2017 IEEE CIS Sponsored Winter School on

Computational Intelligence: Fundamental Theory and Practical Applications

02 January2017 to 06 January2017, Chennai, India

Link: https://drive.google.com/file/d/0ByIP3VZiV7kIZ19jdTY4V1JfWlE/view

Organizers

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IEEE Computational Intelligence Society (CIS) – Madras Chapter received an Outstanding Chapter Award for the year of 2016 from IEEE CIS. This recognition served as the motivation for the society to launch IEEE CIS sponsored Winter School in Chennai, India.

The School of Computer Science & Engineering of VIT University, Chennai in association with IEEE CIS Madras Chapter, has hosted the 2017 IEEE CIS Sponsored Winter School on "**Computational Intelligence: Fundamental Theory and Practical Applications**" during January 2-6, 2017.

Recent developments in Computational Intelligence (CI) methods has its applications in diverse areas. The objective of the winter school is to provide a platform for young researchers to learn about the state-of-the-art techniques and interact with eminent subject matter experts and discuss their ideas. The winter school comprised of 14 presentations and

two Hands on Session/Demonstration Session that broadly covered the topics, including Neural Networks, Fuzzy Logic, Evolutionary Computing, Deep Learning, Cyber Physical Systems, Image Processing, audio processing, data clustering and classification.

I. Summary of Winter School

This summary is a snapshot of the five-day program in CI consisting of lectures, demonstrations and panel discussion.

The winter school had 14 presentations that broadly covered the topics specific to Computational Intelligence, Neural Networks, Fuzzy Logic, Evolutionary Computing, Deep Learning, Cyber Physical Systems, Image Processing, audio processing, data clustering and classification.

On the first day of the winter School, Dr. Jagannathan Sarangapani, Missouri University of Science and Technology, USA gave the inaugural speech and Dr. N. Kumarappan, Annamalai University, Chidambaram has delivered the special address. Presidential speech was delivered by the Chancellor of VIT University, Dr. G.Viswanathan, who emphasized the need for Computational Intelligence.

On the first day of the winter school, there was one general information session and two technical presentations. Dr. N. Kumarappan, Chair, IEEE CIS Madras Chapter, gave an introduction speech about the "IEEE CIS". In this talk, Dr.N.Kumarappan has given a brief introduction about IEEE CIS and various benefits of joining IEEE as a member. It is followed by an intriguing presentation by Dr. Jagannathan Sarangapani on the topic "A Novel Hybrid Reinforced Learning Approach and its Application to Optimal Control of Dynamic Systems". Dr. Sarangapani's lecture comprised of an accessible in-depth application of reinforcement learning and dynamic programming methods using function approximations. The final presentation of the day was by Dr. Vaidehi Vijayakumar, Dean / SCSE, VIT University Chennai Campus on the topic "Computational Intelligence for Sensor Networks". Dr. Vijayakumar presented an overview of CI techniques used in remote healthcare using body sensor networks.

On the second day of the winter school there were three technical presentations and a demonstration.
The first presentation was by Dr. N. Kumarappan on the topic "Computational Intelligence Applied to Micro Grid". Dr. Kumarappan suggested a solution for Environmental Economic Dispatch problem using Cuckoo Search algorithm (CSA) method. In this talk, he explained about the effectiveness of the CSA over other evolutionary algorithms in minimizing the emission cost by optimally dispatching different DG types connected to a microgrid. The second presentation was by Dr. T. Thyagarajan, Madras Institute of Technology Chennai on the topic "Computational Intelligence for Process Modeling and Control". Dr. Thyagarajan emphasized on process modeling and control systems with the aid of CI techniques. The third presentation was by Dr. G. Saravana Kumar, Indian Institute of Technology Madras on the

topic "Soft Computing Techniques for Computer Aided Diagnosis". Dr. Saravana Kumar emphasized on the Computer aided diagnosis using imaging improves the performance and confidence of radiologists and soft computing techniques that enhances the accuracy and reliability of computer methods. The second day of the winter school ended up with Hands on Session/ demonstration session on Computational Intelligence tools and techniques by Ankush, Research Associate.

