

# **Student Performance Prediction with Online Learning Analytics using Dataset of Exam Metrics**

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## **1. Featured Application**

Student Prediction Analytics is the technique of prediction analysis system to improve the student career with the guidance of prediction analytics techniques. This Student Performance Prediction via online Learning Analytics using exam metrics is mainly using the prediction techniques with machine learning and approaching microservice model for feature enhancements. This will provide the prediction of student performance and stability metrics of the student curriculum and non-curriculum activities in the education institutions based on the prediction metrics.

## **2. Keywords**

Amazon Web Services, Application Programming Interface Model, Prediction Analysis, Machine Learning, MicroServices, MangoDB.

## **3. Abstract**

Student Performance Prediction Analysis will help to the students and the faculties about the understand and the improvement area of the student with the education system outcomes. It provides the environment to the lectures to understand the culture of the student improvement area with academic and non-academic or non-curricula area of interest of the student as per the Research conducted between 2012 to 2021 was the base research for the fundamental activities of the student performance analysis based on the student performance outcome metrics of the curriculum activities. For the paper gone through lots of papers related to student analysis metrics and to proceed with the curriculum and non-curriculum activities of the student outcomes So, Forming the system with highly scalable and more predictive using the real time data for the result outcomes instead of previous year data kind of analysis with Microservices Architectural View of the Data Mining. The Development code is available on cloud github with services with for microservices <https://github.com/Sowmiya11/StudentPerformancePrediction>

## **4. Introduction**

This Student Performance Prediction via Online learning analytics is based on the data which is trained with the system. In the existing the Student Performance Analysis is based on the exam metrics over the last year or some existing records of the student which is assumption data of the model but in this system the peer-to-peer model is proposed as per the latest result of the particular student metrics for example if the proposal of the system is for Student A the recent exam and curriculum metrics are considering for the performance analysis.

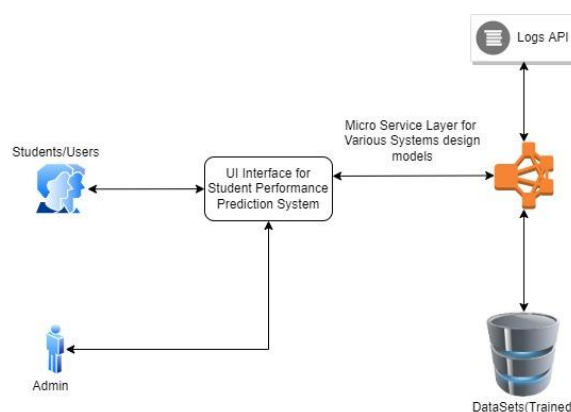
Centralized data model set for each student will be stored and maintained for the training the system. Student will get the clear understanding of the student self-evaluation and

prediction of their area of the improvement also predictable using the proposed system. All the curriculum results of the student are considering for the training the data set. It's also helping the student for the self-monitoring purpose with their culture and study model also they can monitor and share their progresses with lectures for the review as a kind of Peer Review Model System.

Student Performance Prediction Analysis will help students to improve their level of understanding the system kind of the journal level research improvement of the massive impacts for the students. This Systematic review applied for the various batches of the exam data metrics of the year 2021 which provides the higher percentage of positive metric analysis on the student performance this process involved the below symmetries into the systems

- Machine Learning concepts are used to predict and deeply analysis the understanding of the student exam outcomes.
- Collecting the exam metrics and training the system as per the outcome progress of self-training of the machine learning mechanism.
- Each level of training and processing system is splitting into the microservices.
- Identify the higher and lower end of nodes of the result sets with different perspective of datamining
- Higher rate of outcomes on various data sets with microservice architecture.
- Collecting the exam data with cloud on mango dB with involving various

The remaining of this paper speaks into various strategies which are involves the study and improvement of following categories [2] Study of the Background of Education system improvement, [3] Existing student performance prediction system, [4] Architecture of the Analysis and Training Datasets [5] Microservice of the symmetric model for the student performance prediction system and [6] Testing of the System using Karate Framework. The outcome of each model will be considering for the feedback of the system.



**Figure 1.** Flow Overview of Student Performance Prediction System.

## 5. Study of the Background education system improvement

Study of the Education System improvement is the key of the student performance prediction system. Study Invokes the key of independent system management, study of

the area of interest, data mining processing of data and the review models are also included with the machine learning progressiveness to the system construction.

Analyzed the systems which are available for the student curriculum and non-curriculum improvements with their based papers and journals for career improvements with the various data mining projects, those systems are mainly focused on the collective student performance with the help of various datasets which are available on the college or any education systems. Most of the systems involves the propagations are developed with R Language and the system-oriented designs but in the proposed system we are planned and migrated the development with latest emerging technology like Java Microservices with Spring boot for UI we are proposing system with Data Sets.

