Report on STTP on

Machine learning applications for spatio temporal data analytics

Minutes of sessions

DAY 1:(07TH JANUARY 2019)

Session First (9.00 AM to 11.00 AM) (INAUGRATION)

1) The day started with prayers to the almighty by lighting the lamp followed by welcoming the dignitaries.

2) Rev. Fr. Colbert da Silva addressed the audience with a warm welcome followed by Dr.Krishnamurthi with his enlightening thoughts.

3) Dr. Avik Bhattacharya, the chief guest for the day shared the fundamental idea of IEEE with the audience. The audience could gain sufficient knowledge about the IEEE.

4) At the last, Ms. Sana Shaikh, HOD, Department of Computer Engineering, DBIT, Mumbai,proposed a vote of thanks.

Session Second (11.15 AM To 1.15 AM)

A) Remote Sensing by Dr.Avik Bhattacharya

1) The lecture started off with **Introduction to Remote Sensing.** The basic definition of **Remote Sensing, the Importance of Remote Sensing, Principles of Remote Sensing were discussed.**

2) Two ways of **Remote Sensing** viz. **Passive and Active** were focussed**.**

3) Various **Remote Sensing Images of the Earth** were showed to the participants and the technology behind this was put forth before the participants. The participants seemed to be enjoying the session.

4) **Sensors used in Remote Sensing** and their types were discussed.

5) Various terminologies related to the **Remote Sensing** were put forth.

6) Atmospheric effects were also discussed.

B) Geo Informatics by Dr. Amiya Kumar Tripathy

1) The lecture focussed on the usage of **GIS** in today's technological era.

2) Some **case studies** like **Equitable Piped Water Supply, Mumbai DP,Mobile GIS data collection** were discussed.

3) The lecture mainly focussed on problems with regions that suffer from water crisis.

4) The lecturer focussed on providing a solution to these problems with the help of **GIS.**

5) The main objectives of **GIS** were discussed.

6) The steps to use **GIS** viz. **Data collection, Segregation and sorting, Storing** were discussed.

7) The concept of Spatial Query Processing was introduced and briefed.

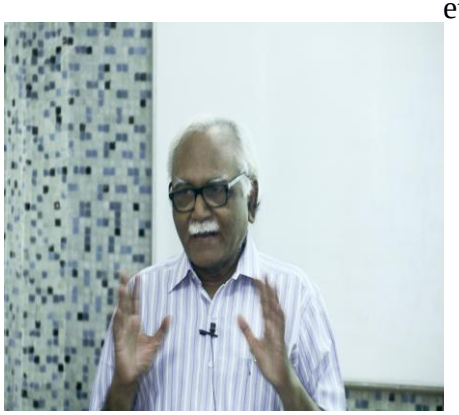
Day 2 Tuesday (08-01-2019)

Session First (9.00 AM to 11.00 AM)

Basic Of Machine Learning (By Dr. Phiroj Shaikh)

- Overview of machine learning and what is machine learning
- Types of machine learning
- Basic definition of machine learning by different great author.
    - Application of machine learning for spatio temporal data.

1. **GIS (Geographic Information System) (By Dr. J N Shah)**
    - Application of machine learning in GIS.
    - Discussion on Various application based on GIS.
    - Detail study of Pocra Project collaboration with IIT-B and Maharashtra Gov.
    - Details study of various application like school mapping, dry waste management etc.



Session Second (11.15 AM To 1.15 AM)

Topic: Machine Learning For Geospatial Technologies. (By Dr. Sanjay Shitole)

- Various application of Machine learning in geospatial technologies like crude oil identification
- Study 3 main keyword of machine learning is Generalization, Associative, and Learning ability.
- Types of machine learning.
- Study about Error Back Propagation Training Algorithm.
- Training algorithm of Perceptron Example done.

Day 3: Wednesday (09-01-2019)

Session 1 (9:00 AM to 11:00 AM):

Topic : Use of Machine Learning Algorithm In stereo Image Processing And Analysis.

Speaker: Jyoti Joglekar (Prof of K .J.Somaiya)

- What is Bayesian Desision Theory.
- What is Naive Bayes Training and how useful it is.
- How machine learning is used in Stereoscopic Images
- Types of process
    1. Optimization bases
    2. Probab

ilistic Based

Session 2 (11:15 AM to 1:15 PM):

Topic: Introduction to Geo-informatics

Speaker: Dr. Amiya Kumar Tripathy

1. Cameras used in Drones

    a. Infarred Camera :- Used Infarred rays to take pictures.

    b. Thermal Camera :- Uses heat emitted by objects to take pictures.

2. Drones to modify Indian agricultural industry :-

    a. Uses drone image processing.

    b. Provides autopiolet mode once the coordinates of the field are mapped.

    c. Used for or to take high resolution visible spectrum photos. A typical flight takes 100+ images.

3. NDVI cameras :- NDVI images defines different plants with different colors based on their type and health.

4. R-Tree :- Minimum bounding rectangle is used to map object into tree structure. As it provides a convinent way to traverse.

5. Global Positioning System (GPS) :- Devices used :-

a. Constellation of satellites

b. Handhelf devices

Day 4 : Thursday(10-01-2019)

Session 1 (9:00 AM to 11:00 AM):

Adversial Methods for domain Adpation(Dr. Biplab Banerjy)

- What is linear Regression?(Overview and Usefullness)
- Convex vs Non-Convex Function.
- Overview of Gradient Descent Algorithm.
- Lasso and Ridge Regression.
- Image Classification(Deep Learnibg)
- Branch Convolutional Neural Network for Hierarchical Classification
- Convolution(Image Convolution Examples)

Session 2 (11:15 AM to 1:15 PM):

Change Detection in Urban Planning(Dr. Priya Mendiratta)

- Modelling Urban Growth Dynamicsof Mumbai Meteropolitan region using geospatical data sets.
- Spatio-Temporal Data Analysis.
- Object Based Image Analysis(OBIA).
- Direction of Urban Growth(Classification of images based on urban growth).
- Overview on SLEUTH Model.
- Limitations of the study of Urban Planning.

