Canadian computational geometry and one of the pioneers of the field worldwide. He solved many fundamental and foundational questions in Computational Geometry. But his interests range wider, and he has initiated many other entirely new directions of multidisciplinary research. His most impressive successes in this regard are his recent contributions in music theory and ethnomusicology. He is currently a Professor and head of the Computer Science Program at New York University Abu Dhabi, in the United Arab Emirates as well as a Research Associate in the Schulich School of Music at McGill University in Montreal, Canada. Professor Toussaint has published over 400 papers, and has given over 300 invited presentations. His ability to communicate his ideas to researchers in diverse fields is demonstrated by his recently published book *The Geometry of Musical Rhythm: What Makes a “Good” Rhythm Good?* This book proposes a new way to analyze musical rhythms using geometry and shows how useful this approach can be in many domains of musicology in the broadest sense. The book was selected for inclusion in Princeton University Press’ fifth anthology of the best writing on mathematics. Professor Toussaint was a cofounder of the two main computational geometry conferences, both held annually: The ACM Symposium on Computational Geometry and the Canadian Conference on Computational Geometry. He has been the editor of the leading international scholarly journals in his fields including the IEEE Transactions of Pattern Analysis and Machine Intelligence, the IEEE Transactions on Information Theory, the Pattern Recognition journal, the Discrete and Computational Geometry journal, the journal of Computational Geometry: Theory and Applications, and the journal of Computational Geometry and Applications. He garnered several prestigious awards including a Killam Senior Research Fellowship from the Canada Council for the Arts, a Radcliffe Fellowship from the Radcliffe Institute for Advanced Study at Harvard University, and a Lifetime Achievement Award from the Canadian Association for Computer Science.

**Speech title: Local Spatial Planning Problems in Algorithmic Robotics**

*Abstract*—In this presentation, some results and open problems are described concerning the mobility properties of geometric objects in two and three dimensional Euclidean spaces. One class of problems asks simply whether two or more objects can be separated by one or more rigid translations or rotations, without any collisions occurring between the objects during the motions. The objects may consist of discs and balls, or a variety of different classes of geometric shapes, such as line-segments, polygons, or polyhedra. The objects may be constrained to move one-at-a-time, or they may be permitted to move simultaneously. A second class of problems arises for polygonal and polyhedral linkages in which their vertices and edges, respectively, act as joints (either revolute, universal, dihedral, or hinge). Such problems are concerned with whether idealized linkages can be reconfigured from a given starting configuration to a specified target configuration, by means of prescribed allowable motions.

# Conference Program

## Brief Schedule of Conference

Day 1 August 15, 2018 (Wednesday)			
12:00~17:00	On-site Sign in	Lobby (1 <sup>st</sup> F), North Avenue Academic Building	
Day 2 August 16, 2018 (Thursday)			
Morning Conference			
9:00~17:00	On-site Sign in	Hall way (5 <sup>th</sup> F), North Avenue Academic Building	
09:30~09:40	Opening Remarks	Room 507 (5 <sup>th</sup> F), North Avenue Academic Building	
09:40~10:20	Keynote Speech I (Mehmet Celenk )		
10:20~10:40	Coffee Break & Group Photo Shooting	Hall way (5 <sup>th</sup> F), North Avenue Academic Building	
10:40~11:20	Keynote Speech II (Patrick Shafto)	Room 507 (5 <sup>th</sup> F), North Avenue Academic Building	
11:20~12:00	Keynote Speech III (Godfried T. Toussaint)		
12:00~14:00	Lunch Break	6 <sup>th</sup> F, North Avenue Academic Building	
Afternoon Conference Venue: 5 <sup>th</sup> F, North Avenue Academic Building			
14:00~16:00	Poster Sessions		Hall way (5 <sup>th</sup> F), North Avenue Academic Building
14:00~15:45	<b>Session 1</b> <Artificial Intelligence and Data Analysis> Venue: Room 504 7 presentations	<b>Session 2</b> < Signal Analysis and Processing > Venue: Room 513 7 presentations	<b>Session 3</b> < Biometric Technology and Applications > Venue: Room 508 7 presentations
15:45~16:05	Coffee Break		Hall way (5 <sup>th</sup> F), North Avenue Academic Building
16:05~17:50	<b>Session 4</b> < Neural Network and Machine Learning > Room 504 7 presentations	<b>Session 5</b> < Image Processing > Venue: Room 508 6 presentations	
18:00	Dinner Banquet		6 <sup>th</sup> F, North Avenue Academic Building
Day 3 August 17, 2018 (Friday)			
One Day Tour			

# Detailed Schedule for Sub-Sessions

August 16, 2018 (Thursday)

Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.

