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ABSTRACT

As the name specifies “STUDENT PERFORMANCE ANALYSIS SYSTEM” is the software developed for analyzing the student performances in the academic. The student performance analysis system provides an easy way for the teachers and students in searching the details of the academic attendance report and marks/percentage details the with graph. Performance analysis of outcome based on learning is a system which strive for excellence at different levels and diverse dimensions in the field of student’s interests.

Student performance modelling is one of the challenging and popular research topics in educational data mining, we could find only a few specific surveys on student performance analysis and prediction. These specific surveys are limited in nature and primarily focus on studies that try to identify possible predictor or model student’s performance. However, the previous works do not address the temporal aspect of prediction. Moreover, we could not find any such specific survey which focuses only on classroom-based education.

- It helps in maintaining students’ records.
- Graphical user interface is user friendly.
- Easy for student to view his academic records.
- Machine learning regression algorithm is used to predict marks for upcoming test.
- Easy to handle.
- It provides information about Test Performances, detailed analysis of each subject, anytime.
- It also acts as a platform where the complete academic information about the student.

Chapter 1

INTRODUCTION

Student Performance Analysis System is an emerging field and very crucial to schools and universities in helping their students and professors. Most of the pre-existing methods are based only on past academic performance of students. This system aims to develop models which can predict the student's performance and grades while keeping in mind other equally essential personality factors like interests, attributes which affects their lifestyle. It uses various machine learning and deep learning techniques to predict the performance of the students.

The project aims to predict a student's performance by analyzing behavioral patterns and existing grades. It helps us to identify the success factors and success blockers. The project contains an algorithm which analyses attributes like: existing grades, absences, number of hours studied, etc. The Algorithm then predicts an expected performance based on the attributes. The project is based on the Machine Learning and the algorithm used is Linear Regression. Linear Regression Algorithm helps us to identify correlation between variables or attributes.

- **PYTHON:**

Python is a general-purpose, interpreted, high-level programming language popularly used for website development, data analytics and automation.

Python is a general-purpose language which means it is versatile and can be used to program many different types of functions. Because it is an interpreted language, it precludes the need for compiling code before execution and because it is a high-level programming language, Python is able to abstract details from code. In fact, Python focuses so much attention on abstraction that its code can be understood by most novice programmers.

Python code tends to be short and when compared to compiled languages like C and C++, it executes programs slower. Its user-friendliness makes it a popular language for citizen developers working with machine learning algorithms in low-code no-code (LCNC) software applications.

Python has a simple syntax and is known for having a large community that actively contributes to a growing selection of software modules and libraries. Python's initial development was spearheaded by Guido van Rossum in the late 1980s. Today, Python is managed by the Python Software Foundation.

Modules used:

- **Pandas:**

Pandas is an open-source library that is made mainly for working with relational or labeled data both easily and intuitively. It provides various data structures and operations for manipulating numerical data and time series. This library is built on top of the NumPy library. Pandas is fast and it has high performance & productivity for users.

- **NumPy:**

NumPy is a general-purpose array-processing package. It provides a high-performance multidimensional array object, and tools for working with these arrays. It is the fundamental package for scientific computing with Python. It is open-source software.

- **Matplotlib:**

Matplotlib is an amazing visualization library in Python for 2D plots of arrays. Matplotlib is a multi-platform data visualization library built on NumPy arrays and designed to work with the broader SciPy stack. It was introduced by John Hunter in the year 2002. One of the greatest benefits of visualization is that it allows us visual access to huge amounts of data in easily digestible visuals. Matplotlib consists of several plots like line, bar, scatter, histogram etc.

- **Streamlit:**

The trend of Data Science and Analytics is increasing day by day. From the data science pipeline, one of the most important steps is model deployment. We have a lot of options in python for deploying our model. Some popular frameworks are Flask and Django. But the issue with using these frameworks is that we should have some knowledge of HTML, CSS, and JavaScript. Keeping these prerequisites in mind, Adrien Treuille, Thiago Teixeira, and Amanda Kelly created “Streamlit”. Now using streamlit you can deploy any machine learning model and any python project with ease and without worrying about the frontend. Streamlit is very user-friendly.

- **SkLearn:**

Scikit-learn is mainly coded in Python and heavily utilizes the NumPy library for highly efficient array and linear algebra computations. Some fundamental algorithms are also built in Cython to enhance the efficiency of this library. Support vector machines, logistic regression, and linear SVMs are performed using wrappers coded in Cython for LIBSVM and LIBLINEAR, respectively. Expanding these routines with Python might not be viable in such circumstances. Scikit-learn works nicely with numerous other Python packages, including SciPy, Pandas data frames, NumPy for array vectorization, Matplotlib, seaborn and plotly for plotting graphs, and many more.

- **Datasets:**
  - **CSV files:**

A CSV is a comma-separated values file, which allows data to be saved in a tabular format. CSVs look like a garden-variety spreadsheet but with a .csv extension. CSV files can be used with most any spreadsheet program, such as Microsoft Excel or Google Spreadsheets. They differ from other spreadsheet file types because you can only have a single sheet in a file, they cannot save cell, column, or row. Also, you cannot not save formulas in this format.

  - **Excel Files:**

Excel is a spreadsheet program from Microsoft and a component of its Office product group for business applications. Microsoft Excel enables users to format, organize and calculate data in a spreadsheet. By organizing data using software like Excel, data analysts and other users can make information easier to view as data is added or changed. Excel contains a large number of boxes called cells that are ordered in rows and columns. Data is placed in these cells. Excel is a part of the Microsoft Office and Office 365 suites and is compatible with other applications in the Office suite. The spreadsheet software is available for Windows, macOS, Android and iOS platforms.

Chapter 2

SYSTEM ANALYSIS

2.1 Scope of the Project

The different areas where we can use this application are:

- Any Educational Institute can make use of it, for the departmental level and at basic subject level for providing a brief overview of the performance related to particular course.
- This system is specifically developed for the faculty and the students.

2.2 Aim of Project

The aim of the project is to providing the online interface for students, faculty etc. Student information analysis system aims to improve the efficiency of college information management, and the main function is to predict the upcoming exam's results with high accuracy and understand where the student is lacking and also providing insights on various aspects of student's academic performance. Through this the teacher can keep track of overall class performance and also individual student performance.