Day 5 : Friday(11-01-2019)

Session 1 (9:00 AM to 11:00 AM):

Applications of GIS and Remote Sensing in Natural Resource Management(Dr. Sangita Mishra)

Study of different types of Case Studies:

1. Micro Level Drought Vulrenability for sustainable development of using GIS and Remote Sensing.
2. Spatio Temporal drought in Tel River Basin.
3. Water Scarcity.
4. Agricultural Drought using vegetative indices.
5. Study of Erosion of hydrological waterways.

Session 2 (11:15 AM to 1:15 PM):

Security in GIS(Dr. Priya Mendiratta)

- Collaborative planning.
- Enhanced situational awareness.

- Promotes better decisions.
- New levels of productivity and efficiency in critical operations .
- Why GIS need in defense and homeland security?
- Different GIS techniques used for providing solutions.

STTP LAB

Day 1

Third Session

- Features of QGIS
- Installation of QGIS
- Create Vector and Raster Data
- Explore Vector Data and Attributers

Day 2

Third Session

2. Create GeoPackage for Vector Data
3. Classification of Vector Data
4. Create Maps in QGIS
5. Create Layers in QGIS
6. Vector Analysis in QGIS

Day 3

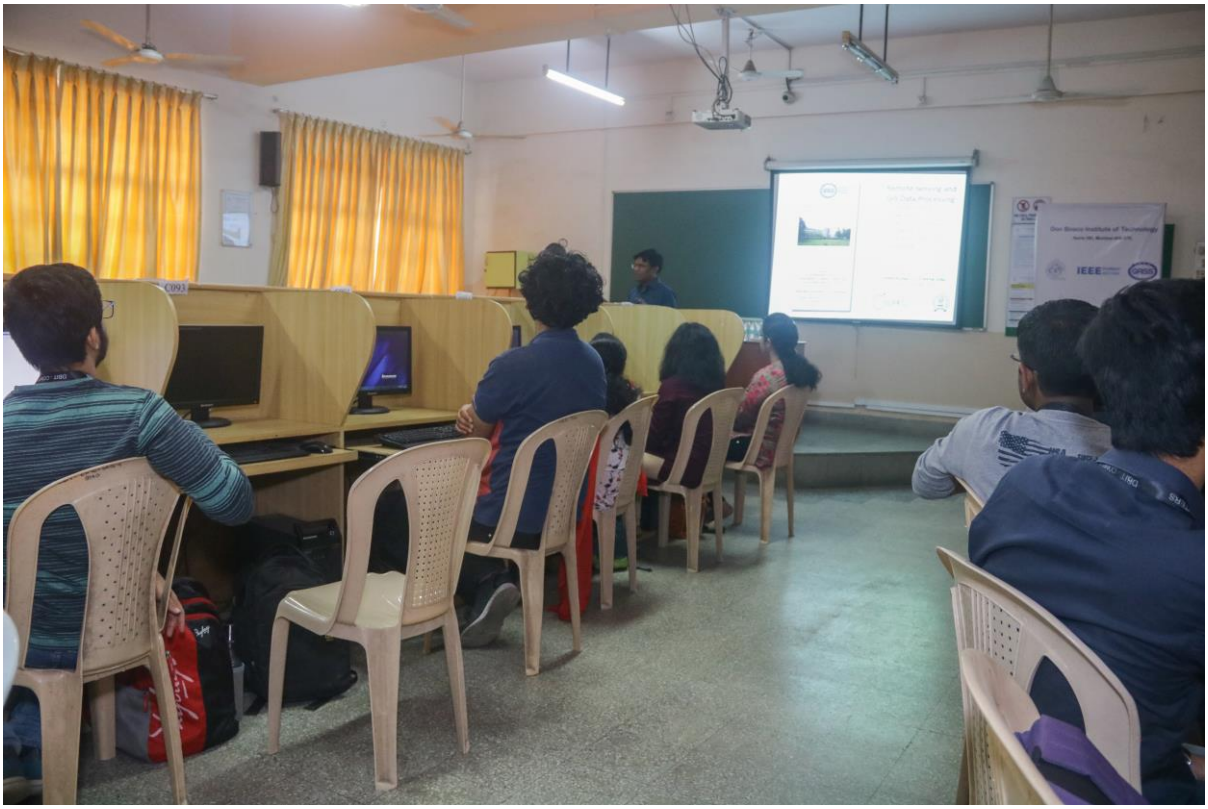
Third Session

- Web GIS software
- Advantages of WEB GIS
- Web Mappings
- Studies of Web Server and Client Application

Day 4

Third Session

- Different Types of Free available resources for downloading MAPS.
- Classification of Vector Data in Free Open Source Software.
- Types of Software for GIS.
- Study of Remote Sensing.



Session 3 (3.00 PM to 5.00 PM)

Valedictory

The Event started with a Great valedictory speech by our college Principal Dr. Prasanna Nambihar that followed pattern. It offered a fond reflection on the activities and achievements of the Computer Department. She connected with audiences using anecdotes and lots of name-dropping and offered gratitude. She kept her speech simple, short and encouraged us on actively participating on the discussion event of the complete STTP wherein a lots of interesting talks happened.

Then the Certificate distribution event took place and a group photo of all the participants was taken which concluded the event.