## Session 1 <Artificial Intelligence and Data Analysis>

Session Chair: Prof. Juan J Li

Venue: Room 504 (5<sup>th</sup> F), North Avenue Academic Building

Time: 14:00~15:45

<p>P0007 (14:00~14:15)</p>	<p>Experimental validation of a diagnostic system for predictive maintenance of on-board systems of aerospace vehicle.</p> <p><b>Vincenzo Quaranta</b>, Gianluca Diodati</p> <p>CIRA, Italian Aerospace Research Centre, Italy</p> <p><i>Abstract</i>—This paper deals with the experimental validation of an innovative diagnostic system, developed by the Italian Aerospace Research Centre (CIRA) to improve predictive maintenance techniques of on-board systems of aerospace vehicle.</p> <p>Diagnostics is the analysis process that, preferably without intrusive inspections, by using the measurements of certain physical quantities, characteristics of the monitored machine, allow to evaluate the health conditions of the equipment itself and to estimate the relative trend in time, for evaluations and predictions on its short and long-term reliability. The diagnostic main objectives are: detection, localization and identification of the fault.</p> <p>For the validation of the monitoring methodologies developed at CIRA, the predictive maintenance of an electric blower, available at CIRA plant, has been selected as a relevant test case. Currently, for engine health monitoring, the analysis of operational vibrational levels is used. These measures allow to detect, for example, incipient failures in the bearings, in the stator windings and in the rotor.</p> <p>A diagnostic system is typically developed according to the following steps: data acquisition, data processing, decision making. Following this strategy, a set of vibrational measurement by means of tri-axial accelerometers have been performed on the electric blower, then the statistical analysis of the wavelet decomposition of the measured signals have been evaluated. Finally a dedicated neural network classifier has been trained and then used to recognize the health status of the system.</p> <p>To properly train the faults classifier a set of vibrational signals with frequency contents corresponding to known engine damages has been experimentally added to the operational vibrations of the engine by means of an electro-dynamic shaker acting on the engine chassis and driven with a set of ad-hoc designed signals. The algorithm test and validation has been performed for four different kind of artificially introduced faults (engine imbalance, asymmetry of the stator</p>
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	<p>magnetic field, defect of the bearing outer ring, defect of the bearing inner ring) with 7 different damage's levels measured during 11 different run of the engine.</p> <p>The artificial neural network classifier was trained by the use of a subset of experimental data and then validated through a comparison with another different subset of data from the same experimental campaign. The paper demonstrates the feasibility of developing a suitable artificial neural network to establish if a vibrational time signal, elaborated through a wavelet process, is or isn't representative of a certain damage with a certain level of confidence.</p>
<p>P0018 (14:15~14:30)</p>	<p>Feature Selection and Extraction Methods for Fault Detection in Wind Turbines</p> <p><b>Gokcen Kavaz</b>, Burak Barutcu</p> <p>Roketsan Missiles Industries Inc. Turkey</p> <p><i>Abstract</i>—Health monitoring and fault detection of wind turbines constitute an important part of the operational processes. The global goal of increasing the share of renewable energy systems in overall energy supplies caused increases both in number and size of wind turbines which made condition monitoring and fault detection systems even more crucial.</p> <p>Determining the features best characterize a system is an important part of artificial intelligence applications. In this research, feature selection and extraction methods were applied to wind turbine data to improve the performance of the fault detection system. Data gathered from Supervisory Control and Data Acquisition (SCADA) System of an onshore wind turbine was used for this aim. The advantage of using this data is that SCADA system is a built-in part in most MW class wind turbines, therefore no additional costs are required. However, SCADA systems was not initially built for fault detection purposes so generally the data output rate is low. The low frequency of SCADA data causes difficulties in predicting faults in early phases. Intelligent methods are required to overcome this factor. Artificial Neural Networks (ANN) were selected for fault detection and isolation purposes. The results show that, feature selection and extraction methods applied in this research are effective in increasing the performance of ANNs trained for fault detection of wind turbines.</p>
<p>P0020 (14:30~14:45)</p>	<p>Ethics and Emerging Technologies: Teaching Philosophy with Robotic Weapons Systems</p> <p><b>Christopher Korpela</b>, Michael Saxon</p> <p>Robotics Research Center United States Military Academy West Point, NY</p> <p><i>Abstract</i>—Technological advancements in autonomy promise a Revolution in Military Affairs (RMA), where autonomous weapons will co-mingle with human military members and noncombatant populations. Because of this, the college classroom provides an excellent laboratory for integrative learning between engineering disciplines and the humanities. Our project, the Ethics of Ground Lethal Autonomous Weapons (GLAWS) demonstrated that students could successfully integrate the engineering skills required to improve small, autonomous robots to</p>

	<p>perform on a simulated battlefield, which brought out corresponding discussions of philosophical concepts such as exist in the ethics of war, including just war theory, as well as larger issues in agency and responsibility.</p>
<p>P0024 (14:45~15:00)</p>	<p>The Effect of Moderator Bots on Abusive Language Use</p> <p><b>Li-Yin Young</b></p> <p>University of Colorado Boulder, Colorado</p> <p><i>Abstract</i>—Moderator bots are widely used on forums and social media. On Internet forums, moderator bots play an important role in automatically monitoring the content of images and the text present on the forum as well as providing repetitive information without the need for interaction with an administrator. The increasing use of moderator bots inspired me to study the performance of moderator bots. To date, research investigating the effect of moderator bots has not been conducted. Herein, we analyzed Reddit, a popular U.S. social news aggregation platform, which uses a moderator bot (AutoModerator) to mitigate the invalid comments occurring in discussion groups. This has thus become an ideal research opportunity for this study. We implemented a regression discontinuity design and interrupted time-series analysis to estimate the effect of AutoModerator on word-quality improvement. We observed an abrupt and significant decrease in the rate of abusive posts to which AutoModerator was attached. These results suggest that AutoModerator has been effective in controlling the word quality.</p>
<p>P0026 (15:00~15:15)</p>	<p>On the Computational Study of Chinese Alzheimer’s Disease Online Communities: A Sentiment and Contextual Analysis Approach</p> <p><b>Qiming Sun, Tiffany Tang</b></p> <p>Wenzhou-Kean University, China</p> <p><i>Abstract</i>—Alzheimer’s Disease (AD) is a neurodegenerative disease affecting millions of people worldwide. There are very few published systematic prevalence studies of AD in China which claims the most AD cases worldwide. Our understandings on the public awareness, challenges and problems of the AD population faces and knowledge held among the general public and medical professionals are even rare which motivates the present study. In particular, to research the current situation of AD communities in China, this present study proposes several data mining and natural language processing techniques (including sentiment analysis and named entity recognition) on the posts in two popular Chinese forums. The computational analysis results revealed the varying attentions that AD communities receive from the society, the users’ collective emotion state, the problems and challenges the population is facing and some common patterns from across the general public and medical professions. Our computational studies, one of the very few in the literature, can facilitate the acknowledgment and understanding of the disease for everyone in the society and provide policy-makers and commercial companies with some insights and urging needs of the population.</p>

<p>P0037 (15:15~15:30)</p>	<p>Analyzing Stock Market Movements Using News, Tweets, Stock Prices and Transactions Volume Data for APPLE (AAPL), GOOGLE (GOOG) and SONY (SNE)</p> <p>Brijen Rai, Mangala Kasturi and <b>Ching-Yu Huang</b></p> <p>Kean University, Union, USA</p> <p><i>Abstract—Goal:</i> Today’s financial markets are of complex behavior which is the result of decisions made by many traders. Goal of this research is to calculate the relationship between financial markets stock prices, volumes, counts in financial news and tweets.</p> <p><i>Method:</i> Collect the data sets for the three companies - <b>Apple, Google and Sony</b></p> <ol style="list-style-type: none"> <li>1. Collect tweets using Twitter API written in Python and extract tweet counts only related to stocks for the above companies.</li> <li>2. Collect News data counts using News API, written in Python, only related to stocks for the above companies.</li> <li>3. Collect stocks data including Volume, Close Price, etc. for the above companies.</li> </ol> <p><i>Findings:</i> We find a positive correlation between the daily number of mentions of the above companies in the Tweets, News, daily stocks close prices and daily transactions volume of a company's stock after the tweets and news are released. Our results provide measurable support for the suggestion that activities in financial markets, news and tweets are fundamentally interlinked.</p>
<p>P0045 (15:30~15:45)</p>	<p>Analyzing relationship: Twitter tweet Frequency with the Stock prices of Telecom Companies</p> <p><b>Amrita Shelar</b> and Ching-Yu Huang</p> <p>Kean University, Union, USA</p> <p><i>Abstract—</i>Twitter is a widely used online social media. In this paper, we investigate whether the daily number of tweets that mention any of the telecom companies i.e. Verizon, T-Mobile, AT&amp;T and Sprint vis-à-vis stock prices. The study focuses on correlating data sets of Twitter tweet frequency with the stock prices of telecom Companies; using Statistical Methods: Z-score and Chi-Square - Test of Independence with data visualization. Our results demonstrate the relation between daily numbers of tweets is correlated with that of stock price for Verizon and T-Mobile. Our preliminary results also demonstrate the relation of frequency of tweets with stock prices of each day. Furthermore, it appears that Twitter tweets and stock prices are independent.</p>

Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.

