A Project Report

On

Student Grade Predication Model

Submitted in partial fulfillment of the

requirement for the award of the degree of

MASTER OF COMPUTER APPLICATION

GALGOTIAS UNIVERSITY

(Established under Galgotias University Uttar Pradesh Act No. 14 of 2011)

DEGREE

Session 2024-25
By

Ankit Kumar

(24SCSE2030041)

Prince Kumar

(24SCSE2030311)

Prem Prakash Choubey

(24SCSE2030538)

Under the guidance of

Dr. Rajiv Kumar

SCHOOL OF COMPUTER APPLICATIONS AND TECHNOLOGY

GALGOTIAS UNIVERSITY, GREATER NOIDA

INDIA

Jan, 2025

SCHOOL OF COMPUTER APPLICATIONS AND TECHNOLOGY

GALGOTIAS UNIVERSITY, GREATER NOIDA

CANDIDATE'S DECLARATION

I/We hereby certify that the work which is being presented in the project, entitled "Student Grade Prediction Model" in partial fulfillment of the requirements for the award of the MCA (Master of Computer Application) submitted in the School of Computer Applications and Technology of Galgotias University, Greater Noida, is an original work carried out during the period of Sept, 2024 to Jan 2025, and under the supervision of Dr. Rajiv, Department of Computer Science and Engineering/School of Computer Applications and Technology , Galgotias University, Greater Noida.

The matter presented in the thesis/project/dissertation has not been submitted by me/us for the award of any other degree of this or any other places.

Ankit Kumar

(24SCSE2030041)

Prince Kumar

(24SCSE2030311)

Prem Prakash Choubey

(24SCSE2030538)

This is to certify that the above statement made by the candidates is correct to the best of my knowledge.

Dr. Rajiv kumar

Designation

CERTIFICATE

This is to certify that Project Report entitled " Student Grade Prediction Model " which is submitted by Ankit kumar, Prince kumar, Prem Prakash Choubey in partial fulfillment of the requirement for the award of degree MCA. in Department of School of Computer Applications and Technology, Galgotias University, Greater Noida, India is a record of the candidate own work carried out by him/them under my supervision. The matter embodied in this thesis is original and has not been submitted for the award of any other degree

Signature of Examiner(s) **Signature of Supervisor(s)**

Date: Jan, 2025

Place: Greater Noida

ACKNOWLEDGEMENT

We would like to express sincere thanks to our project supervisor Dr. Rajiv kumar, for his/her patience and encouragement throughout these months. He always put aside his precious time to discuss project topics with us and gave us strength to keep working on this project. We could not have completed this project work without the assistance of our project supervisor, Dr. Rajiv kumar

We also want to take this opportunity to thank all the Faculty and Staff of the Faculty of Information Technology for their support and encouragement. Finally, we all would like to thank our family for their encouragement and understanding. Their support enabled us to pursue our graduation from this esteemed University.

Roll No.	Student Name	Student Signature
24SCSE2030041	Ankit Kumar	
24SCSE2030311	Prince Kumar	
24SCSE2030538	Prem Prakash Choubey	

Abstract

In graduate studies, many students find it difficult to achieve good grades because they do not get much support in higher education courses compared to students' support in schools. We can use machine learning for the student grades prediction task so that instructors can help students prepare for topics where student grades were predicted low.

Student Grade Prediction is a way of predicting a student's grade based on his/her internal mark, attendance and assignment marks (all are entered in percentage). To provide a User-friendly environment a web page is created through which any student can enter his/her internals, attendance and assignment marks on the web page and the data will be processed and the corresponding grades will be provided.

Table of Contents

TABLE OF CONTENTS

Page No

Chapter 1 : Introduction

Chapter 2 : LITERATURE SURVEY

Chapter 3: SYSTEM ANALYSIS

Chapter 4 : DESIGN

Chapter 5 : IMPLEMENTATION DETAILS

Chapter 6 : SAMPLES

Chapter 1: Introduction

1.1 GENERAL BACKGROUND

In the present educational system, student performance is getting worse every day. Predicting student performance in advance can help students as well as their teachers to keep track of the progress of the student. Many educational institutes have adopted this system today. Such systems are favourable to the students in improving their performance. The purpose of this system is to help regular students in their academics. The core function of Student Grade Prediction is to help the student to know his/her performance in advance. Such techniques would help the students to improve their performance based on the predicted grade and would enable teachers to identify those individuals who might need assistance.

