RESEARCH AND TRAINING UNIT FOR NAVIGATIONAL ELECTRONICS
OSMANIA UNIVERSITY, HYDERABAD

5-Day School on

MACHINE LEARNING, DEEP NEURAL NETWORKS AND ASR (ASR-19)

(Course Code: NERTU/SC/73)

(FRI-TUE, 08-12, MARCH 2019)

Location : NERTU Auditorium, OU

Time : 09.00AM – 06.30PM

Faculty:

1. Prof.B.Yegnanarayana, IIITH
2. Prof.C.Chandra Sekhar, IITM
3. Prof.Chakravarthy Bhagavatula, HCU
4. Dr. Vineeth N Balasubramanian, IITH
5. Dr. P.K.Srijith, IITH
6. Prof.P.Ananth Raj, ECE-OU.
7. Dr.A.V.Ramana, Neuronics Labs
8. Mr.P.Mythilisharan, NERTU, OU
9. Prof.P.Laxminarayana, NERTU-OU

COORDINATOR:

Prof.P.Laxminarayana, Director, NERTU, OU
Ph. 0949 080 5486, laxminarayana@osmania.ac.in

Registration Fee (INR) : 18%GST will be extra.
(It includes Tea, Snacks, Lucnch, Lectures, Lab and Course Material.)

Full Time Students	5,000
Teachers	7,500
Scientists Engineers from R&D, Industry & Commercial Organizations	10,000

DD/Cheque should be drawn in favor of

The Director, NERTU, OU

Or online payment through NEFT to

The Director, Eqpt. Maint., NERTU, OU
A/C No. : 52198270713
IFSC Code: SBIN0020071
Osmania University Branch, State Bank of India

Last Date for Registration : 28th February 2019

Preparation for Workshop in Basics and Programming : 01-07, March 2019

Interested candidates can visit www.osmania.ac.in or http://www.uceou.edu for more details like faculty, schedule and registration form. Register for the course by sending the filled registration form along with receipt of online payment **to** nertu.courses@osmania.ac.in and copied to email IDs of Co-Coordinators.
or hard copy with DD/Cheque to
"The **Coordinator, ASR-19, Research and Training Unit for Navigational Electronics (NERTU), Osmania University, Hyderabad 500007".**

Limited Accomodation will be available on first-come—first served basis, at University Guest House on Payment. AC double: Rs.800 Non-AC Rs.600 per day, AC Single: Rs.500 Non-AC Rs.400 per day will be paid at Guest House only.

For Schedule and other Details please contact

Research Scholars, NERTU as CO-COORDINATORs, ASR-19

Balnarsaiah, Ph. 0949 284 9616, battulabalu@gmail.com

Ch.Srinu, Ph. 0903 293 0657, sreenu471.ece@gmail.com

S. Saraswathy,Ph.09948991235,sirikondasaraswathi@gmail.com

About Workshop : Machine Learning and Deep Neural Networks

All of a sudden, **Artificial Intelligence (AI)** is on a rage!, and everyone, whether understands or not, is talking about it. Understanding the latest developments in the AI, seems to be overwhelming, but it really boils down to concepts of Machine Learning. **Machine Learning (ML)** has become necessary in every sector as a way of making machines intelligent. In a simpler way, ML is set of algorithms that parse data, learn from them, and then apply what they've learned to make intelligent decisions.

In recent days, **Deep Learning (DL)** is gaining much popularity due to it's supremacy in terms of accuracy, when trained with huge amount of data. Deep Learning systems like **Deep Neural Networks (DNN)**, are increasingly taking over, all AI tasks, ranging from language understanding, speech and image recognition, machine translation, medical diagnostics, planning, and even game playing and autonomous driving. So DL will become an essential skill for academicians and researchers, and it will be an added advantage for working software engineers.

Practically, **Deep Learning** is a subset of **Machine Learning** that achieves great power and flexibility by learning to represent the world as nested hierarchy of concepts, with each concept defined in relation to simpler concepts, and more abstract representations computed in terms of less abstract ones. **Traditional Machine Learning** algorithms are complex and also they're still machine like. Without domain expertise and human intervention, they are only capable of what they're designed for; nothing more, nothing less. For AI designers and the rest of the world, that's where deep learning holds a bit more promise. Now-a-days, software industry moving towards AI. As Bharath is well known in the world for software services, it is necessary for Indian graduates to have familiarity and expertise on the topic. Nowadays DNNs are in use in almost all Automatic Speech Recognition (ASR) systems.

Though outstanding work in ASR and TTS has produced the commercial speech recognition systems for voice-driven computing and word-processing systems in English and European Languages, ASR systems are not yet launched into the market at full level. Therefore it is expected to have lot of demand for development of ASR and TTS systems for all Indian Languages and their applications.

The main objective of the course is to give the basic concepts and Hands on Practice and confidence to build or develop applications of Deep Neural Networks (DNNs) for ASR. **The course is designed with Lectures and intensive hands on practice. Engineers, scientists, academicians, and research scholars, already working or decided to work for development of applications of Machine Learning using DNNs, are encouraged to register for the school.** Participants are expected to have the UG level knowledge in Probability Theory, Linear Algebra and programming language like Python. The participants have to bring their own laptop for participating in the school.