2.3 Hardware and Software Requirement

2.3.1 Hardware Configuration

- Intel i3 or Ryzen 3 Processor
- 4 GB RAM
- 30 GB HDD
- 1024 * 768 Resolution Color Monitor.

2.3.2 Software Configuration

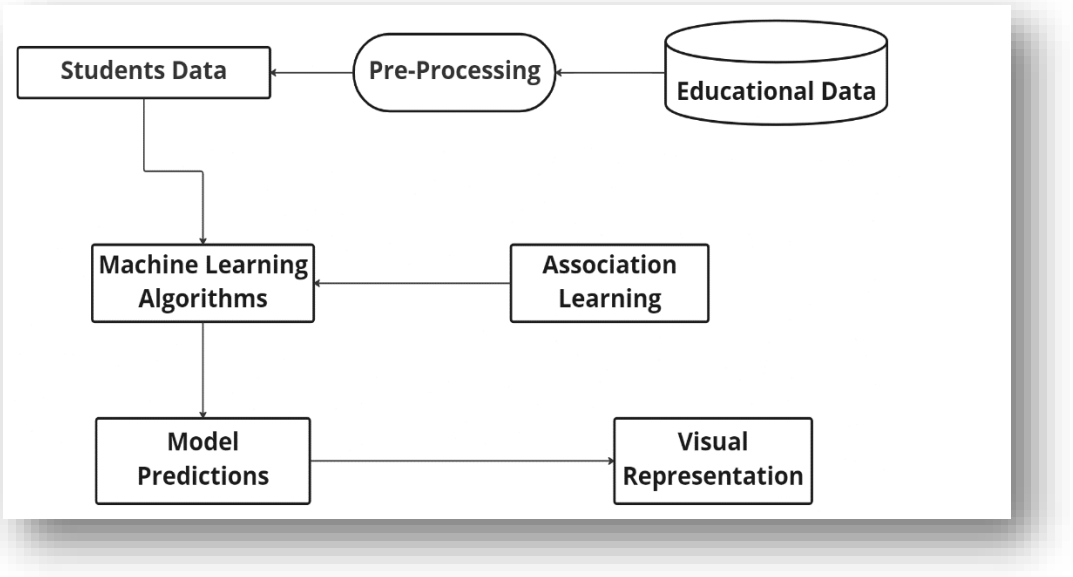
- OS: Windows 7 or above, Linux, Mac
- Datasets (excel or csv files)
- Required python modules
- Web Browser
- Streamlit (Local host)

Chapter 3

SYSTEM DESIGN

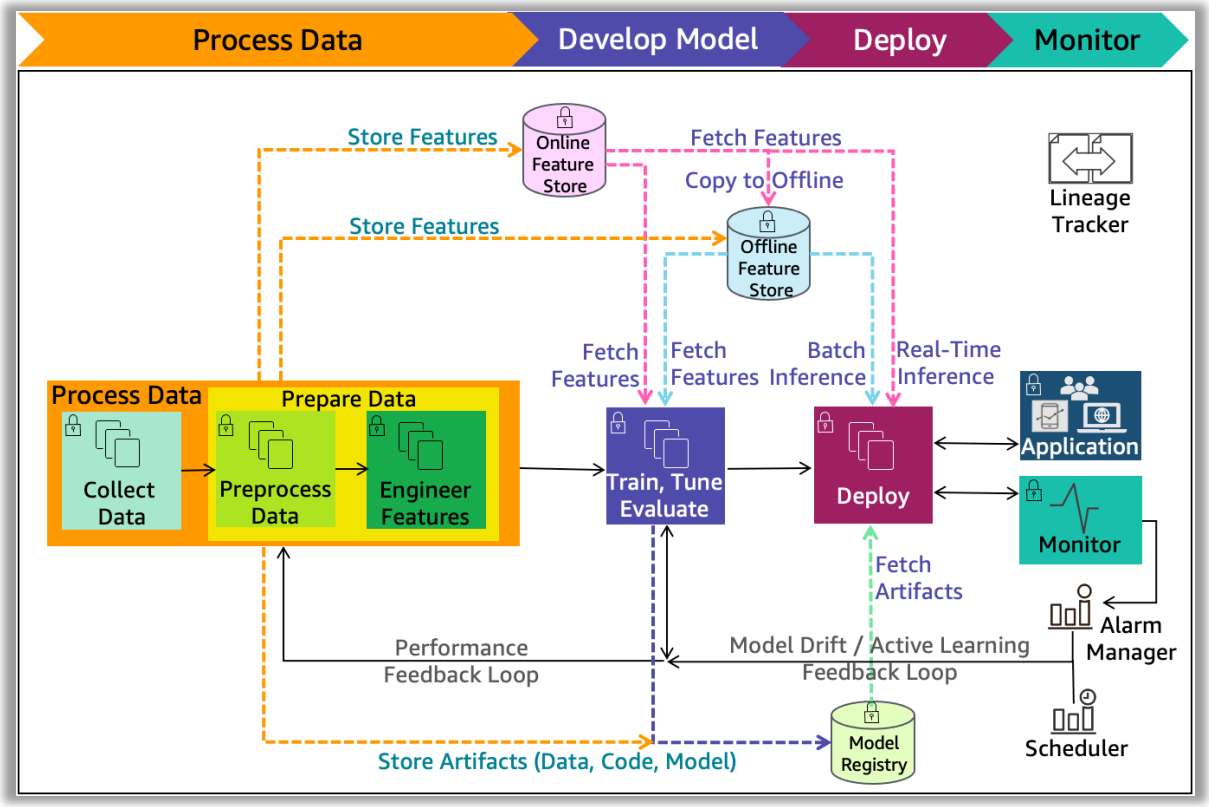
3.1 System Perspective:

3.1.1 Architecture Diagram



Machine Learning (ML) is concerned with the construction and study of system that can learn from data. For example, ML can be used in e-mail message to learn how to distinguish between spam and inbox messages. Classification is the process of finding a model (or function) that describes and distinguishes data classes or concepts. The model is derived based on the analysis of a set of training data (i.e., data objects for which the class labels are known). The model is used to predict the class label of objects for which the class label is unknown.