On the third day of the winter school there were two technical presentations and a panel discussion.
Dr. A. Nayeemulla Khan, VIT University, Chennai started the day off with a presentation on the topic "Deep Learning", followed by another presentation by Dr. R. Jagadeesh Kannan & Mr. Ankush Rai, VIT University, Chennai on the topic, "Computational Intelligence Techniques in Cyber Physical Systems". The third day ended with a panel discussion. The panel was composed of experts from Image processing, Big Data Analytics, Theory of Computation and Computational Intelligence. Each of them gave brief description about their domain and discussed about the latest trends and scope of research in their domain.

On the fourth day of the winter school there were four technical presentations and a panel discussion.
Dr. Narasimhan Sundararajan, Nanyang Technological University, Singapore presented on the topic, "Metacognitive neural networks and its learning algorithm" followed by a lecture by Dr. Suresh Sundaram, Nanyang Technological University, Singapore on the topic, "Spiking Neurons and its learning algorithm". Dr. R. Venkatesh Babu, Indian Institute of Science, Bangalore presented about Deep Learning – Theory and Principles. Then Dr. Dipti Prasad Mukherjee, Indian Statistical Institute, Kolkata presented on Image Processing using Computational Intelligence Techniques. Finally, there was a panel discussion about the need for quality publication and methodology for such publications. The panel was chaired by Dr. N. Kumarappan, Annamalai University.

On the last day, there were three technical presentations.
Dr. Stefano Squartini, University of Marche Ancona, Italy gave a lecture on, "Computational Audio Processing", followed by Dr. Swagatam Das, Indian Statistical Institute, Kolkata on the topic, "Computational Intelligence Approaches to Data Clustering – Overview, Recent Advances and Future Challenges". In the end, Dr. Ponnuthurai Suganthan, Nanyang Technological University, Singapore presented on the topic, "Non-iterative and Fast Learning methods for Classification".

II. Program Details

Time	January 02, 2017 Day 1	January 03, 2017 Day 2	January 04, 2017 Day 3	January 05, 2017 Day 4	January 06, 2017 Day 5
09.30 - 11.00	**Inauguration of IEEE CIS Winter School**	**Dr. N. Kumarappan** Annamalai University Chidambaram *Topic: Computational Intelligence Applied to Micro Grid*	**Dr. A. Nayeemulla Khan** VIT University Chennai Campus *Topic: Deep Learning*	**Dr. Narasimhan Sundararajan** Nanyang Technological University, Singapore *Topic: Metacognitive neural networks and its learning algorithm*	**Dr. Stefano Squartini** University of Marche Ancona, Italy *Topic: Computational Audio Processing*
11.00 - 11.15	**Tea Break**	**Tea Break**	**Tea Break**	**Tea Break**	**Tea Break**
11.15 AM - 12.45	**Dr. Jagannathan Sarangapani** Missouri University of Science and Technology, USA *Topic: A Novel Hybrid Reinforced Learning Approach and its Application to Optimal Control of Dynamic Systems*	**Dr. T. Thyagarajan** Madras Institute of Technology Chennai *Topic: Computational Intelligence for Process Modeling and Control*	**Dr. R. Jagadeesh Kannan &** VIT University Chennai Campus *Topic: Computational Intelligence Techniques in Cyber Physical Systems*	**Dr. Suresh Sundaram** Nanyang Technological University, Singapore *Topic: Spiking Neurons and its learning algorithm*	**Dr. Swagatam Das** Indian Statistical Institute Kolkata *Topic: Computational Intelligence Approaches to Data Clustering – Overview, Recent Advances and Future Challenges*
12.45 - 01.45	**Lunch Break**	**Lunch Break**	**Lunch Break**	**Lunch Break**	**Lunch Break**
1.45- 3.15	**Dr. Vaidehi Vijayakumar** VIT University Chennai Campus *Topic : Computational Intelligence for Sensor Networks*	**Dr. G. Saravana Kumar** Indian Institute of Technology Madras *Topic: Soft Computing Techniques for Computer Aided Diagnosis*	**Mr. Ankush Rai** VIT University Chennai Campus *Topic: Computational Intelligence Techniques in Cyber Physical Systems*	**Dr. R. Venkatesh Babu** Indian Institute of Science, Bangalore *Topic: Deep Learning – Theory and Principles*	**Dr.Ponnuthurai Suganthan** Nanyang Technological University, Singapore *Topic: Non-iterative and Fast Learning methods for Classification*

