QIP SHORT TERM COURSE

ON

Computational Biology and Neuroscience

June 13th- 18th, 2016

Organised By

Department of Computer Science and Engineering

Indian Institute of Technology (BHU) Varanasi

Uttar Pradesh – 221005

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BACKGROUND

Computational Biology has emerged as one of the interdisciplinary research and education forum which cover computer science, genetic biology, and neuroscience. The computing methods, classical as well as modern have been deployed to solve the various problems of neuroscience at two levels mainly, One is Neuron ensemble another is genetic. The neuro-generative diseases are mainly Parkinson disease and Alzheimer, which have well been taken by intelligent computing methods for their classification and diagnosis between normal and abnormal state of brain. The intelligent computing methods deployed in diagnosis are Artificial Neural Nets (ANN), Support Vector Machine (SVM), and Random Forest for the classification of diseases. Certain Data Mining methods like clustering (K-means, Hierarchical and SOM) have been utilized for the study of abnormality in brain. From the computational biology perspective, the gene expression and gene-gene interaction have been widely used for the analysis of abnormalities in brain due to neuro-generative and genetic diseases. In this course, the objective is to deliberate lectures on the three aspects: one is gene expression and gene-gene interaction, protein structure and functions second is intelligent computational methods deployed for the PD, Alzheimer's disease and episodic memory and another one is brain interconnectivity network which differs in normal and abnormal patients.

This course would also demonstrate some of the tools and techniques which are deployed for the analysis of diseases with intelligent computing methods.

COURSE CONTENTS

- **Genetic Biology and Diseases:**
1. Biology of genes(DNA,RNA and Proteins) Genome: Gene expression and Gene-gene interaction Proteome: protein structure and functions
2. Genetic sign and symptoms of the diseases: Parkinson disease, Alzheimer's disease, Episodic memory
3. Neuroscience : Fundamental of neuro-anatomy and neuroscience and some neuro-diseases
4. Neuro-imaging and brain Connectivity
5. Cognitive functions and neuroscience
6. Some Neuropsychiatric diseases: Schizophrenia, Dementia, and Bipolar mood disorder, ADHD and OCD.
- **Overview of Intelligent Computing methods:**
1. Artificial Neural Network: Hopfield network, SOM
2. Genetic Algorithm

3. Data Mining Methods: Classification, Clustering, Prediction
4. Application of Intelligent Computing Methods to
   a) Gene alignment, sequencing and interaction
   b) Parkinson diseases, Alzheimer, Episodic memory, cognitive abnormality and neuropsychiatric diseases
5. Brain Connectivity Network

- **Laboratory Work:**
  Demonstration of Clustering, Classification, ANN, GA classification methods to diagnosis of Neuro-generative and genetic Diseases, also brain connectivity and imaging

COURSE MATERIAL

Each registered participant will be provided with a set of comprehensive lecture notes in CD.

FINANCIAL ASSISTANCE

Limited number of Participants (30) from Government and AICTE recognized engineering institutions will be eligible for to and fro railway fare via shortest route in III AC class and free lodging and boarding in the Institute guest house/Hostels during course period. Candidates attending the course in full only will be eligible for TA and DA.

For all other participants no TA/DA will be paid by IIT (BHU) Varanasi

LECTURES BY FACULTY

Faculty members of IIT (BHU) and other faculties of BHU Varanasi and guest faculty members from other premier Institutions (like IITs, IMS BHU, IISc Bangalore)/ Organization (NBRC Maneser Haryana) will deliver lectures.

ELIGIBILITY

The course is open to teachers of Engineering Colleges and a few polytechnics approved by AICTE. No course fee is charged for participants sponsored by AICTE approved institutions.
Participants from Governments Departments and Industries are eligible, provided they meet their T.A. and D.A. and pay a course fee @ Rs. 2500/- and Rs. 5000/-, respectively. The payment is to be made by demand draft drawn on any Nationalised Bank in favour of Registrar, IIT (BHU) Varanasi, payable at Varanasi.

BOARDING AND LODGING

Boarding and lodging facilities will be provided for the selected candidates from AICTE approved institutions in the institute guest house/hostel.

IMPORTANT DATES

- Last date of submitting scanned copy of application by email: **23rd May, 2016**.
- Intimation of Selection: **25th May, 2016**.
- Last date for receiving the caution deposit: **5th June 2016**.

The selected participants have to send a demand draft for Rs. 1000/- drawn on any Nationalized Bank in favour of Registrar, IIT (BHU) Varanasi, payable at Varanasi, as a caution deposit for confirmation of their participation. The caution-money will be returned back only if the participant joins the course.

Interested candidates may send advance copy of the application duly countersigned by the Head of the Department / Controlling Officer (for sponsored candidate) to avoid procedural delay.

Application Form

1. Name (block letter):

2. Designation & pay scale:

3. Organization:

4. Address for communication:

  Pin code:

  Ph. No.:   **Fax No.**

E-mail:

5. Highest Academic Qualification:

6. Specialization:

7. Experience (in years):

  (a) Teaching:

  (b) Industrial:

8. Amount of TA required as per entitlement mentioned in this brochure (only for AICTE approved college teachers):

Please register me for the course on "Computational Biology and Neuroscience" to be held at CSE IIT (BHU) Varanasi.

Place:

Date: Signature of the applicant

SPONSORSHIP

Prof./Dr./Mr./Ms../Mrs./_____
is an employee of our institute and his/her application is hereby sponsored. The applicant will be permitted to attend the short-term course "Computational Biology and Neuroscience" at IIT (BHU) Varanasi during June 13-18, 2016, if selected.

Date: Signature of Sponsoring Authority

Designation:

Official Seal:

For applicants from Industries and Government Departments:

DD No.   Date:
Bank:

Amount: Signature of the Applicant

The duly sponsored application form should be mailed to:

Prof. R.B. Mishra
Course Coordinator
Department of Computer Science and Engineering, Indian Institute of Technology (BHU) Varanasi, Varanasi - 221005, Uttar Pradesh.

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