1.2 THE PROPOSED SYSTEM

Student Grade Prediction is a way of predicting a student's grade based on his/her previous marks. The purpose of this system is to help regular students in their academics. The core function of Student Grade Prediction is to help the student to know his/her performance in advance. Such techniques would help the students to improve their performance based on the predicted grade and would enable teachers to identify those individuals who might need assistance. It will also motivate the students to study when they see a low grade. It will also help to reduce the dropout cut and can increase pass the percentage.

1.3 PROJECT SCOPE

1.3.1 LIMITATIONS OF THE EXISTING SYSTEM

- No Early Prediction

  Students can predict their marks only by half of the semester, and the time for improving their marks is very long to cope with their expected marks they have to do extra efforts.

- Performance Prediction

  The prediction is based on their performance, not on the capability of the student. The grade that we get from SGP can be considered a factor to measure the capability of a student.

- May Not Be Accurate

  The grade that we get from SGP can't give 100% accuracy.

1.3.2 ADVANTAGES OF THE PROPOSED SYSTEM

- Grade Before Finals

Before the final marks of all subjects are evaluated, prediction can be performed. Which in turn can help the student to know his grade range.

- **Improve Grade**

This helps the students to improve their performance so that they can achieve their expected scores. Even if the grade provided by SGP is not satisfactory the student can improve to achieve their desired grade.

- **Mentorship**

SGP can help the course instructor determine weak students in the class if necessary. It improves their performance. In this way rate of the student, students increased.Organization of the Report

CHAPTER 2

LITERATURE SURVEY

This chapter reviews available literature about the project topic. A review of similar systems is made and the strength and weaknesses are identified. The similarities between the reviewed systems and the proposed system are outlined as well as the differences.

2.1 EARLY WARNING SYSTEMS FOR STUDENTS AT RISK OF DROPPING OUT BY UNICEF

An EWS is a tool that aims to identify students at risk of dropping out of school, based on the presence of ‘red flags’: specific factors that contribute to dropout. Having identified them, the EWS then supports them to stay in school through strategies and interventions to meet their specific needs.
Disadvantages of the existing system:

1. The software is not accessible to everyone.
2. It is a proprietary software only used by UNICEF.

CHAPTER 3

SYSTEM ANALYSIS

3.1 INTRODUCTION

Software Engineering is the analysis, design, construction, verification and management of technical or social entities. To engineer software accurately, a software engineering process must be defined. System analysis is a detailed study of the various operations performed by the system and their relationship within and module of the system. It is a structured method for solving the problems related to the development of a new system. The detailed investigation of the present system is the focal point of system analysis. This phase involves the study of the parent system and the identification of system objectives. Information has to be collected from all people who are affected by or who use the system. During analysis, data is collected on the variable files and transactions handled by the present system. The main site m of the system provides efficient user-friendly automation. So, the system analysis process should be performed with extra precision so that an accepter of the existing system, its disadvantages and the requirements of the new system can be obtained.

System analysis involves gathering the necessary information and using the structured tool for analysis. This includes studying the existing system and its drawbacks, designing a new system and conducting a cost-benefit analysis. System analysis is a problem-solving activity that requires intensive communication between the system users and system developers. The system is studied to the minute detail and analysed. The system is viewed as a whole and the inputs to the system are identified. The outputs from the organization are traced through various phases of processing of inputs.

There are several different approaches to system analysis. When the system is developed, systems analysis (according to the Waterfall model) would constitute the following steps: -

- The development of a feasibility study, involving determining whether a project is economically, technologically and operationally feasible.

- Conducting fact-finding measures, designed to ascertain the requirements of the system's end-users. These typically span interviews, questionnaires, or visual observations of work on the existing system.

- Gauging how the end-users would operate the system (in terms of general experience in using computer hardware or software), what the system would be used for and so on.

- Techniques such as interviews, questionnaires etc. can be used for the detailed study of these processes. The data collected by these sources must be scrutinized to conclude.

The conclusion is an understanding of how the system functions. This system is called the Existing System. The Existing system is then subjected to close observation and the problem areas are identified. The designer now functions as a problem solver and tries to sort out the difficulties that the enterprise faces. The solutions are given as a proposal which is the Proposed System. The proposal is then weighed with the existing system analytically and the best one is selected. The proposal is then presented to the user for an endorsement by the user. The proposal is reviewed on user request and suitable changes are made. This is a loop that ends as soon as the user is satisfied with the proposal.