03.15-03.30	Tea Break	Tea Break	Tea Break	Tea Break	Tea Break
03.30 – 04.45	**Dr. Vaidehi Vijayakumar** VIT University Chennai Campus *Topic : Computational Intelligence for Sensor Networks*	**Hands-on Session/Demonstration**	**Hands-on Session/Demonstration**	**Dr. Dipti Prasad Mukherjee** Indian Statistical Institute Kolkata *Topic: Image Processing using Computational Intelligence Techniques*	**Valedictory of IEEE CIS Winter School**
05.00 – 07.00			**Panel discussion**	**Panel discussion**	
07.00 – 08.30 PM				**Networking Banquet dinner**	

Panel discussion

1. January 4, 2017 - Day 3, 5 PM - 7 PM

The panel was chaired by Dr.L.Jeganathan, Professor, SCSE and other fellow professors share their expertise and answered the questions of the participants. The expertise of the panel members are: Dr. L. Jeganathan (Theoretical Computer Science), Dr. S. Gettha (Network Security), Dr.Bharadwaja Kumar (Big Data), Dr. Sakkaravarthi Ramanathan (Dependable Computing). The following are the questions were raised and discussed in the panel discussion:

- Is human behavior algorithmic? The questions are answered by Dr. L. Jeganathan. He mentioned that it is part of cognitive science and CI's goal to find out with other deep insights on the topic of "computational epistemology".
- How could the coupling of several types of neural network can be achieved to develop a cognitive architecture for data assessment?
- How ontology could be used to digitize the thought process for effective applications in natural language processing and passing Turing test.
- How knowledge can be used to build a stimulant based knowledge representation and inference system.
- In depth discussion on intention detection and utilization for big data based operating system for smart city.

2. January 5, 2017 - Day 4, 5 PM - 7 PM

The panel was chaired by Dr. N. Kumarappan, Annamalai University. Dr. Kumarappan shared his expertise on computational intelligence applied to power engineering. The panel consisted of Dr. Swagatam Das, Indian Statistical Institute, Kolkata who discussed core of computational intelligence and differential evaluation, Dr. Vaidehi Vijayakumar, Dean, VIT University Chennai discussed computational intelligence applied to image processing and Dr. Stefano Squartini, University of Marche Ancona, Italy shared his expertise on computational audio processing. In addition, the panel members also answered questions on the methodology and quality of paper publication due to popular demand. Some of the questions were, "How to publish paper in IEEE", "importance of impact factor", "ratio of rejection" and "plagiarism".

Hands-on Session/Demonstration

1. January 2, 2017 - Day 2, 3.30:4.45 PM
Artificial neural network using MATLAB , Ankush Rai, Research Associate, VIT University Chennai,

2. January 3, 2017 - Day 3, 3.30:4.45 PM
Fuzzy logic using MATLAB, Ankush Rai, Research Associate, VIT University Chennai

III. Participants

Total Participants: 50 (IEEE Members: 7)

IV. Conclusion

The CIS Winter School was well attended, organized well, and was a very successful event. The participants are impressed with the lectures delivered by eminent speakers. The discussions and interactions between the students and the invited speakers, and among the invited speakers themselves made the plenary sessions very interesting and exciting! The participants also enjoyed the social networking with invited speakers.

V. Acknowledgment

We would like to thank the IEEE CIS and IEEE CIS Madras Chapter for supporting the event. We also would like to thank all the professors and students whose participation made this winter school successful.

VI. Photos

Venue of the Event

Event Banner

Chief Guest and other guests during inauguration

Participants at the inauguration of the event.

Lamp lighting ceremony at the event.

Various Speakers and Panel Discussion

Panel Discussion

Valedictory Session

Certificate Distribution

Participants – Group Photo