### **5.1 Student Curriculum Outcomes**

Student Curriculum outcomes are the main factor of the student performance analysis system. For example, the student exam outcomes are helping to maintain the system with drive-based system to collect and manage the data with the all outcomes over the various outcomes. This system is featured with self-training model of the system to be maintained over the system area of improvements. It also invoked data mining and machine learning for the self-training of the data set which are all feeded to the system. The data are predicted with the K Means cluster node classifier to classify the system.

### **5.2 Systematic Prediction**

Systematic prediction is performing the system with the various layers of processing the data like as below,

- Collecting Data as feed for each time from the user.
- Sorting and training the system.
- Progress of the outcomes for each phase by help of microservices.
- Review Model
- Notifying the user outcomes.

### **5.3 Peer to Peer Review Model**

Peer review model will provide the idea of reviewing the outcomes with various stages this will also train the system with various phases like as reviewing the various stages this will helps the system for systematic prediction status before, but this system is systematic tracking of exams and the outcomes of those review feed back system, this flow will help the consistency to the prediction of student career growth of the various levels for the reviews. Student Performance prediction system are not the flow of the monitoring the system with the any systematic prediction status before, but now we are developed system with systematic tracking of exams and the outcomes of those with feedback system.

## **6. Student Performance Prediction System**

Existing student performance prediction is tightly coupled with the system which is installed and it's a kind of legacy data trained system which means the system is process

the prediction using the existing data set and not with the real time data for the performance and the procedure what they followed for the development. In the proposed system development and the deployment strategies are overcomes with all the drawbacks of the existing flow as explained followed topics of the journal.

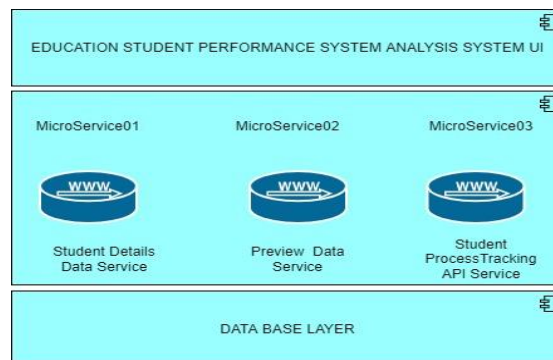
### 6.1 Working Model of data Prediction with Patch Data System

The flow of the system is monitored and maintained the trained data set with the Prediction of Machine learning for automated system. All the datasets are trained as the flow of feeding data into the system. For example, if we are calculating the percentage of the prediction of the current semester data is predicted with the current curriculum data like internal exams and the activity feedback of the student from the faculty etc.,

Need to conclude solution with the past student's history of percentage with the professor approached percentage like past performance of the student otherwise might can have the existing performance of the same student for the prediction. It will fall over the place of student current performance.

## 7. Architecture and Working Flow of the Student Performance Prediction System

Architecture view of the Student Performance prediction system is mentioned mainly with the data flow progress of the data prediction over the prediction.



### 7.1 Student Performance Analytics System via exam metrics

Student performance prediction system involved the different layers which includes the UI. This will provide the better user experience for the UX as the development. This will provide the best feature to the application and will be implemented with the Vue JS. It helps the system to bring lazy loading of the dynamic system maintenance over the featured changes.

### 7.2 SDD - Student Detail Data Service Layer

SDD is the microservice model for Student Detail Data Service which will provide the data to the system to do process, prediction and analysis so this layer is the core of the system which will provide the high prediction of the system of filtering to the student prediction system.

### 7.3 RDS - Review Data Service Layer

RDR is the Review Data Service Layer which is microservice Review Data Service is the microservice which will return the data for the student review metrics and will support the prediction level of filtering the review metrics which include students self-review and staff review details to the student prediction system.

### 7.4 Student Process Tracker API Services

In Student Predictive Analysis system, the progressive tracking is happening in Student Process Tracking API Service which is the microservice provides the performance metrics kind of half the outcome of the system. Tracking the prediction is the layer of applying the business logics and metrics to the system prediction This all provides the performance and stability to the system.

### Conclusion

This performance analysis prediction system applied to the various student for investigating with various college and education system inputs outcomes, which are all considered as a proxy So applied the PRISMA protocol and SLR guidelines to produce with various review processes. The search of 62 primary articles of exhaustive on search of seven bibliographic databases yielded a synthesis of various primary articles in the research. All the researched articles presented as prediction of various student performance dataset outcomes. This article is presented for the intelligent models to forecast student performance student outcomes. The predictive models were published in peer reviewed venues, spanning with 2010 till November 2022. To the best of knowledge this was the first summarized the outstanding efforts of other researchers who studied the attainments of student performance outcomes. The proposed changes and the challenges of those are all prediction of academic performance at the program level so call the research community to implement the recommendations concerns over the research phases (1) Prediction of the program level outcomes and (2) the validation of prediction models and outcomes using multiple datasets of different majors and disciplines.

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