## Session 2 < Signal Analysis and Processing >

Session Chair: Prof. Patricia Morreale

Venue: Room 513 (5<sup>th</sup> F), North Avenue Academic Building

Time: 14:00~15:45

<p>P0027 (14:00~14:15)</p>	<p>Mine the Gap: Gap Estimation and Contact Detection Information via Adjacent Surface Observation</p> <p><b>Yazdan Jamshidi</b>, Greg Welch</p> <p>University of Central Florida, USA</p> <p><i>Abstract</i>—In general, conventional computer vision techniques suffer from an inability to detect hidden surface contacts due to line-of-sight visibility problems. Rather than fitting models to scene objects and estimating inter-object gaps, our approach is to leverage the fact that light passing between and reflecting off the surfaces can offer valuable information as it alters the appearance of nearby surfaces. For a proof of concept demonstration, we employed a machine learning approach to classifying adjacent surface imagery to estimate hidden surface distances and contact locations in a controlled setting under ambient lighting conditions. Our proof-of-concept results demonstrate relatively high accuracy for the estimation of gap size and the detection of contact between hidden surfaces. We envision such measures could someday provide complementary information to be combined with traditional visible-surface methods, to obtain more precise and robust estimates of hidden surface relationships.</p>
<p>P0036 (14:15~14:30)</p>	<p>New Geometric Features that Make a ‘Good’ Rhythm Good</p> <p><b>Godfried T. Toussaint</b></p> <p>New York University Abu Dhabi, United Arab Emirates</p> <p><i>Abstract</i>—Recent research has uncovered a variety of geometrical and other mathematical features possessed by a musical rhythm, that appear to contribute to the rhythm’s attractiveness or “goodness” as measured by the rhythm’s universal adoption among traditional cultures around the world, and the test of time [1]-[3]. These features find applications, in music perception, music recognition, music information retrieval, and music recommendation systems. They also furnish algorithms for the automatic generation of good rhythms, and software tools to help the composer [4]. In this presentation four new geometric features of musical rhythms are described, that augment those collected to date, and provide further evidence of the singular success that the ubiquitous <i>clave son</i> rhythmic ostinato has enjoyed for more than 700 years of recorded history. Musical rhythms are represented here as binary symbol sequences consisting of sounded and</p>

	<p>silent pulses (onsets and rests) mapped onto a regular circular lattice. Of the four features, two are based on the number of sub-symmetries present in the rhythms, calculated on either the binary sequences themselves, or the duration intervals between their adjacent sounded pulses [5]-[6]. A sub-symmetry in a symbol sequence is a palindrome consisting of a contiguous subsequence of symbols of the sequence. The third feature measures the area of the convex hull of the polygonal plot in phase-space, obtained from the binary sequence representation of a rhythm [7]-[8]. The fourth feature indicates whether or not the hierarchical underlying meter has the fractal property [9]-[10].</p>
<p>P0049 (14:30~14:45)</p>	<p>DNN-LSTM-CRF model for Automatic Audio Chord Recognition</p> <p><b>Shota Nakayama</b> and Shuichi Arai</p> <p>Tokyo City University Graduate Division, Japan</p> <p><i>Abstract</i>—Automatic Chord recognition systems use timewise models to postprocess frame-wise chord predictions from acoustic models. In this paper, we propose a DNN - LSTM - CRF model for chord recognition. Deep learning has become widespread in chord recognition and has good effects for improving recognition accuracy. It is common to perform chord classification with CNN and perform final chord recognition using RNN, CRF or the like. However, CRF commonly used for post filtering considers chord information at the previous time only. Since there is a progress pattern for chord progression in music We thought that estimation accuracy could be improved by using chord information at a previous time. Therefore, we focused on LSTM (Long Short – Term Memory). We think that improvement of estimation accuracy can be expected by considering chord information of many times in LSTM and further using chord information of previous time in CRF. Although a hybrid model of RNN and CRF has been proposed, RNN has a kind and it is necessary to select an appropriate RNN. Therefore, we conducted comparison study using three types of RNN, LSTM, GRU and Bi-LSTM. Our results showed the effectiveness of RNN in chord recognition using deep learning. This discovery constitutes a further step towards the development of a chord recognition system.</p>
<p>P0050 (14:45~15:00)</p>	<p>Tweet Semantic Classification in Civil Engagement Research</p> <p>S. Compion, P. Croft, J. J. Li, K. Ngoy and <b>F. Qi</b></p> <p>Kean University Union, NJ USA</p> <p><i>Abstract</i>— This paper presents a proposal of applying Latent Semantics Indexing to automatically classify tweets into different categories to create a location-based geographic map of students’ civil engagement intensity and correlate them with social effects. Since the work is at a proposing stage, the focus of the paper is on the research methodology, as well as previous results with Facebook data. We implemented the methodology in a posting classification tool working with Facebook API. During our validation, the tool extracted 100 postings and classified them into five categories of politics, entertainment, science, technology, and daily life. Once applied to tweet</p>