3.2 STAKEHOLDERS OF THIS PROJECT

3.2.1 ADMIN

Admin is the person who manages the software. He is the person who focuses on the data and reports of the software. The admin login to the system using the password and email provided.

3.2.2 USER

These are the students that use the software for taking predicting their grades. They can access this software from anywhere at any time.

3.3 SOFTWARE REQUIREMENT SPECIFICATION

3.3.1 USER

1. The system should have a provision to enter an internal mark, assignment mark and attendance mark for every user.

2. The system should have a provision to view their predicted grade.

3.3.2 ADMIN

1. Admin can access all the information and edit predicting criteria.

3.4 FEASIBILITY STUDY

Feasibility is defined as the practical extent to which a project can be performed successfully. To evaluate the feasibility, a feasibility study is performed, which determines whether the solution considered to accomplish the requirements is practical and workable in the software. Information such as resource availability, cost estimation for software development, benefits of the software to the organization after it is developed and cost to be incurred on its maintenance are considered during the feasibility study. The objective of the feasibility study is to establish the reasons for developing the software that is acceptable to users, adaptable to change and conformable to established standards. Various other objectives of the feasibility study are listed below:

• To analyse whether the software will meet organizational requirements.

• To determine whether the software can be implemented using the current technology and within the specified budget and schedule.

• To determine whether the software can be integrated with other existing software. Referencing this information, I do studies and discussions about whether the desired system and its functionality are feasible to develop and the output of this phase is a feasibility study report that should contain adequate comments and recommendations.

3.4.1 TECHNICAL FEASIBILITY

Technical feasibility assesses the current resources (such as hardware and software) and technology, which are required to accomplish user requirements in the software within the allocated time and budget. For this, the software development team ascertains whether the current resources and technology can be upgraded or added to the software to accomplish specified user requirements. Technical feasibility also performs the following tasks:

• Analyses the technical skills and capabilities of the software development team members.

• Determines whether the relevant technology is stable and established.

• Ascertains that the technology chosen for software development has a large number of users so that they can be consulted when problems arise or improvements are required.

3.5 SOFTWARE DEVELOPMENT LIFE CYCLE MODEL

One of the basic notions of the software development process is SDLC models which stand for Software Development Life Cycle models. SDLC – is a continuous process, which starts from the moment, when it’s decided to launch the project, and it ends at the moment of its full removal from exploitation. Software development lifecycle (SDLC) is a framework that defines the steps involved in the development of software. It covers the detailed plan for building, deploying and maintaining the software. SDLC defines the complete cycle of development i.e., all the tasks involved in gathering a requirement for the maintenance of a Product. Some of the common SDLC models are Waterfall Model, V-Shaped Model, Prototype Model, Spiral Model, Iterative Incremental Model, Big Bang Model and Agile Model.

3.5.1 AGILE MODEL

The Agile Model is a combination of Iterative and incremental models. This model focuses more on flexibility while developing a product rather than on the requirement. In the agile methodology after every development iteration, the client can see the result and understand if he is satisfied with it or he is not. Extreme programming is one of the practical uses of the agile model. The basis of this model consists of short meetings where we can review our project. In Agile, a product is broken into small incremental builds. It is not developed as a complete product in one go. At the end of each sprint, the project guide verifies the product and after his approval, it is finalized. Client feedback is taken for improvement and his suggestions and enhancement are worked on in the next sprint. Testing is done in each sprint to minimize the risk of any failures.

3.6 HARDWARE AND SOFTWARE REQUIREMENTS

3.6.1 SOFTWARE SPECIFICATION

This project is built upon the latest technology software.

Front-End :	HTML
Back-End :	Python
Operating System :	Windows

3.6.2 HARDWARE SPECIFICATION

The selection of hardware configuring is a task related to the software development, particularly inefficient RAM may adversely affect the speed and corresponding efficiency of the entire system. The processor should be powerful to handle all the operations. The hard disk should be sufficient to solve the database and the application.

Hardware Requirements

• PROCESSOR :	Dual Core
• HARD DISK :	256 GB
• RAM :	1 GB
• MONITOR :	15” Colour Monitor
• KEYBOARD :	104 keys Standard Keyboard
• MOUSE :	Standard 3 Button Mouse

CHAPTER 4

DESIGN

4.1 INTRODUCTION TO DATAFLOW DIAGRAM

Data Flow Diagram is a network that describes the flow of data and processes that change or transform, data throughout the system. This network is constructed by using a set of symbols that do not imply a physical implementation. It is a graphical tool for structured analysis of the system requirements. DFD models a system by using external entities from which data flows to a process, which transforms the data and creates, output-data-flows which go to other processes or external entities or files. Data in files may also flow to processes as inputs.