3.1.2 Data flow Diagram



A data-flow diagram (DFD) is a graphical representation of the "flow" of data through information system. DFDs can also be used for the visualization of data processing (structured design). On a DFD, data items flow from an external data source or an internal data store to an internal data store or an external data sink, via an internal process. A DFD provides no information about the timing or ordering of processes, or about whether the flow processes will operate in sequence or in parallel. It is therefore quite different from a flowchart, which shows of control through an algorithm, allowing a reader to determine what operations will be performed, in what order, and under what circumstances, but not what kinds of data will be input to and output from the system, nor where the data will come from and go to, nor where the data will be stored (all of which are shown on a DFD).

Chapter 4

IMPLEMENATION

4.1 Discussion of Code segment

- **Result Prediction Part**

```
# Load the data into a Pandas dataframe
    training_data = pd.read_csv("datasets/csv/training_data.csv", ';')

    # Training the Machine learning model
    training_data = training_data[['G1', 'G2', 'G3', 'absences', 'failures', 'studytime']]
    predict = 'G3'
    X = np.array(training_data.drop(['G3'], axis = 1))
    y = np.array(training_data[predict])

# Split the data into training and test sets
    X_train, X_test, y_train, y_test = train_test_split(X, y, test_size = 0.2)

# Train the model using different Machine Learning algorithms
    match choose:
        case 'LinearRegression':
            model = LinearRegression()
            model.fit (X_train, y_train)
        case 'RandomForestRegressor':
            model = RandomForestRegressor(n_estimators =100, random_state = 0)
            model.fit(X, y)
        case 'ElasticNet':
            model = ElasticNet(alpha = 1.0, l1_ratio = 0.5)
            model.fit(X_train, y_train)
        case 'ExtraTreesRegressor':
            model = ExtraTreesRegressor(n_estimators = 100)
            model.fit(X_train, y_train)
        case 'SVR':
```

```
            model = SVR(kernel = 'rbf', degree = 3, C = 1.0, gamma = 'auto')
            model.fit(X_train, y_train)
        case 'GradientBoostingRegressor':
            model = GradientBoostingRegressor(n_estimators = 50)
            model.fit(X_train, y_train)


# Evaluate the model
    st.subheader("Accuracy of the model:")
    train_accuracy = int(model.score(X_train, y_train) * 100)
    test_accuracy = int(model.score(X_train, y_train) * 100)

# Display the accuracy
    st.write(f"Train accuracy: {test_accuracy}%")
    st.write(f"Test accuracy: {test_accuracy}%")

# Displaying the predicted results
    sub1 = data.columns[0]
    sub2 = data.columns[1]

    st.subheader("Student Grades")
    array = data.to_numpy()
    new_data = np.array(array)
    predictions = model.predict(new_data)
    st.write("Select the number of students to display")
    length = st.slider('Pick', 0, len(predictions))

    predictions = pd.DataFrame(predictions)
    test = pd.read_csv("datasets/csv/testing_data.csv")

    test = test[['regno', 'name', 'age', 'gender', sub1, sub2]]
    result = pd.concat([test, predictions], axis = 1, join = 'inner')
    result.rename(columns = {0:'Prediction'}, inplace = True)
    st.table(result[:length])
```

- **Data Analysis part**

```
st.write("## Insights on your data...")
with st.container():
    st.subheader("Age of the students:")
    col1, col2 = st.columns(2)
    with col1:
        fig = plt.figure(figsize = (10,4))
        sns.countplot(x = 'age', data = df)
        st.pyplot(fig)

    with col1:
        fig = plt.figure(figsize = (10,4))
        sns.kdeplot(df['age'])
        st.pyplot(fig)

    with col1:
        st.subheader("Number of Failures")
        fig = plt.figure(figsize = (10,4))
        sns.countplot(x = 'failures', data = df)
        st.pyplot(fig)
    col5, col6 = st.columns(2)
    with col5:
            st.subheader("Do Urban students perform better than Rural students?")
            fig = plt.figure(figsize = (10,4))
            sns.kdeplot(df.loc[df['address'] == 'U', 'CG1'], label = 'Urban', shade = True)
            sns.kdeplot(df.loc[df['address'] == 'R', 'CG1'], label = 'Rural', shade = True)
            plt.title('Do urban students score higher than rural students?')
            plt.xlabel('Grade')
            plt.ylabel('Density')
            st.pyplot(fig)
```

4.2 Datasets Collection

Data is an essential component of any AI model and, basically, the sole reason for the spike in popularity of machine learning that we witness today. Due to the availability of data, scalable ML algorithms became viable as actual products that can bring value to a business, rather than being a by-product of its main processes.

Collecting and organizing the data plays a prominent role in the Machine Learning Projects. The datasets collected should be in the excel or csv file types.

The data should be cleaned before accessing it. That is the data in the files should not contain the NULL values. NULL values interrupt the processing of the data in the calculation part. The data should be in the correct format as shown with the example file. All the columns should be present with respect to each student.

Then after collecting the data, it is then imported into the project with the help of Pandas library. Pandas' library in python helps in reading the given data from csv or excel file types in to Pandas DataFrames, this DataFrame is later used for the analysis part.

- **Splitting Your Data: Training, Testing, and Validation Datasets in Machine Learning**
  Usually, a dataset is used not only for training purposes. A single training dataset that has already been processed is usually split into several parts, which is needed to check how well the training of the model went. For this purpose, a testing dataset is usually separated from the data. Next, a validation dataset, while not strictly crucial, is quite helpful to avoid training your algorithm on the same type of data and making biased predictions.

4.3 Modules Explanation

1. **Strategy: matching the problem with the solution**

In the first phase of an ML project realization, company representatives mostly outline strategic goals. They assume a solution to a problem, define a scope of work, and plan the development. For example, your eCommerce store sales are lower than expected. The lack of customer behavior analysis may be one of the reasons you are lagging behind your competitors.

2. **Dataset preparation and preprocessing**

Data is the foundation for any machine learning project. The second stage of project implementation is complex and involves data collection, selection, preprocessing, and transformation.

- **Data collection**

It's time for a data analyst to pick up the baton and lead the way to machine learning implementation. The job of a data analyst is to find ways and sources of collecting relevant and comprehensive data, interpreting it, and analyzing results with the help of statistical techniques. The type of data depends on what you want to predict.

- **Data visualization**

A large amount of information represented in graphic form is easier to understand and analyze. Some companies specify that a data analyst must know how to create slides, diagrams, charts, and templates.