	<p>analysis, we hope to contribute to the field of applying machine learning algorithms to social study with focus on measuring the effectiveness of civil engagement.</p>
<p>P0052 (15:00~15:15)</p>	<p>Localisation of Drone Controllers from RF Signals using a Deep Learning Approach</p> <p><b>David Shorten</b>, Saket Srivastava and John Murray</p> <p>University of Hull, UK</p> <p><i>Abstract</i>—Despite their many uses, small commercial Unmanned Aerial Systems (UASs) or drones pose significant security risks. There is, therefore, a need to find methods of detecting, localising and countering these vehicles. This paper presents work towards autonomously localising drone controllers from the Radio Frequency (RF) signals they emit. An RF sensor array is used to monitor the signal spectrum. A Convolutional Neural Network (CNN) is trained to be able to predict the bearing of the drone controller, relative to the sensor, given its output. The position of the controllers can then be calculated from these bearings, provided that at least two such sensors are deployed a reasonable distance apart. The model is able to achieve a mean absolute error of <math>3.67^\circ</math> in bearing calculation, which translates into a moderate positional error of 40m at a range of 500m.</p>
<p>P0053 (15:15~15:30)</p>	<p>Optimizing ANN Training Performance for Chaotic Time Series Prediction Using Small Data Size</p> <p><b>Lei Zhang</b></p> <p>University of Regina, Canada</p> <p><i>Abstract</i>—In this paper, the training performance of artificial neural network (ANN) is investigated based on three aspects of the training data: the data size, the distribution of the subsets for training, validation and testing, and the data segments of the training data, which are generated using Lorenz chaotic system equations and the forward Euler method to represent the chaotic features commonly found in real world applications, specifically for the prediction of dynamic time series such as Electroencephalogram (EEG) signals captured from brain activities. This research investigates the potentiality and feasibility of using small data set for training ANN to generate chaotic time series, which can be used for the simulation and analysis of chaotic features in EEG signals. Contradictory to the popular belief that better performance can be achieved by larger number of training samples, the training results show that the same level of training performance can be achieved by a relative small number of training samples for the generation and prediction of the chaotic system time series.</p>

<p>P0055 (15:30~15:45)</p>	<p>Comparative Study of Machine Learning and Deep Learning Architecture for Human Activity Recognition using Accelerometer Data</p> <p><b>Sarbagya Ratna Shakya</b>, Chaoyang Zhang and Zhaoxian Zhou</p> <p>University of Southern Mississippi, USA</p> <p><i>Abstract</i>—Human activity recognition (HAR) has been one of the popular fields of research in recent times. Many approaches have been implemented in literature for recognizing and analyzing human activity. The classical machine learning approaches use handcrafted feature extraction and are based on classification, but recently deep learning approaches have shown a greater success in recognition accuracy with increased performance. With the wide popularity of mobile phones nowadays and various sensors such as accelerometer, gyroscope, and camera that is already installed on the mobile phones, the activity recognition using the accumulating data from mobile phones has been a good area of research in HAR. In this paper, we investigate the state of art in HAR based on the data collected through the accelerometer sensor of the mobile devices. We employ different machine learning(ML) classifiers, algorithms, and deep learning (DL) models across different benchmark datasets. The experimental result from this study provides a comparative performance analysis based on accuracy, performance, and cost between different machine learning algorithms and deep learning algorithms based on recurrent neural network (RNN) and convolutional neural network(CNN) models for activity recognition.</p>
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Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.

### Session 3 < “Biometric Technology and Applications” >

Session Chair: Prof. Jingchiou Liou

Venue: Room 508 (5<sup>th</sup> F), North Avenue Academic Building

Time: 14:00~15:45

<p>P0013 (14:00~14:15)</p>	<p>An Ontology for Classifying Vietnamese Dance Movements</p> <p>Abdelmoutia Telli, Ma Thi Chau, Mustapha Bourahla, Karim Tabia, <b>Salem Benferhat</b></p> <p>CRIL-CNRS, Université d’Artois, France</p> <p><i>Abstract</i>—This paper proposes an OWL ontology called “VDM” (Vietnamese Dance Movements), to define taxonomy of dance movement classes and their relationships for the traditional Vietnamese dances taking into account the semantics of its art and its cultural anthropologists. The “VDM” terminology can be used to describe elementary movements (poses) as a dataset ontology importing the ontology “VDM”. These poses are results of dance sequences segmentation (using segmentation techniques). The ontology “VDM” is supported by classification rules, which are developed with the OWL complementary language SWRL (Semantic Web Rule Language) to entail movement phrases, which are basic movements with complete meaning. The dataset ontology containing pose descriptions can be queried using the query language SQWRL (Semantic Query Web-enhanced Rule Language).</p>
<p>P0011 (14:15~14:30)</p>	<p>An Online Integrated Fingerprint Image System</p> <p><b>Ching-yu Huang</b>, Limin Liu</p> <p>Kean University, US</p> <p><i>Abstract</i>—Fingerprint analysis is one of the most commonly-used biometrics technologies, primarily used in forensic science to identify people. Due to various reasons, most fingerprint related studies are conducted in an isolated environment which makes it hard for researchers to collaborate across institutes. Web-based client/server applications have become an important component for international collaboration because such an application allows users from different locations to execute the same program on the same data. Such systems can be quickly developed and are easy to use. In this paper, a 3-tier integrated online fingerprint system was developed to manage and process fingerprint images in real-time. This system allows users all over the world to access the public NIST-14 fingerprint dataset and collaborate with other researchers to conduct the research task. The front-end of the system is an advanced web-based interface that allows users to view fingerprint images in different resolution, singular points, enter, and update the location of singular points. This system can also preserve the entered information in the back-end</p>

	<p>database.</p>
<p>P0001 (14:30~14:45)</p>	<p>Automatic Ecosystem Identification using Psychoacoustical Features</p> <p><b>Diana C. Duque-Montoya</b> and Claudia Isaza</p> <p>Universidad de Antioquia, Colombia</p> <p><i>Abstract</i>—The recent changes in worldwide ecosystems require constant monitoring and actions to prevent habitat destruction and mass extinction of species. The development of Passive Acoustic Monitoring (PAM) techniques has allowed the study of ecosystem dynamics, producing no harm to them. In this study, a relation between psychoacoustical features and ecosystem degradation was explored. Psychoacoustical features are used mainly for urban soundscapes categorization and they are based on human subjective perception of sound; however, they provide a starting framework for linking soundscape to spatial structure. To map soundscape to ecosystem health, an artificial neural network (ANN) and three different types of support vector machines (SVM) were tested for automatic ecosystem type identification using the selected features. Three out of four models led to good results, but as future work, it is suggested to adapt psychoacoustical features to a more neutral auditory system so the analysis includes more species perception of the ecosystem soundscape.</p>
<p>P0023 (14:45~15:00)</p>	<p>Skin Conductance as an In-Situ Marker for the Degree of Concentration in a First Person Shooting Training Game: Some Preliminary Findings</p> <p>Yuxuan Yao, Qian Zhuang, <b>Bo Su</b>, Zhihao Jin, Tiffany Tang</p> <p>Wenzhou-Kean University, China</p> <p><i>Abstract</i>—It is known that varying degrees of concentration could lead to the change of body property such as skin conductance level. Through our experiments in the present study, assuming concentration related to skin conductance level, we use skin conductance variety detected using a compact and wearable galvanic skin response (GSR) sensor to investigate the possible link between the degree of concentration and the level of skin conductance for college students involving one of the most favored daily activities—game playing. In our experiment, four adults (four men) completed a specific mode of web-based game requiring a certain degree of concentration. Mixed results had been obtained. Preliminary results revealed that when players are concentrated (exhibited by relatively low level of skin conductance value), their performance tends to be better. Our results also showed that such pattern might vary as a function of both internal and external factors; no conclusive results can be obtained on whether skin conductance can be used a reliable <i>in situ</i> marker for the degree of concentration. Despite these, our study serves as a preliminary yet promising one down the research path.</p>

