**Machine Learning for Efficient Assessment and Prediction of Human Performance in Collaborative Learning Environments**

The objective of this work is to propose a machine learning-based methodology system architecture and algorithms to find patterns of learning, interaction, and relationship and effective assessment for a complex system involving massive data that could be obtained from a proposed collaborative learning environment (CLE). Collaborative learning may take place between dyads or larger team members to find solutions for real time events or problems, and to discuss concepts or interactions during situational judgment tasks (SJT). Modeling a collaborative, networked system that involves multimodal data presents many challenges. This paper focuses on proposing a Machine Learning - (ML)-based system architecture to promote understanding of the behaviors, group dynamics, and interactions in the CLE. Our framework integrates techniques from computational psychometrics (CP) and deep learning models that include the utilization of convolutional neural networks (CNNs) for feature extraction, skill identification, and pattern recognition. Our framework also identifies the behavioral components at a micro level, and can help us model behaviors of a group involved in learning.

**EXISTING SYSTEM:**

Collaborative learning methods have been implemented broadly by organizations at all stages, as research recommends that active human involvement in cohesive and micro group communications is critical for effective learning. Even though there is a long practice of using mathematical models for modeling human behavior, Cipresso introduced a computational psychometrics-based method for modeling characteristics of real behavior. Cipresso’s article provides us with a way to extract dynamic interaction features from multimodal data for modeling and analyzing actual situations. But it took lot of time to extract the data.

**DISADVANTAGES OF EXISTING SYSTEM:**

* One of the biggest challenges in this area is related to the reliance on data analytics, which makes it necessary to extract a small amount of information from a huge amount of collective behaviors.
* An important line of inquiry focuses on finding accurate evidence and valid assessment of these micro-level interactions which supports collaborative learning.

**PROPOSED SYSTEM:**

We propose a three-stage method to explore and study collaborative group behaviors. The first stage integrates and processes multimodal data obtained in a collaborative learning environment (CLE) that includes sensor input, audio, video, eye tracking, facial expressions, movement, posture, gestures, and behavioral interaction log data. The second stage performs feature extraction and cloud computation using computational psychometrics (CP) and convolutional neural network (CNN)-based deep learning for skill, pattern, and trend identification. Finally, the third stage uses the parameters measured in the previous two stages to understand and model group interactions, competencies, and collaborative behavior at a micro-level. The third stage uses machine learning for effective assessment and visualization of group dynamics such as correctly assessing the increase in the groups’ level of shared understanding of different perspectives, and ability to clarify misconceptions.

**ADVANTAGES OF PROPOSED SYSTEM:**

* Massive data-intensive, high-performance, scalable computing is transforming our capabilities to gather and analyze data in different forms.
* Cloud computing moves computation closer to the data. The main advantage to this process is that this approach is scalable to hundreds of computing nodes, each providing at least a modest performance.

**SYSTEM REQUIREMENTS:**

**HARDWARE REQUIREMENTS:**

* System : Pentium Dual Core.
* Hard Disk : 500 GB.
* Monitor : 15’’ LED
* Input Devices : Keyboard, Mouse
* Ram : 1GB.

**SOFTWARE REQUIREMENTS:**

* Operating system : Windows 7.
* Coding Language : Python
* Tool : PyCharm, Visual Studio Code
* Database : MYSQL

**REFERENCE:**

Pravin Chopade, Saad M Khan, David Edwards, and Alina von Davier Artificial Intelligence and Machine Learning ACT Next, ACT Inc., “**Machine Learning for Efficient Assessment and Prediction of Human Performance in Collaborative Learning Environments**”, IEEE International Symposium on Technologies for Homeland Security (HST): IEEE Xplore: 13 December 2018, DOI: 10.1109/THS.2018.8574203