Centre for Skill Development & Entrepreneurship
Panjab University, Chandigarh
(csde.puchd.ac.in)

Lecture on "Machine Learning Skills for Engineering and Science Researchers"

Centre for Skill Development and Entrepreneurship (CSDE) organised special lecture on 'Machine Learning Skills for Engineering and Science Researchers' at Seminar Hall, UIET, PU, Sector-25. Prof. Harrison B. Prosper, Kirby W. Kemper Professor of Physics and Distinguished Research Professor, Department of Physics, Florida State University (USA) delivered the lecture. His research interests include high energy Physics, cosmology, advanced analysis methods and Bayesian statistics. Machine learning has important role in the development of modern systems and devices. Prof. Harrison explained about the basic concepts on Machine learning theory with appropriate examples. He stated that Machine learning is a computational Algorithm to learn regularities in data automatically; in other words to learn functions of the data. Classification challenges like spam filtering, search engines, traffic monitoring systems are using machine learning for the precise implementation. Various machine learning techniques include neural networks, decision trees, Bayesian networks etc. All these techniques use statistics in there logic for analysis. Common formula for all the machine learning techniques uses the constrained empirical risk represented by R(W) and a suitable loss function represented by L(y,f). Algorithm design using decision trees and neural network are shared using an example of wine taster machine. This technique is now commercially in use. He quoted the example of MNIST database. Further, he stated that the most common approach in Machine Learning is to fit a function $f(x, w^*)$ parameterised by w, by minimising the constrained empirical risk R (w).

$$R (w) = 1/N (\sum_{i=1}^{N} L(y_i, f(x_i, w) + c(w))$$

Where L(y, f) is a suitable loss function and c (w) is the constraint.

He also explained that data visualisation is a part of Machine Learning. It is numerical approximation of the same mathematical quantity. Unsupervised learning and supervised learning were explained with suitable examples. Talking about the business Intelligence he said that by 2025 approximately US$40,000 million/annum would be spent on Machine learning since it will grow huge as an industry. Apple, Yahoo and other Giants such as Google are spending a lot of money annually on this field since they believe that soon there would be machines that would be artificially as intelligent as humans. Automation of all the aspects of digital life and manufacturing need machine learning for their implementation.

Panjab University Vice-Chancellor, Prof. Arun Grover in his presiding talk shared the need for improving the skills of the students on the campus. He also shared his views related to

enterprising skills and start-ups during the address. Around 100 research scholars and students from engineering and sciences participated and interacted during the lecture.

Harish Kumar
Honorary Director

Venue: Seminar Hall, UIET, Sector-25, Panjab University, Chandigarh.
Date: November 17, 2016