<p>P0030 (15:00~15:15)</p>	<p>Validity of Handwriting in Biometric Systems</p> <p><b>Ameur Bensefia</b>, Hatem Tamimi</p> <p>Higher Colleges of Technology, United Arab Emirates</p> <p><i>Abstract</i>—Many studies in the last decade have been dedicated to the use of the handwriting as a feature in the human identification, opening the door to consider it as a biometric identifier. In this paper we provide an evaluation of the handwriting as a potential biometric identifier according to a standard framework. Firstly, we present the required conditions for a human characteristic to be considered as a biometric identifier. We also provide a generic biometric system, detailing all its various components, and the two associated modes in which it can operate: Identification and Verification. In the second part of this paper we evaluate and discuss the validity of the handwriting as biometric identifier based on the framework we defined.</p>
<p>P0031 (15:15~15:30)</p>	<p>Face Recognition using Local Mapped Pattern and Genetic Algorithms</p> <p>Eduardo Silva, Maurílio Boaventura, <b>Ines A. G. Boaventura</b>, Rodrigo C. Contreras</p> <p>UNESP – Universidade Estadual Paulista, Brazil</p> <p><i>Abstract</i>—Facial recognition is one of the most used biometric technologies in automated systems which ensure a person’s identity for authorizes access and monitoring. The acceptance of face use has several advantages over other biometric technologies since it is natural, it does not require sophisticated equipment, data acquisition is based on non-invasive approaches, and it can be done remotely, cooperatively or not. Although many facial recognition studies have been done, problems with light variation, facial occlusion, position, expression, and aging are still challenges, because they influence the performance of facial recognition systems and motivate the development of more reliable recognition systems that deal with these problems. In this paper, we describe the Multi-Scale Local Mapped Pattern (MSLMP) applied for facial recognition. Techniques based on genetic algorithms and image processing were applied to increase the performance of the method. The obtained results reach up to 100% of accuracy for some face Database. A very difficult database to deal is the MUCT database which was created in 2010 with the aim of providing images with a high variation of lighting, age, positions, and ethnicities in the facial biometry literature, which makes it a highly difficult database in relation to automated recognition. A new processing technique was developed based on the average gray levels of the images of the database for deal with difficult databases like MUCT. The results obtained with our techniques for MUCT database are superior to results obtained for recognition techniques applied to this database available in the literature.</p>

<p>P0040 (15:30~15:45)</p>	<p>LifeLine: A Device for Detecting Abnormal Patterns</p> <p>J. J. Li, P. Krivoschik, A. Suvorov, C. Fortes, and <b>P. Kenny</b></p> <p>Kean University Union, NJ USA</p> <p><i>Abstract</i>—This paper presents a reliable LifeLine, app or device, that uses multiple native hardware sensors in conjunction with motion detection methods and AI/machine learning algorithms to automatically detect life-threatening conditions. The app or device then autonomously responds to said conditions and sends alarm signals through various communication channels within milliseconds, without the need for user intervention. The app version is currently on Google Play. The testing of such an autonomous AI app or device imposes some new challenges due to the nondeterminism in AI agent’s reaction to various scenarios and the continuous learning of the AI agent with new knowledge.</p>
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Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.

**Session 4 < “Neural Network and Machine Learning” >**

Session Chair: Prof. George Chang

Venue: Room 504 (5<sup>th</sup> F), North Avenue Academic Building

Time: 16:05~17:50

<p>P0010 (16:05~16:20)</p>	<p>A Privacy-Preserving Concurrent Query-Answering Protocol for Selfish Knowledge-Based Systems</p> <p><b>Pinata Winoto</b></p> <p>Wenzhou-Kean University, China</p> <p><i>Abstract</i>—This paper shows a distributed implementation of concurrent query-answering protocol among agents with objective to answer their individual query by means of logical inference from the integrated private knowledge bases (KBs) owned by each agent. Agents may misreport some contents of their KB as long as it will not affect the correctness of the answer they are looking, and such a misreport is not verifiable by others. Our proposed protocol is intended to prevent agents from misreporting and, more importantly, to protect their privacy, so that all answers obtained from the integrated KB are truthfully derived and no party knows the knowledge of individual others other than its own.</p>
<p>P0017 (16:20~16:35)</p>	<p>IMU Error Compensation for Rotating Missiles by Artificial Intelligence Methods</p> <p><b>Gokcen Kavaz, Can Tasan</b></p> <p>Roketsan Missiles Industries Inc. Turkey</p> <p><i>Abstract</i>—Inertial Measurement Units (IMU) have a wide area of use such as space and defense systems, robotics, transportation and biomedical systems. They are frequently selected as main sensors of navigation systems due to their advantages of lightweight, high autonomy, concealment and reliability. However, errors of IMU sensors accumulate rapidly due to the integration processes in navigation algorithms and it becomes a crucial problem in long term stability. This is even a more important issue in highly dynamical environments.</p> <p>The goal of this research is to compensate errors of IMU sensors to be used in rotating missiles. Computation principle of the inertial navigation algorithm is mainly based on the integration of acceleration and angular rate values to reach position, velocity and attitude of the missile. As both acceleration and angular rate ranges are very large in this system, small measurement errors result in unreliable navigation solutions even in the initial parts of the flight. Artificial Neural Networks (ANN) were used to compensate sensor errors and improve navigation solution due to their successful approach to non-linear functions and tolerance to noisy and missing data. Different ANN architectures were trained and evaluated. The model proposed was simulated in the</p>