- **Data selection**

After having collected all information, a data analyst chooses a subgroup of data to solve the defined problem. For instance, if you save your customers' geographical location, you don't need to add their cell phones and bank card numbers to a dataset. But purchase history would be necessary. The selected data includes attributes that need to be considered when building a predictive model.

- **Data preprocessing**

The purpose of preprocessing is to convert raw data into a form that fits machine learning. Structured and clean data allows a data scientist to get more precise results from an applied machine learning model. The technique includes data formatting, cleaning, and sampling.

3. **Dataset splitting**

A dataset used for machine learning should be partitioned into three subsets — training, test, and validation sets.

Training set. A data scientist uses a training set to train a model and define its optimal parameters — parameters it has to learn from data.

Test set. A test set is needed for an evaluation of the trained model and its capability for generalization. The latter means a model's ability to identify patterns in new unseen data after having been trained over a training data. It's crucial to use different subsets for training and testing to avoid model overfitting, which is the incapacity for generalization we mentioned above.

Validation set. The purpose of a validation set is to tweak a model's hyperparameters — higher-level structural settings that can't be directly learned from data. These settings can express, for instance, how complex a model is and how fast it finds patterns in data. The proportion of a training and a test set is usually 80 to 20 percent respectively. A training set is then split again, and its 20 percent will be used to form a validation set. At the same time, machine learning practitioner Jason Brownlee suggests using 66 percent of data for training and 33 percent for testing. A size of each subset depends on the total dataset size.

4. **Model training**

After a data scientist has preprocessed the collected data and split it into three subsets, he or she can proceed with a model training. This process entails "feeding" the algorithm with training data. An algorithm will process data and output a model that is able to find a target value (attribute) in new data — an answer you want to get with predictive analysis. The purpose of model training is to develop a model.

5. **Model deployment**

The model deployment stage covers putting a model into production use. Once a data scientist has chosen a reliable model and specified its performance requirements, he or she delegates its deployment to a data engineer or database administrator. The distribution of roles depends on your organization's structure and the amount of data you store.

4.4 Software Testing

White Box Testing:

White box testing techniques analyze the internal structures the used data structures, internal design, code structure, and the working of the software rather than just the functionality as in black box testing. It is also called glass box testing or clear box testing or structural testing. White Box Testing is also known as transparent testing, open box testing.

Working process of white box testing**:**

- Input**:** Requirements, Functional specifications, design documents, source code.
- Processing**:** Performing risk analysis for guiding through the entire process.
- Proper test planning**:** Designing test cases so as to cover the entire code. Execute rinse-repeat until error-free software is reached. Also, the results are communicated.
- Output**:** Preparing final report of the entire testing process.

Black Box Testing:

Black Box Testing is a software testing method in which the functionalities of software applications are tested without having knowledge of internal code structure, implementation details and internal paths. Black Box Testing mainly focuses on input and output of software applications and it is entirely based on software requirements and specifications. It is also known as Behavioral Testing.

Types of Black Box Testing:

There are many types of Black Box Testing but the following are the prominent ones –

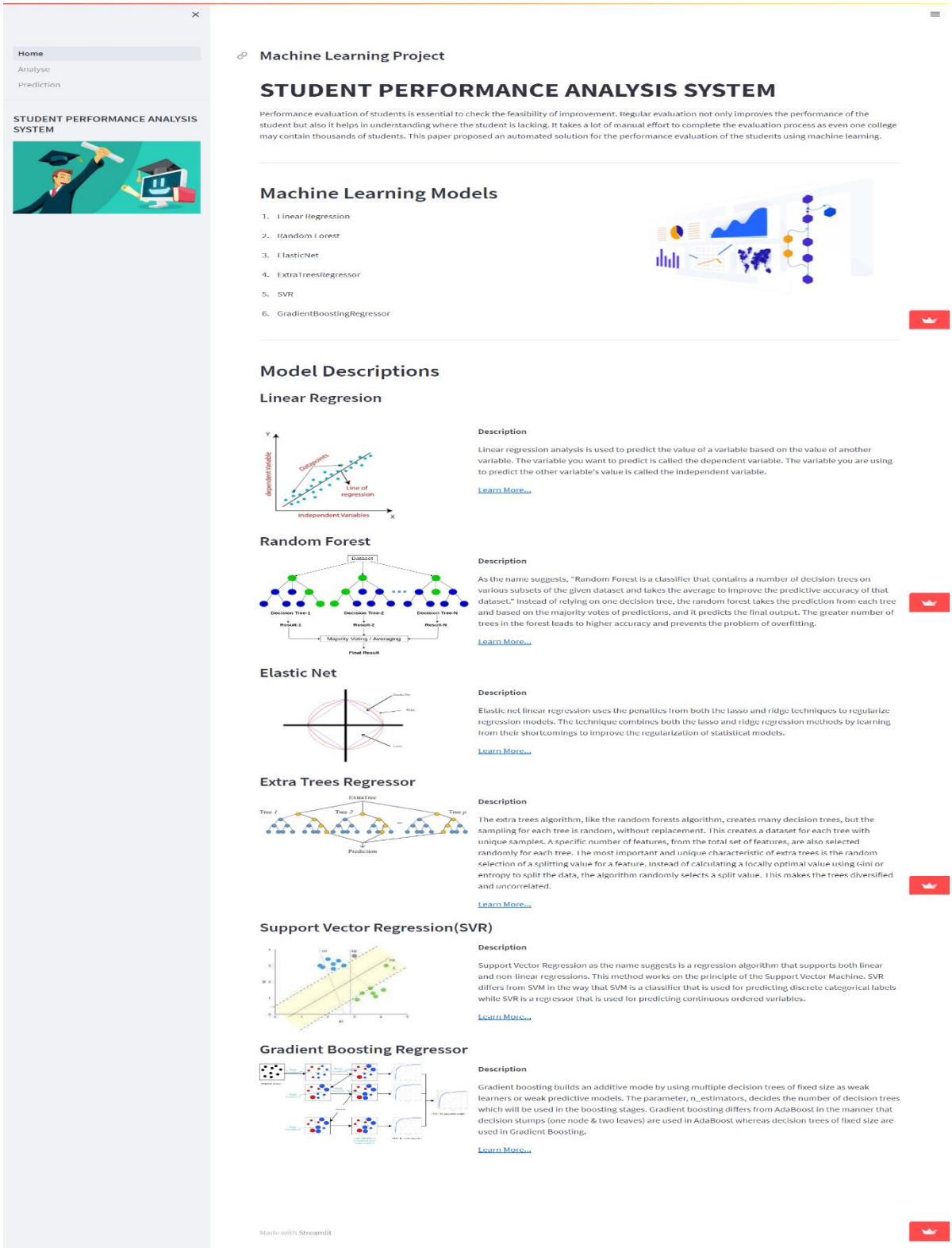
- Functional testing: This black box testing type is related to the functional requirements of a system; it is done by software testers.
- Non-functional testing**:** This type of black box testing is not related to testing of specific functionality, but non-functional requirements such as performance, scalability, usability.
- Regression testing**:** Regression Testing is done after code fixes, upgrades or any other system maintenance to check the new code has not affected the existing code.