The topics to be covered in the Lectures are: Introduction to Pattern Recognition and Machine Learning, Bayesian decision theory, Nearest Neighbor Classifiers, Linear Regression, Decision Trees, SVMs; **Introduction to Deep Neural Networks:** Multilayer Perceptron and Neural Networks, Backpropagation Algorithm, Learning in Deep Neural Networks, Feed Forward and Convolutional Neural Networks, Recurrent Neural Networks and Restricted Boltzman Machines, fundamentals of ASR, HMMs, SGMMs and DNNs for ASR.

The Hands on Practice include: Installation of required tools for Automatic Speech Recognition (ASR) using DNNs. Collection and Data preparation for building ASR using DNNs. Building and testing the ASR system using Open Surce tools for DNNs. A demo on DNNs for other applications like Face Recognition will be shown.

ABOUT NERTU: The Research and Training Unit for Navigational Electronics (NERTU) is established in 1982. It is the focal point for research and training in the areas of Electronic Navigation in India. It is the first University centre to work in the area of Global Positioning System (GPS) and GPS Aided Geo Augmented Navigation (GAGAN) System. Since its inception, NERTU has been conducting almost one or two short term courses per year in the area of GNSS, since 1992. Scientists, engineers, academicians and research scholars from many organisations have participated and benefited from these courses NERTU has successfully **executed 61 sponsored and consultancy projects** funded by DRDO, ISRO, DST, MIT, ECIL, HAL, BEL, AICTE and ASL. It has also conducted **66 short term courses/workshops/conferences** on various topics of signal processing, communications and navigation.

5-Day School On

Machine Learning, Deep Neural Networks and ASR (ASR-19)

(FRI-TUE, 08-12, MARCH 2019)

	09.00-10.00 Lecture-1	10.00-11.00 Lecture-2	11.00 11.30	11.30-13.00 Lecture-3	13.00 14.00	14.00-15.00 Lecture-4	15.00 15.30	15.30-18.30 Lab-Practice
Friday, March 08, 2019	Keynote Address on DNNs for ASR **B.Yegnanarayana**	Basics of ASR **A.V.Ramana**		Review of Pattern Recognition **P. Ananth Raj**		Basics of Neural Networks **P.Laxminarayana**		Flow Chart of DNNS and ASR Installation of all Required Tools
Saturday, March 09, 2019	Bayesian Decision Theory **P.K. Srijith**	Linear Regression **P.K. Srijith**		Multilayer Perceptron and Neural Networks **P.Laxminarayana**		Back Propagation Algorithm **P.Laxminarayana**		Data Collection and Preparation with Annotation
Sunday, March 10, 2019	Features for ASR **A.V.Ramana**	DTW and HMMs **A.V.Ramana**	T E A	Deep Learning Models for Automatic Speech Recognition **C.Chandrasekhar**	L U N C H	Deep Learning Models for Automatic Speech Recognition **C.Chandrasekhar**	T E A	Building an ASR System with HMMS and SGMMs
Monday, March 11, 2019	Decision Trees **P.Mythilisharan**	SGMMs **P.Mythilisharan**		Convolutional Neural Networks and Regularization **Vineeth N Balasubramanian**		Convolutional Neural Networks and Regularization **Vineeth N Balasubramanian**		Building an ASR system with HMMs and DNNs
Tuesday, March 12, 2019	SVMs **B. Chakravarthy**	SVMs **B. Chakravarthy**		Language Modelling **Mythilisharan**		Building an ASR system with HMMs and DNNs **(Lab)**		**Valedictory Session**

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Registration Form

1. Name	
2. Designation	
3. Educational Qualifications	
4. Email	
5. Phone	
6. Organization with Address	
7. Professional Experience a. Teaching b. Research/Industry	
8. Registration fee a. Amount in (INR) including GST b. Details of DD/Cheque/Online Transfer	**5000 +900(GST) / 7500+1350(GST) / 10,000+1800(GST)**
9. Signature of the Candidate	

Dr./Mr./Ms. …….. is sponsored to attend the 5-Day school on "Machine Learning, Deep Neural Networks and Automatic Speech Recognition(ASR-19)", to be held from **during 8-12, March 2019.**

Place: **Signature**
Date: **(Sponsoring Authority)**

The filled form along with receipt of online payment should be sent, before **28th February 2019**, by email to nertu.course@osmania.ac.in and copied to Co-coordinators (given below) or hard copy with DD/Cheque to **"The Coordinator, ASR-19, Research and Training Unit for Navigational Electronics (NERTU), Osmania University, Hyderabad 500007".**

Email Ids/Phone Numbers Co-Coordinators for correspondence:

Balnarsaiah, Ph. 0949 284 9616, battulabalu@gmail.com
Ch.Srinu, Ph. 0903 293 0657, sreenu471.ece@gmail.com
S. Saraswathy, Ph.09948991235, sirikondasaraswathi@gmail.com

Registration Fee(in INR) (Includes Course material, tea, snacks and Lunch)

	Registration Fee	GST	Total
Full Time Students	**5,000**	**900**	**5,900**
Teachers	**7,500**	**1,350**	**8,850**
Scientists and Engineers from R & D, Industries and Commercial Organizations	**10,000**	**1,800**	**11,800**

DD/Cheque should be drawn in favour of "The Director, NERTU, OU" or
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