	<p>navigation algorithm of the rotating missile project. Comparative simulation results show that the error compensation by ANNs improves the reliability of the system by increasing the accuracy of navigation solution.</p>
<p>P0038 (16:35~16:50)</p>	<p>Remedial Actions Recommendation via Multi-Label Classification: A Course Learning Improvement Method</p> <p>Ammar Elhassan, <b>Ilyes Jenhani</b> and Ghassen Ben Brahim</p> <p>Prince Mohammad Bin Fahd University, Saudi Arabia</p> <p><i>Abstract</i>— In this paper we present RARS - Remedial Actions Recommender System that is based on a multi-label classification approach to recommend remedial actions to address student performance shortcomings in Learning Outcome Attainment Rates. A dataset of rubric instances is constructed where each instance is characterized by a set of features (e.g. course domain, course level, etc.). Classes labeling the training instances correspond to the remedial actions that have been proposed by instructors and Quality Assurance Experts over several semesters. Experiments carried out on the constructed dataset showed that the use of wrapper multi-label classification approaches as a basis of RARS and especially the classifier chains method with decision trees as a base classifier provides useful remedial actions recommendations.</p>
<p>P0041 (16:50~17:05)</p>	<p>Visualizing Neural Networks for Pattern Recognition</p> <p>V. Jacobson, J. J. Li, <b>K. Tapia</b>, and P. Morreale</p> <p>Kean University Union, NJ USA</p> <p><i>Abstract</i>— Understanding how a machine learns is a pressing topic as machine learning becomes more complex enabled by more powerful computers. This paper presents a visualization of neural networks to make them trackable during the operation of learning for pattern recognition, as well as testing for patterns. Specifically, our implementation includes fully connected neural networks, convolutional neural networks, and networks with memories. This will help us understand the insight of neural networks for pattern recognition to ensure full human control of the machines and to eliminate public’s concern of recent leap in AI and machine learning. The visualization also helps to measure and identify performance bottleneck for future improvement.</p>
<p>P0044 (17:05~17:20)</p>	<p>Efficient Bayesian Inference by Reliability Methods: Applications in Supervised Machine Learning</p> <p><b>Paul Byrnes</b> and Alex Diaz</p> <p>University of Liverpool, UK</p> <p><i>Abstract</i>—Defining a mathematical model of real life phenomena often results in errors and</p>

	<p>uncertainties appearing within the model itself. A Bayesian approach allows for the incorporation of such uncertainties into model predictions whilst updating the model as new information and data becomes available. In supervised machine learning, classifiers which produce probabilistic estimates of class membership require the computation of a complex conditional probability distribution referred to as the posterior. In a high dimensional setting however, the denominator of the posterior expression becomes analytically intractable.</p> <p>This study presents an efficient MCMC based framework to provide a solution. The framework, which stems from reliability engineering, is a rare event simulation technique. By taking advantage of the low acceptance rates in the rejection sampling algorithm, the approach provides an efficient sampling method for Bayesian updating problems which guarantees convergence.</p> <p>Results show the suitability of the framework in high dimensions along with the computational savings over standard MCMC. By comparing the performance against other inference techniques such as, Laplace approximation, Variational inference and Expectation Propagation the framework is found to be a viable alternative for probabilistic based classification models.</p> <p>The proposed method is implemented in conjunction with different classifiers comparing both accuracy and computational expense. Experiments are carried out on both benchmark data sets and large scale industrial applications.</p>
<p>P0047 (17:20~17:35)</p>	<p>Global to Local for Path Decision using Neural Networks</p> <p><b>Dana Vrajitoru</b></p> <p>Indiana University South Bend, USA</p> <p><i>Abstract</i>—In this paper, we present a project aiming to improve the path of an autonomous vehicle on a race track in terms of speed and amount of turning. In this part of the study, we use global information about the track to compute an optimized trajectory. Then we use sample information from the computed path to train a neural network using only local information as input. The goal is to study how well global information can be inferred from local information.</p>
<p>P0048 (17:35~17:50)</p>	<p>Advantages of Hybrid Deep Learning Frameworks in Applications with Limited Data</p> <p>Valeriy Gavrishchaka, <b>Zhenyi Yang</b>, Rebecca Miao and Olga Senyukova</p> <p>Applied Quantitative Solutions for Complex Systems, USA</p> <p><i>Abstract</i>—Recent advancements in deep learning (DL) frameworks based on deep neural networks (DNN) drastically improved accuracy in image recognition, natural language processing and other applications. The key advantage of DL is systematic approach for independent training of groups of DNN layers including unsupervised training of auto-encoders for hierarchical representation of raw input data (i.e., automatic feature selection and dimensionality reduction) and supervised re-training of several final layers in the transfer learning that compensate for data</p>

incompleteness. However, severe data limitations and/or absence of relevant problem for transfer learning can drastically reduce advantages of DNN-based DL. For example, pure data-driven auto-encoders dealing with high-dimensional input data require large amount of data for effective operation. However, hierarchical data representations can be also implemented without NN. Previously we have shown robustness of boosting-like algorithms for effective utilization of existing domain knowledge (e.g. analytical models) via discovery of compact ensembles of complementary low-complexity components. This approach can tolerate significant data incompleteness and boost accuracy of individual base models as was demonstrated in cardiac diagnostics applications. Here we argue that hybrid DL framework with auto-encoders replaced by components discovered by boosting followed by supervised NN could be more tolerant to data incompleteness compared to pure DNN-based DL. Illustrations based on cardio data from [www.physionet.org](http://www.physionet.org) are presented. The proposed framework could be utilized in many applications dealing with incomplete data including personalized medicine and rare or complex abnormalities.

Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.

### Session 5 < Image Processing >

Session Chair: Prof. Chingyu Huang

Venue: Room 508, North Avenue Academic Building (5th F)

