**INTRODUCTION**

Massive Open Online Courses (MOOCs) is one of the most widespread e-learning platforms. The MOOCs present the course using digital tool materials in various forms such as visual, audio, video and plain text. Most students prefer using video lectures to understand the contents of lessons over thoroughly reading plain text documents. The interactive video in the MOOCs could reduce students’ stress, help them to feel relaxed and learn quickly [1] [2].

MOOCs can be classified into two distinct types mainly, connectivist Massive Open Online Courses (cMOOCs) and eXtended Massive Open Online Courses (xMOOCs).The xMOOCs are learning paradigm based on the principles of cognitivist behaviorist theory[4]. The structure of the courses is similar to the traditional course where the syllabus consists of a set of video lectures and a set of multiple choice quizzes in addition to the final exam. The video lectures featuring the course instructor reviewing the content of the previous online lesson are released weekly. The participants can watch and pause the video at their own pace. Moreover, the students can socially interact with other participants and the instructor through posting in discussion forums. The instructors usually post questions, provide task solutions and reply to student questions via these discussion forums; as a consequence the discussion forums play a vital role in enhancing the course quality and make online sessions collaborative and engaging [3] [5].

The cMOOCs are a new learning model based on connectivist learning theory [3][4]. With the connectivism approach, the instructor would not provide the actual learning material; the students get the course syllabus by asking the questions and sharing this information with other participants. References [3][4][5] posit the learning strategy of cMOOCs focused on a collaborative approach in which learning material combined remix, repurposable and provided, forwarded to

other students.

With cMOOCs, it is impossible to involve expertise to assess the students' knowledge whereas in xMOOCs, university lecturers can evaluate the students’ knowledge through the use of computer-marked assessment feedback. In particular, the computer gives immediate feedback to the student when he completes the online assessment. The learner, upon successful completion, will be awarded their certification in xMOOCs.The cMOOCs do not include a formal assessment. Hence, universities are not considered cMOOCs as an official course

[5][6].

With rapid advancements in technology, artificial intelligence has recently become an effective approach in the evaluation and testing of student performance in online courses. Many researchers applied machine learning to predict student performance in [7], however few works have been done to examine the trajectories performance [8]. As a result, educators could not monitor the real-time students learning curve. Two sets of experiments are conducted in this work. In the first set of eperiements, regression analysis is implemented for estimation of students’ assessment scores. The student past and current activities in addition to past performance are employed to predict student outcome. In the second set of experiments, supervised machine learning method has been utilized to predict long-term student performance. Three types of candidate predictors have been considered firstly behavioral features, followed by temporal and demographic features. The proposed models offer new insight into determining the most critical learning activity and assist the educators in keeping tracking of timely student performance. To the best of our knowledge, student performance has been evaluated in online course using only two targets: “success” and “fail”. Our model predicts the performance with three-class labels “success”, “fail” and “withdrew”.