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Early Prediction of Student's Performance

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Abstract: Performance degradation assessment (PDA) is of great significance to ensure safety and availability of mechanical equipment. As an important issue of PDA, the robustness of the trained model directly affects the assessment efficiency and restricts its application in practice. This paper proposes a robust modeling approach based on Student's t-hidden Markov model (Student's t-HMM) and nuisance attribute projection (NAP). NAP can remove nuisance attributes caused by individual differences from the feature space. Student's t-HMM utilizes the finite Student's t-mixture models (SMMs) to describe the observation emission densities associated with each hidden state, which can be more tolerant towards outliers than conventional HMMs. Based on these two techniques, the proposed method is supposed to be more robust and can assess the performance degradation process of new objects based on data of tested objects.

The prediction of students' academic achievement is crucial to be conducted in a university for early detection of students at risk. This paper aims to present data mining models using classification methods based on Decision Trees (DT) algorithms to predict students' academic achievement after preparatory year, and to identify the algorithm that yields best performance. The students' academic achievement is defined as High, Average, or Below Average based on graduation CGPA.

Keywords: Prediction, Academic Achievement, Decision Tree (DT), J48, Random Tree, REPTree.

I. INTRODUCTION

Employment of graduates students is a problem in Saudi Arabia; only 48% of them are employed [1]. This rate is even larger for technical fields like CS and IT. While this is certainly a multi-dimensional problem, feedback from stakeholders (e.g. Aramco employees that are members of the College Board), and potential employees (workplaces where our students perform their COOP) acknowledged that unemployment is more spread among students with low CGPA. This study uses Data Mining (DM) tools to analyze available data from past batches of students at the College of Computer Science & IT (authors' institution) and extract useful information to explain the phenomena of low CGPA. Machine learning systems offer a lot of potential for assisting instructors in detecting poor student performance by providing an early warning system. As a result, instructors can devote more time to such struggling pupils in order to prepare them for summative tests. To determine the prediction accuracy, we used different machine learning algorithms on the historical results of a course given in a bachelor's in computer information systems programme. These models will be utilised on future students' formative exams, and if the model predicts that a student is more likely to fail a course, alternative educational tactics will be applied to improve his or her learning experience. The following part discusses relevant work, followed by a problem statement, explanation of the experiment specifics and findings, and finally, a conclusion Employment of graduates students is a problem in Saudi Arabia; only 48% of them are employed [1]. This rate is even larger for technical fields like CS and IT. While this is certainly a multi-dimensional problem, feedback from stakeholders (e.g. Aramco employees that are members of the College Board), and potential employees (workplaces where our students perform their COOP) acknowledged that unemployment is more spread among students with low CGPA. This study uses Data Mining (DM) tools to analyze available data from past batches of students at the College of Computer Science & IT (authors' institution) and extract useful information to explain the phenomena of low CGPA. The student-centered learning method advocates for ensuring that students have a positive learning experience. As a result, it's vital for instructors to keep track of their students' progress and adjust their instructional tactics accordingly. As a result, formative assessments have become an important tool for teachers to evaluate the efficiency of the learning process.

II. OBJECTIVE

- 1) Calculate Student Performance using Machine learning algorithm
- 2) Need of keeping track of user search results to enhance the process.
- 3) To Predict Student performance using Machine learning Technique.
- 4) To classify dataset using Support vector machine Algorithm.



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- 5) To increase the Academic achievement level of each students.
- 6) To the our System provide performance in early.
- 7) Easy to use or handle
- 8) To examine the impact of sport on academic

III. LITERATURE REVIEW

Sr	Publish-	Year	Author	Key Points	Research gap identified
No	cation detsils				
	A Robust Performance		HUIMING JIANG 1,	Robustness, performance	Use Degardation modeling
1.	Degradation Modeling	11 March 2020	JING YUAN 1 , QIAN	degradation assessment,	approach
	Approach Based on Student's		ZHAO 1, HAN YAN 2,	student's t-HMM, nuisance	
	t-HMM and Nuisance		SEN WANG3 , AND	attribute projection, bearings.	
	Attribute Projection		YUNFEI SHAO		
			Evoyaty Topuor Voya	The techniques used in this	In this paper use Desision
2	Using Mashing Learning		Llawady Tahuai, Taya	avantiment and Constalized	
۷.		21.1 2010	Heryadi; Lukas; Banuar	experiment are Generalized	Tiee
	Techniques to Earlier Predict	31 January 2019	Saleh Abbas; Ford	Linear Model, Deep Learning	
	Student's Performance		Lumban Gaol	and Decision Tree	
3.	Mulyankan: A prediction for		Pooja Pathak; Neha	Artificial Neural	Use ANN algorithm
	student's performance using	04 May 2015	Bansal; Shivani Singh	Networks,ML	
	Neural Network				
4.	Data Mining Analysis on			Student Performance,	
	Student's Academic		Ching-Chieh Kiu	Educational Data Mining,	Use Data Mining
	Performance through	11 March 2020		Decision Tree, Naïve	
	Exploration of Student's			Bayesian, Neural Network	
	Background and Social				
	Activities				

IV. SYSTEM DESIGN



Fig 1: System Design



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V. CONCLUSION

In conclusion, This research focused on the predictive ability of DM methods to predict students' achievement after preparatory year at the degree level in higher education. The students' achievement is based on the Grade Point Average (CGPA) defined as (high, average, or under average). Throughout the experiment, we have implemented three SVM classifiers; J48, RT on the student dataset to predict the achievement of the student at graduation year. The results showed that the J48 classifier outperforms predicting students' achievement with reasonable accuracy of 69.3%. Moreover, the important features that had a significant impact on predicting academic achievement of CCSIT students were; CGPA for Prep year, Computer Skills course, Communication Skills course, Mathematics course. The results obtained will help to predict students' final achievement early enough to take effective countermeasures by providing timely warnings to students. Thus, the percentage of students who have low achievement can be reduced providing the right counseling.

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