Chapter 5

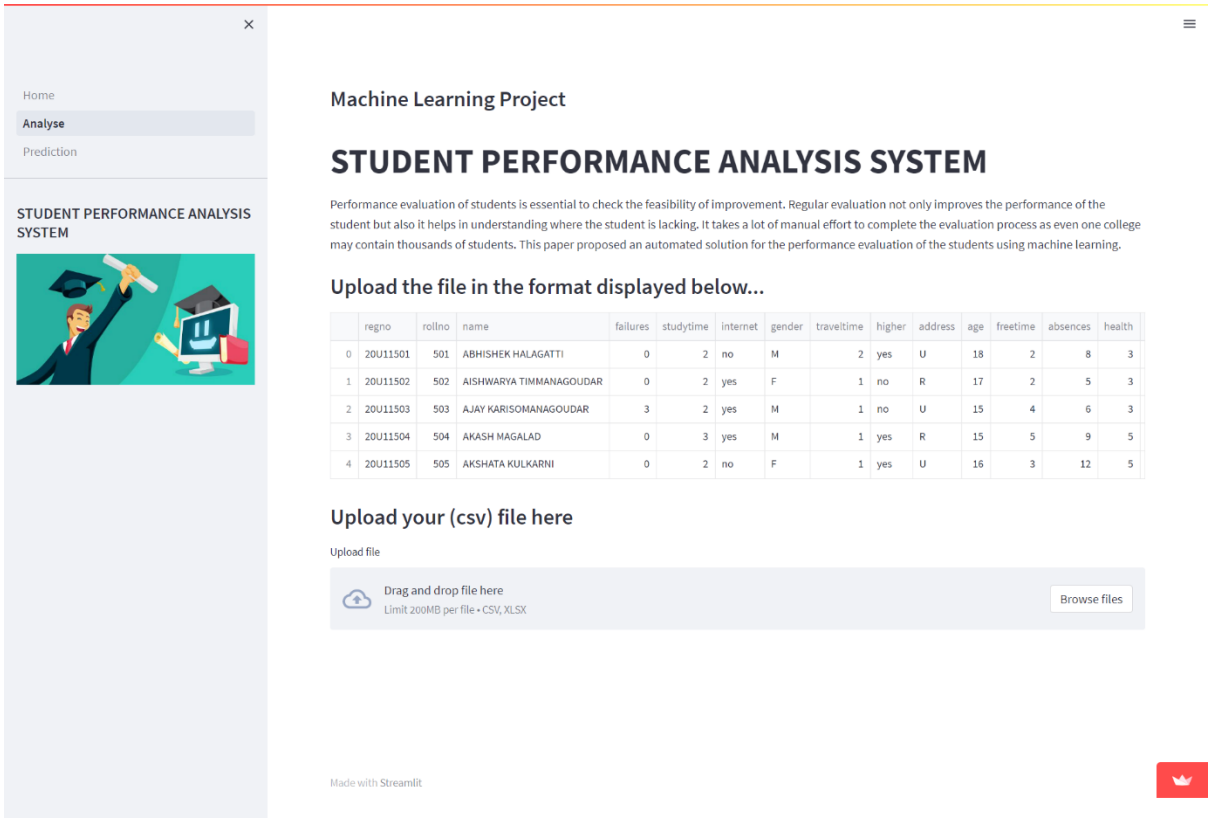
DISCUSSION OF THE RESULTS

5.1 Screen Shots

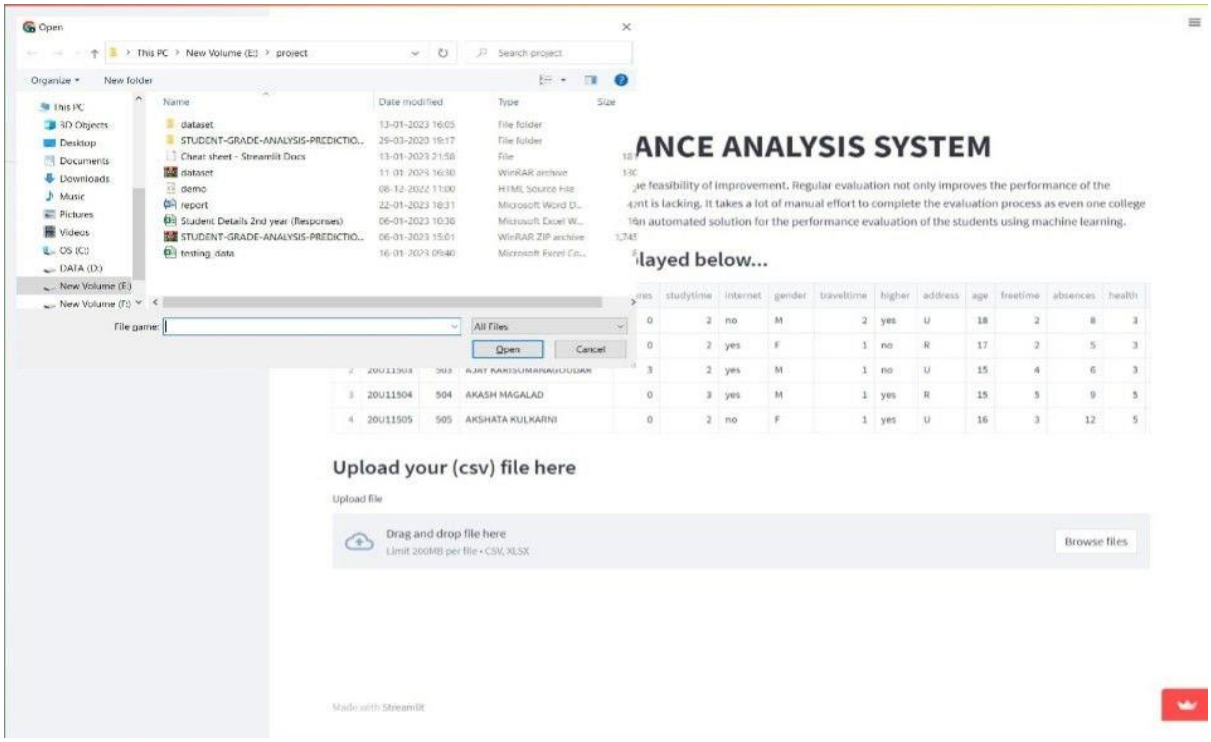
Home Page:



