

“Analysis and Prediction of Student’s Academic Performance Based on Educational Data Mining”

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Abstract - Education plays a pivotal role in producing qualified human power that accelerates economic development and solves the real problems of a community. Students are also expected to spend much of their time on their education and need to graduate with good academic results. However, the trend of graduating students is not proportional to the trend of enrolled students and an increasing number of students commit readmission, suggesting that they did not perform well in their academics. Thus, the study aimed to identify the determinants of academic performance among university students.

Key Words: Data mining, Performance analysis, Machine Learning.

1.INTRODUCTION

Education is regarded as a promoter of human development and seen by many to be in the center of any society’s life and concern. It is a social artifact embodying aspiration about the welfare and development of the society it deems to serve. To Botswana, education is expected to contribute towards the social, cultural, political and economic welfare and development of citizens (RNPE, 1994). According to Botswana educational goals, children who complete secondary education are expected to have acquired lifelong skills and be competitive in the global village when it comes to their employability (RNPE, 1994). This therefore, calls for students to excel academically or hopefully perform

to the satisfaction of the nation. In Botswana basic education is free to all children. The government is the sole sponsor for the education of sponsorship at tertiary level. Since government committed itself to provide basic education for all, the Ministry of Education and Skill Development has been receiving a lion’s share in both recurrent and development budget. Since 2007/2008 budget the Ministry of Education and Skill Development has been allocated over P5 billion of the recurrent budget. The 2013/2014 budget the Ministry of Education and Skill development is allocated P7.93 billion or 22.98 per cent of the ministerial recurrent budget. Considering government hefty investment in education, its output with regard to the quality of students has not been commensurate with the expenditure. The students’ academic performance has been declining at an alarming rate since 2010. Table 1 below shows yearly students’ academic performance for 2010, 2011 and 2012, which indicate a serious decline. This has caused a concern for both the government and the public.

2. PROPOSED SYSTEM

2.1 PROBLEM STATEMENT:

To Analyze and Predict Student’s Academic Performance Based on Educational Data Mining

2.2 EXISTING SYSTEM:

1. Low accuracy detected.
2. Limited Dataset used

2.3 SYSTEM ARCHITECTURE:

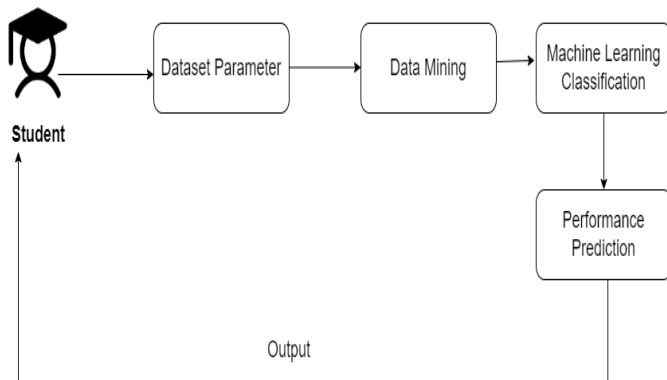


Fig. 1 Architecture

2.4 ALGORITHM:

1. Data Collection

Here we will collect the student's data.

2. Data Preprocessing

In this step we will preprocessing the data.

3. Feature Extraction

In this step we will extract the feature of students.

4. Data classification

In this step we will applying the classification methods.

5. Final Result

In this step will show the final students' performance result.

2.5 MATHEMATICAL MODULE:

Relevant mathematics associated with the Project:

Let S be the Whole system $S = I, P, O$

I-input

P-procedure

O-output

Input (Students Data)

I=Input as Data

Where,

Dataset

Procedure (P),

$P=I$,

Using I System perform operations and calculate the performance of students.

Output(O)-

O = Predict Performance

3. SYSTEM REQUIREMENTS

3.1 SOFTWARE REQUIREMENTS:

- Operating System – Windows
- Application Server - Apache Tomcat
- Front End - HTML, Bootstrap, CSS
- Language - Python.
- Database - My SQL
- IDE - PyCharm, Visual Studio, VS Code

3.2 HARDWARE REQUIREMENTS:

- Processor - Intel i3/i5/i7
- Speed - 3.1 GHz
- RAM - 4 GB (min)
- Hard Disk - 20 GB
- Key Board - Standard Windows Keyboard
- Mouse - Two or Three Button Mouse
- Monitor - SVGA

3.3 ADVANTAGES:

- The research problem of this paper is to objectively evaluate students' academic achievement from the perspective of clustering, and predict the future achievement based on the existing achievement.

- Aims to contribute in the growing work on machine learning.

- To build student performance system.

3.4 APPLICATION:

- College System
- Performance Applications

4 CONCLUSION

The system focuses on the student academic growth analysis using machine learning techniques. For analysis Decision tree and random forest classifier are used. This process can help the instructor to decide easily about performance of the students and schedule better method for improving their academics. In future additional features are added to our dataset to acquire better accuracy.

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