Faculty Development Program
on
MATLAB & Its applications in AI & ML

Under the banner of
Electronics and ICT Academy, NIT Patna

19th - 26th May, 2020

Patron

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Director, NIT Patna

Coordinator (NIT Patna)
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Co-coordinators (AEC, Kumbakonam, TN)
Mr. T. Thivagar & Mrs. N. Nagalakshmi

Organized by

Electronics and ICT Academy, National Institute of Technology Patna, Patna- 800005. India.
www.nitp.ac.in/ict/

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About NIT Patna

National Institute of Technology Patna is the 18th National Institute of Technology created by the Ministry of HRD, Government of India after rechristening the erstwhile Bihar College of Engineering Patna on 28.01.2004. NIT Patna marked its humble beginning in 1886 with the establishment of pleaders survey training school which was subsequently promoted to Bihar College of Engineering Patna in 1924. This made this institute the 6th oldest Engineering institute of India. The Institute is situated on the south bank of holy river Ganges behind Gandhi Ghat (where the ash of father of the Nation, Mahatma Gandhi was offered in the river Ganges). The campus has a picturesque river view with historic building presenting a spectacle of architecture delight and natural beauty. The Institute imparts high level education training, research and development in science, engineering, technology, and humanities along with high quality education and values at UG, PG and Ph.D. level. At present the Institute offers courses in six major technical disciplines viz. *Architecture, Civil Engineering, Computer Science & Engg., Electrical Engg., Electronics & Communication Engg. and Mechanical Engg.* It also consists of well-established departments of Physics, Chemistry, Mathematics and Humanities and Social Sciences.

Electronics and ICT Academy

Ministry of Electronics and Information Technology, Government of India has instituted seven Electronics and Information & Communications Technology (ICT) Academies of which, the academy of NIT Patna is one. The Academy at NIT Patna aims to design and organize basic as well as specialized training programs in niche areas of Electronics and ICT for the development of required knowledge base, skills and tools to equip the teaching community with better knowledge and understanding.

Overview

Today in the era of multidisciplinary academic and research activities, MATLAB not only provides the platform to deal with primary numerical computing, but it also enables the analysis of several data, development of algorithms, and related modelling. Further, it also covers a wide range of applications in the domains related to Artificial Intelligence (AI)/soft computing, such as neural network, machine learning, deep learning, along with some other fields, like, image processing, etc. This program is mainly focusing on the essential introduction of MATLAB, which will be followed by the several advanced topics related to computer vision/image processing, optimization methods, Artificial Intelligence - machine learning & deep learning, etc. The technology of image processing is mainly focused on processing the new image to enhance it, whereas, computer vision is focused on extracting information from input image. Furthermore, this program will also discuss MATLAB based several aspects of machine learning (ML) and deep learning that are usually considered as the subsets of Artificial Intelligence (AI).

Objective and Scope

- Primary objective of this program is to provide an exposure to the participants with the essentials of MATLAB and some of the toolboxes based on Artificial Intelligence, Optimization, etc.
- Develop conceptual and fundamental concept of Machine Learning elements.
- Develop basic understanding of all key component of MATLAB for ML development.
- Develop understanding of Data Science and Analytics.
- Understand different types of Machine learning based algorithm.
- Understand the performance and limitation of AI and ML algorithm.
- Finally this program will provide opportunity to develop ML/AI algorithms for Smart Application development.

Course Content

- Introduction to MATLAB: Variables, Loops, Conditions, Functions, Numbers, Vectors, and Matrices in MATLAB.

- Basics of Image Processing and Computer Vision.
- Various Optimization Techniques - Firefly Optimization, Genetic Algorithm, TLBO Optimization, Swarm Optimization, and Curve Fitting Tool.
- Neural Model, Back Propagation Architecture, Faster training-numerical optimization techniques, Feature Extraction, etc.
- Neural Network Toolbox
- K-Nearest Neighbor, Nearest Neighbor Intuition, Learning KNN model with features subset and with non-numeric data, Properties of KNN.
- Machine & Deep Learning, Recurrent & Convolution Neural Networks, LSTM and CNN, ANN and different feature extractions, and Applications.

Outcomes

By the end of the program, the participants should:

- Understand the essential ideas of MATLAB, including the toolboxes related to AI and others.
- Understand the various optimization methods and tools.
- Know the role of neural network (models).
- Understand the KNN model (and its properties), and dealing with scaling issue.
- Know how to work with Machine and Deep learning approaches, along with the applications of AI.
- Get motivation for further studies and research in these domains.

One-week FDP includes

- **40 Hours Instructor-led live online Hands-on based learning & Interactive Query Session.**
- Soft copy of study material, Training PPT's & Projects code
- Participants will get recorded sessions after completion of training.

- Certificate from E&ICT Academy, NIT Patna

Who Can Participate

Faculty members of UGC/AICTE recognized Universities and Engineering colleges all over India, Research scholars (PhD only), students and Industry personals; however priority will be given to the faculty members.

Resource Persons

- Mr. Jai Mangal Singh, Redtron Edu. LLP
- Representative from the Mathworks
- Dr. Rakesh Ranjan, Assistant Professor, ECE Department, NIT Patna.

Registration Fee

- Faculty/ Research Scholar (PhD): **Rs. 250/-,**
- Students: **Rs. 250/-,**
- Industry and others: **Rs. 1000/-.**

Registration Process

1. Registration fee can be paid by the online mode, the account details for this purpose is:
   Account Name: **NIT Patna**
   Account No.: **50380476798**
   IFSC Code: **ALLA0212286**
2. Link for Registration:
   https://forms.gle/nkFSscmGteF2m1eR7
3. The brochure of the program may be downloaded from the Institute website: **www.nitp.ac.in**.
4. **Last date of registration: 18.05.2020 (till 14.00 Hrs.)**
5. Total - **100** seats and the selection will be done on first-cum-first-serve basis. PDF file of online filled registration form with proof of registration fee paid will be sent through email to **Dr. Rakesh Ranjan** (Email: **rr@nitp.ac.in**) and **Mr. T. Thivagar** (Copy to email to (cc to): **erthivagar@gmail.com**).

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REGISTRATION FORM

1. **Name** (block letter): …………………………….…
2. **Gender**: …..………………………………………….……….…
3. **Caste**:………………………………………………
4. **DOB**:…………………………………………………
5. **Designation** …………………………………………..
6. **Organization**: …………………………………….…
7. **Address for communication**: ………………………
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   Pin code: ……………… **Ph. No.**: …………………
   E-mail: ………………………………………………
8. **Highest Academic Qualification**: …………………..
9. **Specialization**: ………………………………………
10. **Experience (in years)**:
    (a) **Teaching**: …………… (b) **Industrial**: ………….
11. **Aadhar No:** ………………………………………….

DECLARATION

I do hereby agree to abide by the rules and regulations of the FDP.

Place: …………………….…

Date:………………………..

………………………………
Signature of the Applicant