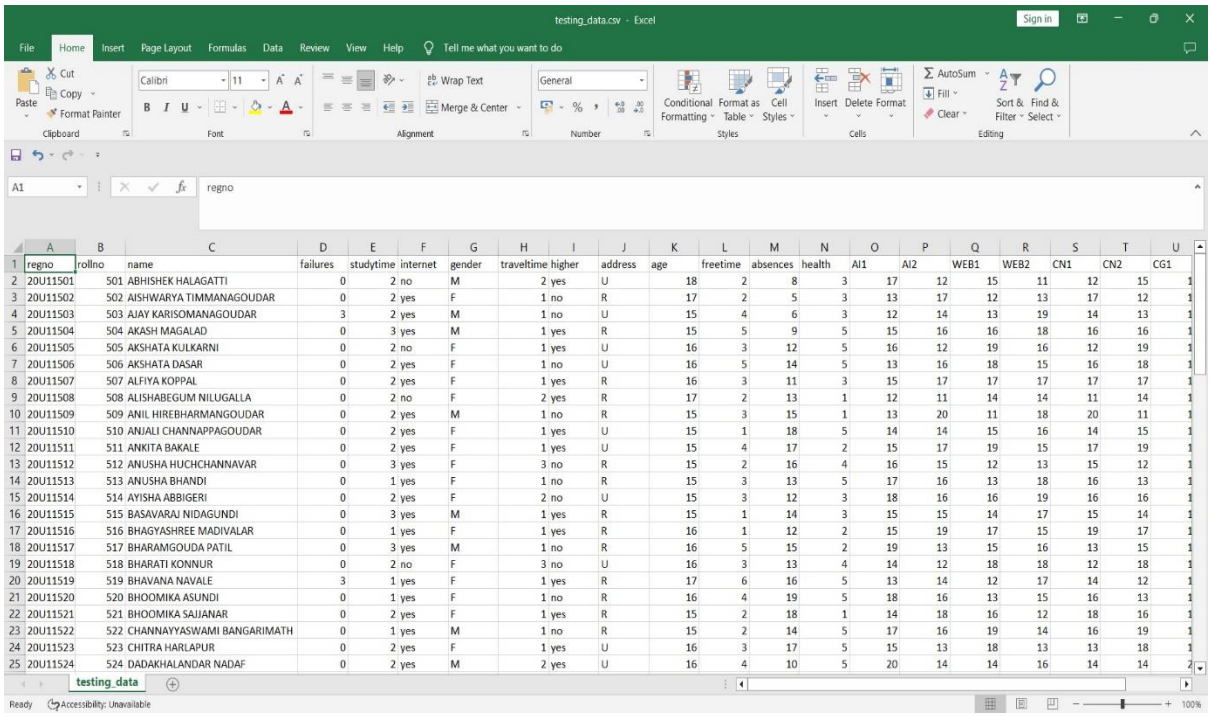
Analysis page:



Uploading the csv file page:



Dataset:



testing_data.csv - Excel

regno	rollno	name	failures	studytime	internet	gender	traveltime	higher	address	age	freetime	absences	health	AI1	AI2	WEB1	WEB2	CN1	CN2	CG1
20U11501	501	ABHISHEK HALAGATTI	0	2	no	M	2	yes	U	18	2	8	3	17	12	15	11	12	15	1
20U11502	502	AISHWARYA TIMMANAGOUDAR	0	2	yes	F	1	no	R	17	2	5	3	13	17	12	13	17	12	1
20U11503	503	AJAY KARISOMANAGOUDAR	3	2	yes	M	1	no	U	15	4	6	3	12	14	13	19	14	13	1
20U11504	504	AKASH MAGALAD	0	3	yes	M	1	yes	R	15	5	9	5	15	16	16	18	16	16	1
20U11505	505	AKSHATA KULKARNI	0	2	no	F	1	yes	U	16	3	12	5	16	12	19	16	12	19	1
20U11506	506	AKSHATA DASAR	0	2	yes	F	1	no	U	16	5	14	5	13	16	18	15	16	18	1
20U11507	507	ALFIYA KOPPAL	0	2	yes	F	1	yes	R	16	3	11	3	15	17	17	17	17	17	1
20U11508	508	ALISHABEGUM NILUGALLA	0	2	no	F	2	yes	R	17	2	13	1	12	11	14	14	11	14	1
20U11509	509	ANIL HIREBHARMANGOUDAR	0	2	yes	M	1	no	R	15	3	15	1	13	20	11	18	20	11	1
20U11510	510	ANJALI CHANNAPPAGOUDAR	0	2	yes	F	1	yes	U	15	1	18	5	14	14	15	16	14	15	1
20U11511	511	ANKITA BAKALE	0	2	yes	F	1	yes	U	15	4	17	2	15	17	19	15	17	19	1
20U11512	512	ANUSHA HUCHCHANNAVAR	0	3	yes	F	3	no	R	15	2	16	4	16	15	12	13	15	12	1
20U11513	513	ANUSHA BHANDI	0	1	yes	F	1	no	R	15	3	13	5	17	16	13	18	16	13	1
20U11514	514	AYISHA ABBIGERI	0	2	yes	F	2	no	U	15	3	12	3	18	16	16	19	16	16	1
20U11515	515	BASAVARAJ NIDAGUNDI	0	3	yes	M	1	yes	R	15	1	14	3	15	15	14	17	15	14	1
20U11516	516	BHAGYASHREE MADIVALAR	0	1	yes	F	1	yes	R	16	1	12	2	15	19	17	15	19	17	1
20U11517	517	BHARAMGOUDA PATIL	0	3	yes	M	1	no	R	16	5	15	2	19	13	15	16	13	15	1
20U11518	518	BHARATI KONNUR	0	2	no	F	3	no	U	16	3	13	4	14	12	18	18	12	18	1
20U11519	519	BHAVANA NAVALE	3	1	yes	F	1	yes	R	17	6	16	5	13	14	12	17	14	12	1
20U11520	520	BHOOMIKA ASUNDI	0	1	yes	F	1	no	R	16	4	19	5	18	16	13	15	16	13	1
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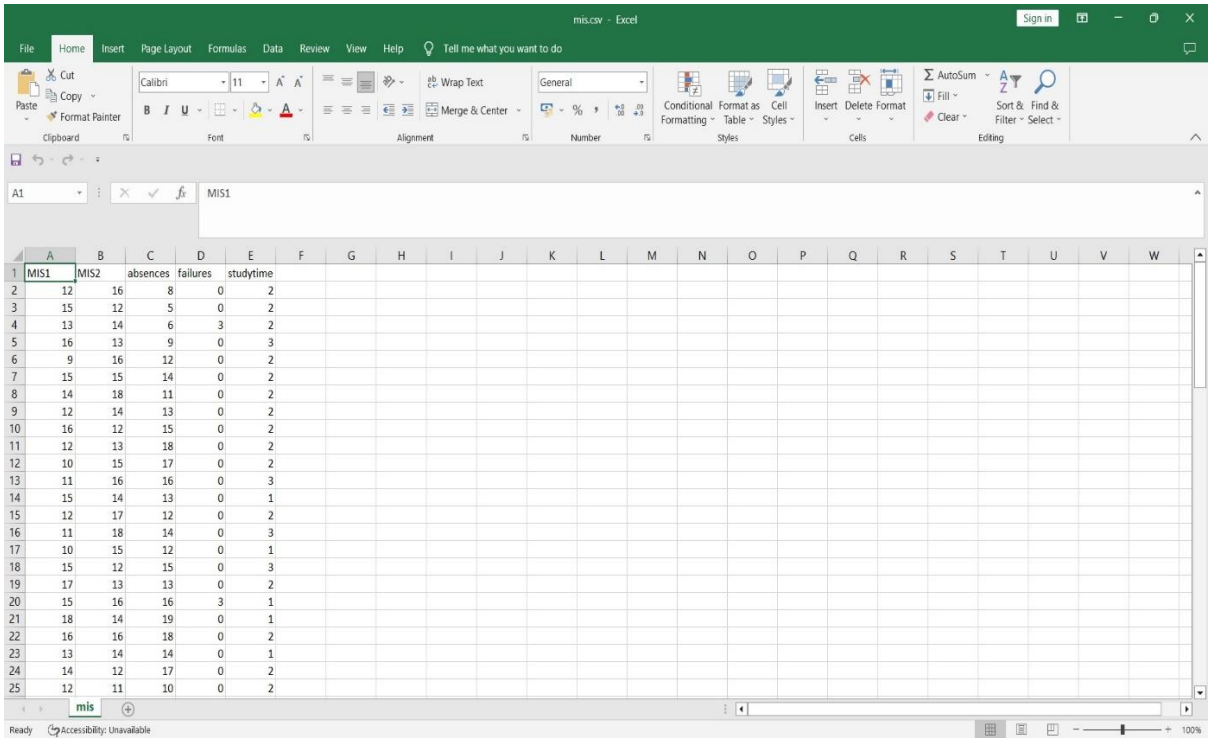
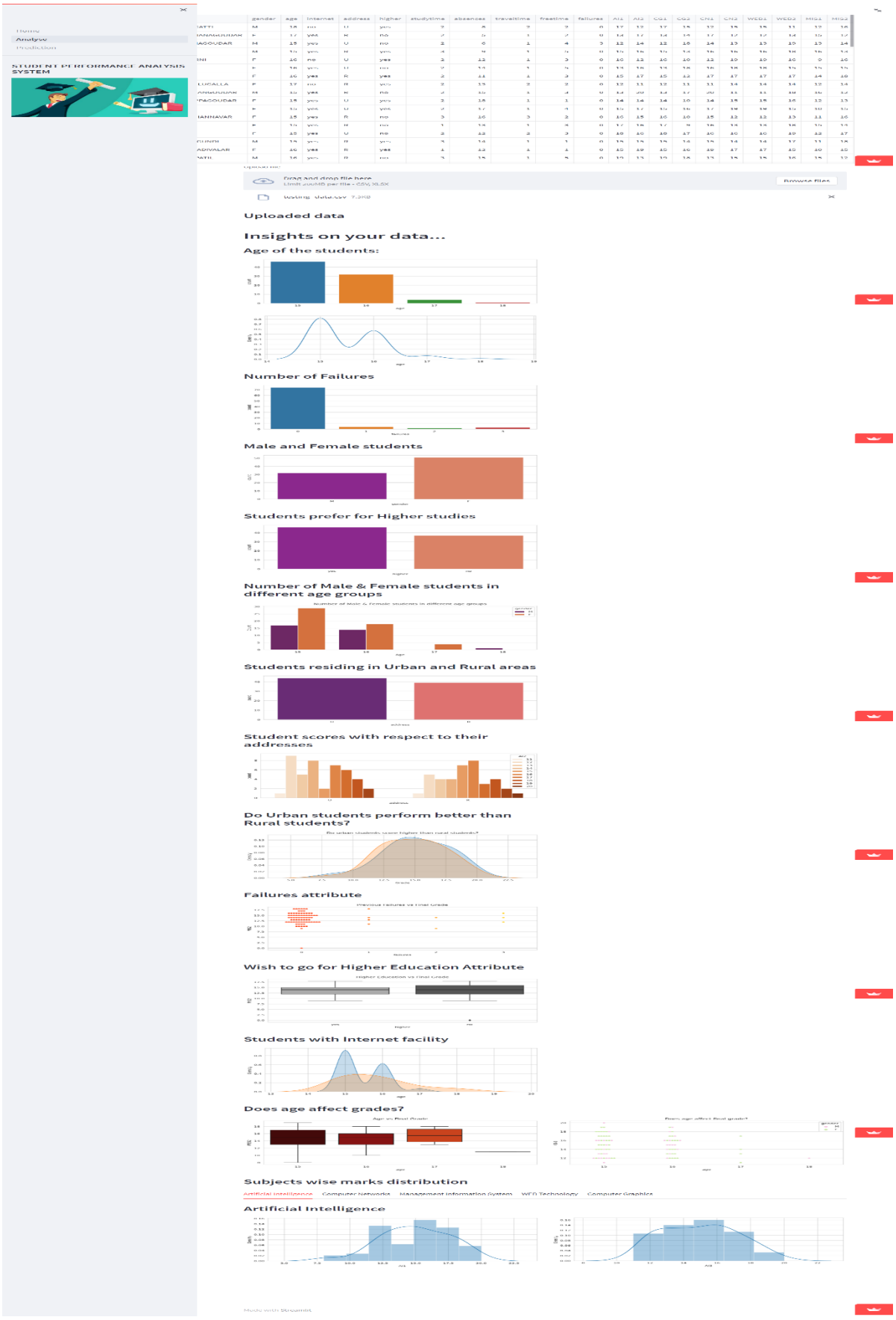
20U11522	522	CHANNAYYASWAMI BANGARIMATH	0	1	yes	M	1	no	R	15	2	14	5	17	16	19	14	16	19	1
20U11523	523	CHITRA HARLAPUR	0	2	yes	F	1	yes	U	16	3	17	5	15	13	18	13	13	18	1
20U11524	524	DADAKHALANDAR NADAF	0	2	yes	M	2	yes	U	16	4	10	5	20	14	14	16	14	14	2