There are various symbols used in a DFD. Bubbles represent the processes. Named arrows indicate the data flow. External entities are represented by rectangles. Entities supplying data are known as sources and those that consume data are called sinks. Data are stored in a data store by a process in the system. Each component in a DFD is labelled with a descriptive name. Process names are further identified with a number. The Data Flow Diagram shows the logical flow of a system and defines the boundaries of the system. For a candidate system, it describes the input (source), outputs (destination), database (files) and procedures (data flow), all in a format that meets the user's requirements. The main merit of DFD is that it can provide an overview of system requirements, what data a system would process, what transformations of data are done, what files are used, and where the results flow. This network is constructed by using a set of symbols that do not imply a physical implementation. It is a graphical tool for structured analysis of the system requirements. DFD models a system by using external entities from which data flows to a process, which transforms the data and creates, output-data-flows which go to other processes or external entities or files. External entities are represented by rectangles. Entities supplying data are known as sources and those that consume data are called sinks. Data are stored in a data store by a process in the system. It is a graphical tool for structured analysis of the system requirements. DFD models a system by using external entities from which data flows to a process, which transforms the data and creates, output-data-flows which go to other processes or external entities or files. Data in files may also flow to processes as inputs.

Rules for constructing a Data Flow Diagram

1. Arrows should not cross each other
2. Squares, circles and files must bear names.
3. Decomposed data flow squares and circles can have the same time
4. Choose meaningful names for data flow
5. Draw all data flows around the outside of the diagram.

0- LEVEL DFD

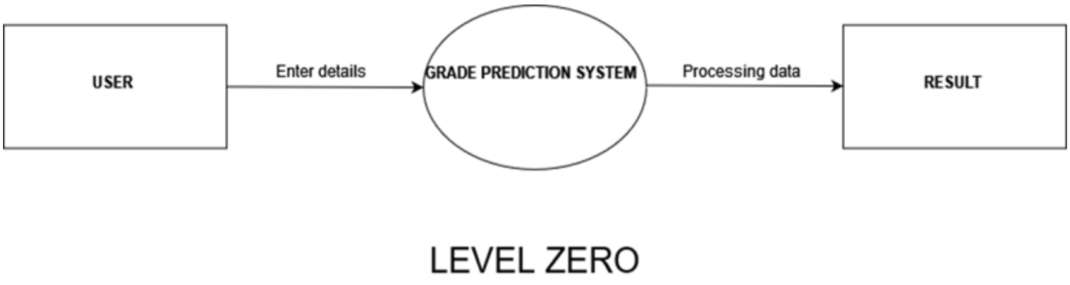


Fig 1: 0 Level DFD

A context-level data stream diagram is a popular practice, which first displays the interaction between the scheme and external agents acting as information sources and information sinks. The system interactions with the outside world are solely by the information flows through the system border in the context diagram (also known as Level 0DFD). The context diagram demonstrates the whole scheme as a single process and provides no hints about its inner structure. This DFD context level is next exploded, producing a DFD level 1, showing some of the details of the modelled system.

