MCA-36 Machine Learning Lab.

General Course Information

Course Code: MCA-36 Course Credits: 2 Type: Professional Core Lab. Course Contact Hours: 2 hours/week Mode: Lab practice and assignments	**Course Assessment Methods (internal: 30; external:70)** The internal and external assessment is based on the level of participation in lab. sessions and the timely submission of lab experiments/assignments, the quality of solutions designed for the assignments, the performance in VIVA-VOCE, the quality of lab. file and ethical practices followed. The internal examination is conducted by the course coordinator. The external examination is conducted by external examiner (appointed by the Controller of Examination) in association with the internal examiner appointed by the Chairperson of the Department.

Pre-requisites: Programming in Java, Python, R and Octave/MATLAB.

About the Course:
In this lab. course, students learn to solve optimization, supervised and unsupervised learning problems using machine learning tools. Students will use machine learning tools available in WEKA, R, Python and Octave etc. The lab experiments involve downloading datasets and applying machine learning techniques on these datasets. The course has a special focus on interpreting and visualizing results of machine learning algorithms.

Course Outcomes: By the end of the course students will be able to:
- CO1. **Implement** machine learning algorithms using modern machine learning tools.
- CO2. **Analyse** the trends in datasets using descriptive statistics.
- CO3. A**pply** descriptive and predictive modelling.
- CO4. **Compare and contrast** machine learning algorithms for a given problem. (describe datasets using descriptive statistics.
- CO5. **Create** lab records of assignment by incorporating problem definitions, design of solutions, results and interpretations.
- CO6. **Demonstrate** use of ethical practices, self-learning and team spirit.

List of experiments/assignments
1. Install WEKA/R/Python/Octave and learn to use these software packages.
2. Two assignments related to classification algorithms and interpreting the results of these algorithms.
3. Two assignments related to clustering algorithms and interpreting the results of these algorithms.
4. Three assignments on designing neural networks for solving learning problems.
5. Two assignments on ranking or selecting relevant features.
6. Two assignments on linear regression and logistic regression.
7. One assignment to be done in groups.

Note:
The actual experiments/assignments will be designed by the course coordinator. One assignment should be designed to be done in groups of two or three students. The assignments must meet the objective of the course and the levels of the given course outcomes. The list of assignments and schedule of submission will be prepared by the course coordinator at the beginning of the semester.

MCA-37 Data Analytics Lab

General Course Information

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Pre-requisites: Basic programming skills.

About the Course:
In this course, the learners will be able to develop working expertise of
1. To provide an overview of language R/Python/Excel used for data science.
2. To introduce students to the programming environment and research environments
3. To introduce the extended use of libraries and packages
4. To familiarize students with how various statistics concepts for data exploration
5. To familiarize with classification regression algorithm.
6. To make understand about data visualization techniques in R.

Course Outcomes: By the end of the course students will be able to:
   CO1. **Apply** basic concepts related to data science
   CO2. **Implementation** of data with statistical summaries and plots.
   CO3. **Designing** predictive models.
   CO4. **Analyse** the quality of a designed model fit.
   CO5. **Interpret** and evaluate the result of predictive models.
   CO6. **Evaluation** of predictive modelling.

List of experiments/assignments:
1. To provide an overview of a language used for data science.
2. Implement statistics like mean median etc. can be collected for data exploration
3. Write a small program to implement all basic concepts
4. Exercise with file handling packages.
5. Write a script for statistics techniques (mean, mode, median, variance, standard deviation)
6. Design user define functions to apply processes on dataset.
7. Write a script to work with tabular/ data frame using dataset.
8. Exercise with different types of popular packages.
9. Script to detect outlier and missing values.
10. Write scripts to implement predictive model.
11. Write a code to apply/analyse predictive model fitness.
12. Write scripts on classification and regression algorithms
13. Script for interpretation of confusion matrix from model.
14. Implement the sampling methods for dataset.
15. Implement Bootstrap method.
16. Script for cross validation example.
17. Draw all types of graph with example in different scripts

Note:
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