mis.csv - Excel

MIS1	MIS2	absences	failures	studytime
12	16	8	0	2
15	12	5	0	2
13	14	6	3	2
16	13	9	0	3
9	16	12	0	2
15	15	14	0	2
14	18	11	0	2
12	14	13	0	2
16	12	15	0	2
12	13	18	0	2
10	15	17	0	2
11	16	16	0	3
15	14	13	0	1
12	17	12	0	2
11	18	14	0	3
10	15	12	0	1
15	12	15	0	3
17	13	13	0	2
15	16	16	3	1
18	14	19	0	1
16	16	18	0	2
13	14	14	0	1
14	12	17	0	2
12	11	10	0	2

Data Analysis Page:



Prediction Page:

Home
Analyse
Prediction

STUDENT PERFORMANCE ANALYSIS SYSTEM

Machine Learning Project

STUDENT PERFORMANCE ANALYSIS SYSTEM

Performance evaluation of students is essential to check the feasibility of improvement. Regular evaluation not only improves the performance of the student but also it helps in understanding where the student is lacking. It takes a lot of manual effort to complete the evaluation process as even one college may contain thousands of students. This paper proposed an automated solution for the performance evaluation of the students using machine learning.

Student Grade Prediction

Select the Subject

Select below

Artificial Intelligence

Select the Model for prediction

Select below

LinearRegression

Accuracy of the model:

Train accuracy: 82%

Test accuracy: 82%

Student Grades

Select the number of students to display

Pick

26

0 83

	regno	name	age	gender	AI1	AI2	Prediction
0	20U11501	ABHISHEK HALAGATTI	18	M	17	12	12.8413
1	20U11502	AISHWARYA TIMMANAGOUDAR	17	F	13	17	16.8685
2	20U11503	AJAY KARISOMANAGOUDAR	15	M	12	14	13.4182
3	20U11504	AKASH MAGALAD	15	M	15	16	16.2309
4	20U11505	AKSHATA KULKARNI	16	F	16	12	12.8305
5	20U11506	AKSHATA DASAR	16	F	13	16	16.2563
6	20U11507	ALFIYA KOPPAL	16	F	15	17	17.4335
7	20U11508	ALISHABEGUM NILUGALLA	17	F	12	11	11.2435
8	20U11509	ANIL HIREBHARMANGOUDAR	15	M	13	20	20.1414
9	20U11510	ANJALI CHANNAPPAGOUDAR	15	F	14	14	14.6544
10	20U11511	ANKITA BAKALE	15	F	15	17	17.6664
11	20U11512	ANUSHA HUCHCHANNAVAR	15	F	16	15	15.7071
12	20U11513	ANUSHA BHANDI	15	F	17	16	17.0451
13	20U11514	AYISHA ABBIGERI	15	F	18	16	17.0090
14	20U11515	BASAVARAJ NIDAGUNDI	15	M	15	15	15.4634
15	20U11516	BHAGYASHREE MADIVALAR	16	F	15	19	19.5589
16	20U11517	BHARAMGOUDA PATIL	16	M	19	13	14.2434
17	20U11518	BHARATI KONNUR	16	F	14	12	12.5372
18	20U11519	BHAVANA NAVALE	17	F	13	14	14.1358
19	20U11520	BHOOMIKA ASUNDI	16	F	18	16	17.4440
20	20U11521	BHOOMIKA SAJJANAR	15	F	14	18	18.5007
21	20U11522	CHANNAYYASWAMI BANGARIMATH	15	M	17	16	17.0839
22	20U11523	CHITRA HARLAPUR	16	F	15	13	13.8201
23	20U11524	DADAKHALANDAR NADAF	16	M	20	14	15.3403
24	20U11525	DIVYA HERALAGI	15	F	13	12	12.1301
25	20U11526	DURUGAPPA PATIL	16	M	16	15	15.7029

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Chapter 6

CONCLUSION

In conclusion, the project concentrates on the development of a system for student performance analysis. A data mining technique, classification algorithm is applied in this project to ensure the prediction of the student's performance in course "System Analysis and Design" is possible. The main contribution of the SPAS is that it assists the lecturers in conducting student performance analysis. The system assists lecturers in identifying the student's that are predicted to fail in the course "System Analysis and Design". Other than that, SPAS assists lecturers to retrieve information of their student's performance throughout the semester.

REFERENCES

1. https://docs.python.org/3/
2. https://pandas.pydata.org/docs/
3. https://numpy.org/doc/
4. https://scikit-learn.org/stable/
5. https://docs.streamlit.io/
6. https://seaborn.pydata.org/
7. https://matplotlib.org/stable/index.html
8. Stack Overflow