1- LEVEL DFD

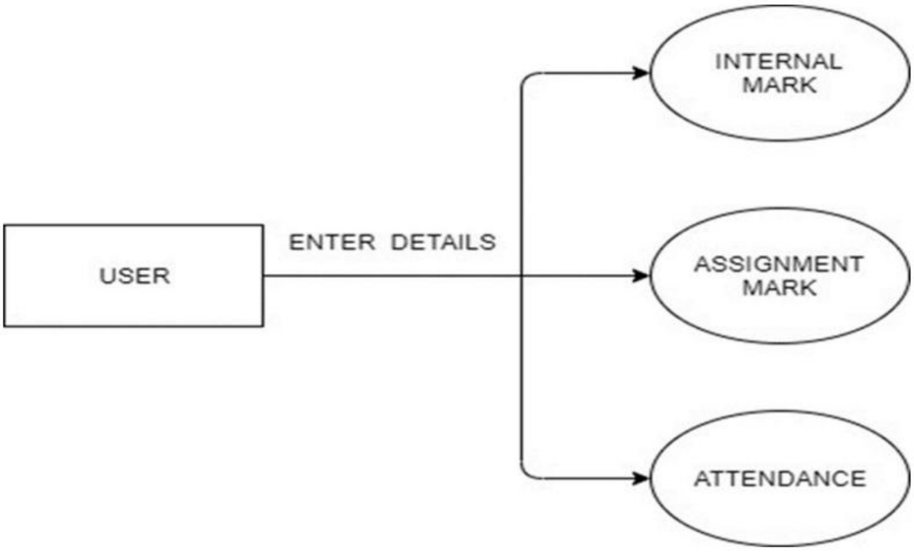


Fig 2: 1 Level DFD

2- LEVEL DFD

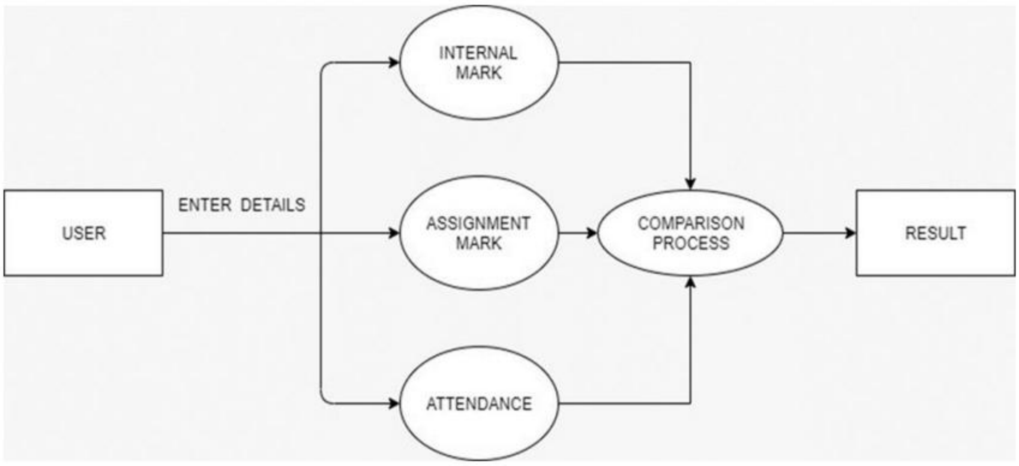


Fig 3: 2 Level DFD

CHAPTER 5

IMPLEMENTATION DETAILS

5.1 HTML

HTML is an acronym which stands for Hypertext Markup Language which is used for creating web pages and web applications. Let's see what is meant by Hypertext Markup Language, and a Web page. Hypertext: Hypertext simply means "Text within Text." A text has a link within which, is a hypertext. Whenever you click on a link which brings you to a new webpage, you have clicked on a hypertext. Hypertext is a way to link two or more web pages (HTML documents) with each other. Markup language: A markup language is a computer language that is used to apply layout and formatting conventions to a text document. Markup language makes the text more interactive and dynamic. It can turn text into images, tables, links, etc.

5.2 PYTHON

Python is an interpreted, object-oriented, high-level programming language with dynamic semantics. Its high-level built-in data structures, combined with dynamic typing and dynamic binding, make it very attractive for Rapid Application Development, as well as for use as a scripting or glue language to connect existing components together. Python's simple, easy-to-learn syntax emphasizes readability and therefore reduces the cost of program maintenance. Python supports modules and packages, which encourages program modularity and code reuse. The Python interpreter and the extensive standard library are available in source or binary form without charge for all major platforms and can be freely distributed.

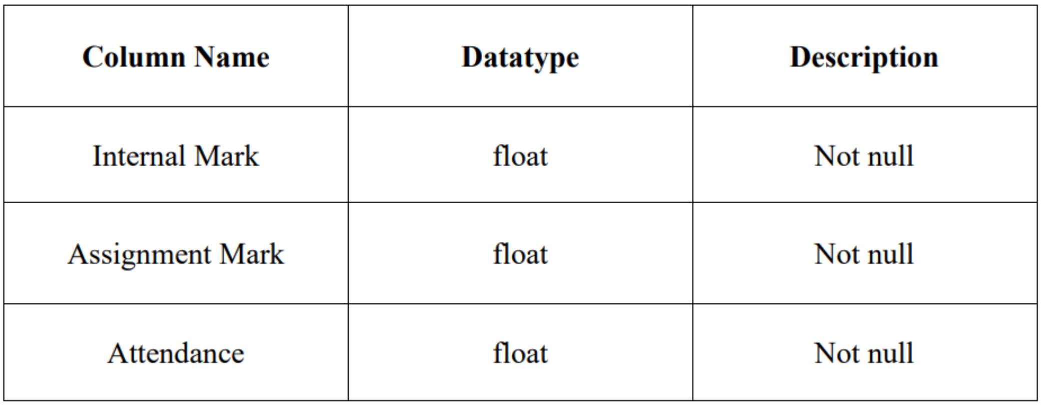
5.3 VISUAL STUDIO CODE

Visual Studio Code features a lightning-fast source code editor, perfect for day-today use. With support for hundreds of languages, VS Code helps you be instantly productive with syntax highlighting, bracket-matching, auto-indentation, boxselection, snippets, and more. Intuitive keyboard shortcuts, easy customization and community-contributed keyboard shortcut mappings let you navigate your code with ease.