Time: 16:05~17:50

<p>P0025 (16:05~16:20)</p>	<p>Nucleus Region Segmentation Towards Cervical Cancer Screening Using AGMC-TU Pap-Smear Dataset</p> <p><b>MrinalKanti Bhowmik</b>, Sourav Dey Roy, Niharika Nath, Abhijit Datta</p> <p>New York Institute of Technology, USA</p> <p><i>Abstract</i>—Considering global health impact, cervical cancer stands in the second position after breast cancer. Detection of any abnormality at an early stage can lead to complete cure of the disease. Higher mortality rate in rural areas symbolize lack of awareness, poor medical facilities, lack of resources and lack of efficient screening programmes. Hence to tackle these issues, automatic computeraided diagnosis of cervical cancer is needed which should be observer-independent and less time consuming. Abnormal Pap-Smear cells are mainly distinguishable from the normal ones based on their nucleus shapes. However due to the variation in size, shape and intensity overlapping of the nucleus area with the surrounding normal cells, accurate extraction of nucleus portion is a very challenging task. In this paper, effectiveness of some state of the art segmentation methods for nucleus region extraction and classification of normal and abnormal cells is highlighted depending on accuracy and quantification of segmentation output. Experiment has been conducted in our own created AGMC-TU Pap-Smear dataset. In these experiment, classification is carried out based on 12 shape features extracted from the segmented nucleus region. The classification accuracy obtained with SVMLinear (SVM-L) classifier is 92.83% based on combination of all the extracted feature set whereas classification based on discriminative feature set is 97.65% and increases the accuracy rate by almost 5% using most effective segmentation method (i.e. FCM) . The Area Under the Curve (AUC) using the outer performed classifier i.e. (SVM-L) based on combined feature set and discriminative feature set are 0.93 and 0.96 respectively for FCM segmentation method. Both accuracy and AUC reveals that accurate segmentation of nucleus region from the whole Pap-Smear cell increases the accuracy rate of classification and hence indicating its effectiveness for predicting the abnormal Pap-Smear cells.</p>
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<p>P0032 (16:20~16:35)</p>	<p>A Novel SDSR Technique for Image Enhancement using Principles of Stochastic Resonance</p> <p><b>Garima Jain, Ks Venkatesh</b></p> <p>Indian Institute of Technology Kanpur, India</p> <p><i>Abstract</i>—Contrast and color of the captured pictures are degraded due to various external factors such as low-light, foggy or cloudy weather and poor camera settings. For rendering the images useful for vision applications such as edge detection or segmentation, contrast stretching is a necessary initial step. In this paper, we propose a novel technique of using the features of both SSR (Suprathreshold Stochastic Resonance) and DSR (Dynamic Stochastic Resonance) techniques to develop a new SDSR (Suprathreshold Dynamic Stochastic Resonance) method for image enhancement. The proposed methodology was tested on a total of 23 images and displayed improved performance, while preserving the color quality of the image.</p>
<p>P0039 (16:35~16:50)</p>	<p>Semi-Automatic Segmentation of Breast Masses in Mammogram Images</p> <p><b>Moustapha Mohamed Saleck, Abdelmajid EL Moutaouakkil and Mohamed Rmili</b></p> <p>Chouaib Doukkali University, Morocco</p> <p><i>Abstract</i>—Breast lesion segmentation is a critical task in Computer-Aided Diagnosis (CAD) techniques for mammography, the performance of CAD system strongly depends on the results of segmentation. In this paper, we present a simple and robust approach for breast mass segmentation in digital mammograms. The proposed approach consists of three major stages. In the first stage, 2D-median filter is applied for enhancing the quality of image. In the second stage, an initial segmentation is designed based on canny and watershed algorithms; this step allows automating the process of seed point selection. In the final phase, the boundaries of tumor are extracted from Region of Interest (ROI) with high accuracy by using region growing method. The validation process of the proposed approach was achieved based on a set of 27 images from Mini-MIAS database with an average overlap of 81.3 % and the result were compared with some other mammograms segmentation methods. An experimental evaluation of this study shows that the proposed method can reliably be applied on mass segmentation in mammogram images.</p>
<p>P0046 (16:50~17:05)</p>	<p>Few-shot Siamese Neural Networks employing Audio Features for Human-Fall Detection</p> <p><b>Diego Droghini, Fabio Vesperini, Emanuele Principi, Stefano Squartini and Francesco Piazza</b></p> <p>Università Politecnica delle Marche, Italy</p> <p><i>Abstract</i>—Nowadays, the detection of human fall is a problem recognized by the entire scientific community. Methods that have good performance use human falls samples in the train set, while methods that do not use it, can only work well under certain conditions. Since examples of human</p>

	<p>falls are very difficult to retrieve, there is a strong need to develop systems that can work well even with few or no data to be used for their training phase. In this article, we show a first study on few-shot learning Siamese Neural Network applied to human falls detection by using audio signals. This method has been compared with algorithms based on SVM and OCSVM, all evaluated starting from the same conditions. The proposed approach is able to learn the differences between signals belonging to different classes of events. In classification phase, using only one human fall signal as a template, it achieves about 80% of <math>F_1</math>-Measure related to the human fall class, while the SVM based method gets around 69%, when it is trained in the same data knowledge conditions.</p>
<p>P0051 (17:05~17:20)</p>	<p>HVS Based Full Reference Video Quality Assessment Based on Optical Flow</p> <p><b>Sagar Gujjunoori</b> and Madhu Oruganti</p> <p>Vardhaman College of Engineering, India</p> <p><i>Abstract</i>—The use of statistical features of optical flow: mean, standard deviation of flow magnitudes and minimum eigenvalue of optical flow patch’s covariance matrix, in measuring the distortion levels is well demonstrated in the state of art [5]. We hypothesize that when there is a higher random flow in both the reference video and distorted video, then the temporal annoyance level is low which result in reduced distortion scores. Based on this hypothesis, we present an HVS based full reference video quality assessment algorithm based on optical flow. The experimental results demonstrate that the proposed model improves the state of art.</p>
<p>P0058 (17:20~17:35)</p>	<p>Semantics Processing for Search Engines</p> <p><b>Qian Wang</b>, Dr. Jenny Li</p> <p>Computer Science, Kean University</p> <p><i>Abstract</i>—This paper presents a study of a tool for extracting links on web sites through semantics keyword inputs. The implementation uses java code to semantically convert English words into website names and their URL’s and then use the website name to match the content of the keywords, and extract all the sub-links of this website. It includes three parts: 1) Let the user input a list of keywords and convert them into a list of URL’s. 2) Use a method to match the keyword information and extract the sub-links from the content. Then save the content in a new list. 3) Create an interface to output the List to users. Some relevant research is shown in the paper, e.g. PageRank algorithm, Hyperlink-Induced Topic Search algorithm.</p>

# Poster Sessions

Venue: Hall way (5th F), North Avenue Academic Building

Time: 14:00~16:00

P0002	<p>Fingerprint Analysis and Singular Point Definition by Deep Neural Network</p> <p><b>Limin Liu</b></p> <p>Shih Hsin University, Taiwan</p> <p><i>Abstract</i>—In this paper, a novel method is presented using deep neural network to identify singular points on a fingerprint. The proposed method can efficiently calculate fingerprint blocks orientation using the pre-trained neural network. The same neural network is applied again to define singular points at pixel level. The training step may be complicated and time consuming, but adopting a pre-trained model to calculate orientations outperforms algorithms that calculate pixel orientation in real time. In addition, the proposed model is rotation insensitive, and experiment results show that the proposed method is so robust that it can identify singular points as small as a circle with few pixels in radius.</p>
P0014	<p>Position Estimation of Camera Based on Unsupervised Learning</p> <p><b>YanTong Wu, Yang Liu and XueMing Li</b></p> <p>University of Posts and Telecommunications, China</p> <p><i>Abstract</i>—It is an exciting task to recover the scene's 3D structure and camera pose from the video sequence. Most of the current solutions divide it into two parts, monocular depth recovery and camera pose estimation. The monocular depth recovery is often studied as an independent part, and a better depth estimation is used to solve the pose. While camera pose is still estimated by traditional SLAM (Simultaneous Localization And Mapping) methods in most cases. The application of unsupervised method for monocular depth recovery and pose estimation has benefited from the study of [1] and achieved good results. In this paper, we improve the method of [1]. Our emphasis is laid on the improvement of the idea and related theory, introducing a more reasonable inter frame constraints and finally synthesize the camera trajectory with inter frame pose estimation in the unified world coordinate system. And our results show better performance.</p>

# Transportation

Kean University is in a great location - metropolitan Union County. The campus is a short distance from Newark Liberty International Airport, NJ Transit trains and major highways.

You have easy access from the Garden State Parkway, NJ Turnpike and Routes 1&9, 22 and 78. No wonder so many students choose to commute to Kean.

Park your car and enter the 150-acre campus dotted with woods, streams and open space, an ideal environment for learning and living. The classroom does not end at the edge of the campus. Kean's faculty takes full advantage of the University's proximity to the New York/New Jersey's metropolitan area with its wealth of cultural and intellectual activities.

## **Garden State Parkway**

**Northbound:** Take Garden State Parkway to Exit 140, keep right and follow signs for Route 82 East towards Elizabeth (Morris Avenue East). Stay on Morris Avenue (Route 82 East) and Kean University Campus will be 2 miles down on your right.

**Southbound:** Take Garden State Parkway to Exit 140-A onto Route 22 West. Keep right and follow signs to Elizabeth (Route 82 East). Turn right on Morris Avenue (Route 82 East). Stay on Morris Avenue (Route 82 East) and Kean University Campus will be 2 miles down on your right.

## **Train**

**From Union Station:** Located at 900 Green Lane in Union, N.J., the station is directly across the street from Kean's main campus. Union Station is on NJ Transit's Raritan Valley line, which runs northeast to Newark Penn Station, and southwest to High Bridge in Hunterdon County. For a Raritan Valley line train schedule, [click here](#).

**From the Elizabeth Station:** Elizabeth Station is located on West Grand Avenue, one block west of Broad Street in Elizabeth, N.J., which is just two miles from campus by bus or taxi. The NJ Transit Northeast Corridor and North Jersey Coast line trains stop there. The Northeast Corridor line runs northeast to Newark Penn Station and New York Penn Station, and southwest to Trenton. The North Jersey Coast line runs northeast to Newark's Penn Station and New York City and southeast to Bay Head in Ocean County.

## **Bus**

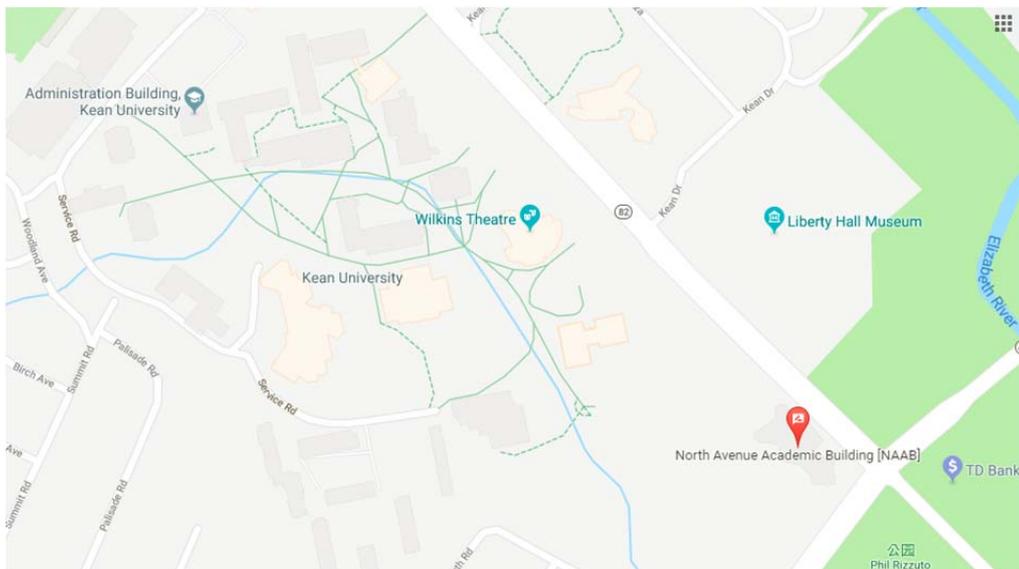
NJ Transit #52 and #26 between Elizabeth and Springfield pass the Campus on Morris Avenue. NJ Transit #113 between Plainfield and Port Authority Bus Terminal, New York, stops at Salem Road and Morris Avenue.

## Conference Venue



North Avenue Academic Building of Kean University

Address: 1000 Morris Ave, Kean University, North Avenue Academic Building,  
Union, NJ 07083 USA



# One Day Tour



## Statue of Liberty

The Statue of Liberty was officially known as the "Statue of Liberty," which is a national monument to the United States. It has become a symbol of democracy and freedom around the world. It was hollow inside, and people could take an elevator to the head of the statue. Her left hand held a plaque marking July 4, 1776, declaring freedom. Designed by Gustave Eiffel, a French civil engineer famous for designing the Eiffel Tower, it was a symbol of friendship between the two countries, which was built on Liberty Island.

Open Time: 08:30~17:15

Address: Liberty Island, 10004 New York Harbor



## Broadway

Broadway is an important north-south road in New York City, and it has become a byword for musicals. There are dozens of theaters on both sides of Broadway. The theatres on 44th to 53rd streets of Broadway are called inner Broadway, while the theatres on 41st and 56th streets of Broadway are called outer Broadway. Classic, hot, commercial plays are performed on inner Broadway, and experimental, unknown, low-cost plays are performed on outer Broadway.

Open Time: whole day

Address: 1681 Broadway, New York, NY



## Central Park

Central Park, located in the heart of high-rises in Manhattan, is a quiet and relaxing place in this bustling city. Covering an area of about 3.4115 square kilometers, the park is one of the largest man-made natural landscapes in the world, known as the back garden of New York. The park is dotted with large and small lakes and forests, with zoos, sports venues and recreation facilities, and two huge man-made lakes.

Open Time: Monday-Friday 10:00~17:00

Saturday-Sunday 10:30~17:30

Address: the Fifth Avenue and 64th Street

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