CHAPTER 6

SAMPLES

6.1 DATABASE SAMPLES



Column Name	Datatype	Description
Internal Mark	float	Not null
Assignment Mark	float	Not null
Attendance	float	Not null

Table 1: Database Details

6.2 CODE SAMPLES

- **model.py**

```
import pandas as pd
import warnings
warnings.filterwarnings('ignore')
from sklearn.model_selection import train_test_split
ds = pd.read_csv(r'D:\Mini Project\Grade Prediction\data.csv')
x = ds.drop("Result",axis=1)
y = ds["Result"]
X_train,X_test,Y_train,Y_test =
train_test_split(x,y,test_size=0.20,random_state=0)
from sklearn import svm
Student Grade Prediction System
Dept. of CSE 14 MBITS
sv = svm.SVC(kernel='linear')
sv.fit(X_train, Y_train)
import pickle
```

```
pickle.dump(sv,open("model.pkl", "wb"))
```

- **app.py**

```
from flask import Flask,request,render_template
import pickle
import numpy as np
app = Flask(__name__)
model=pickle.load(open('model.pkl','rb'))
@app.route('/')
def hello_world():
 return render_template("home2.html")
@app.route('/predict',methods=['POST','GET'])
def predict():
 float_features = [float(x) for x in request.form.values()]
 final = [np.array(float_features)]
 prediction = model.predict(final)
 if prediction == "S":
 return render_template('home2.html', pred="Your Grade will be S   ")
 elif prediction == "A+":
 return render_template('home2.html', pred="Your grade will be A+   ")
 elif prediction == "A":
 return render_template('home2.html', pred="Your grade will be A   ")
 elif prediction == "B+":
 return render_template('home2.html', pred="Your grade will be B+   ")
 elif prediction == "B":
 return render_template('home2.html', pred="Your grade will be B   ")
 elif prediction == "C+":
 return render_template('home2.html', pred="Your grade will be C+ ☹□")
 elif prediction == "C":
 return render_template('home2.html', pred="Your grade will be C   ")
 elif prediction == "D":
 return render_template('home2.html', pred="Your grade will be D   ")
 elif prediction == "P":
 return render_template('home2.html', pred="Your grade will be P   ")
 elif prediction == "F":
```

```
 return render_template('home2.html', pred="Your grade will be F   ")
if __name__ == '__main__':
 app.run(debug=True)
```

• home.html

```
<!DOCTYPE html>
<html>
 <head>
 <title>Grade Prediction</title>
 <link href="https://fonts.googleapis.com/css?family=Roboto:300,400,500,700"
rel="stylesheet">
 <style>
 * {
 box-sizing: border-box;
 }
 html, body {
 min-height: 100vh;
 padding: 0;
 margin: 0;
 font-family: Roboto, Arial, sans-serif;
 font-size: 14px;
 color: #666;
 }
 input, textarea {
 outline: none;
 }
 body {
 display: flex;
 justify-content: center;
 align-items: center;
 padding: 20px;
 background: #755cdb;
 }
 h1 {
 margin-top: 0;
 font-weight: 500;
 }
 form {
 position: relative;
 width: 80%;
```

```
 border-radius: 30px;
 background: #EDF5E1;
 }
 .form-left-decoration,
 .form-right-decoration {
 content: "";
 position: absolute;
```

```
width: 50px;
height: 20px;
border-radius: 20px;
background: #379683;
}
.form-left-decoration {
bottom: 60px;
left: -30px;
}
.form-right-decoration {
top: 60px;
right: -30px;
}
.form-left-decoration:before,
.form-left-decoration:after,
.form-right-decoration:before,
.form-right-decoration:after {
content: "";
position: absolute;
width: 50px;
height: 20px;
border-radius: 30px;
background: #B1A296;
}
.form-left-decoration:before {
top: -20px;
}
.form-left-decoration:after {
top: 20px;
left: 10px;
}
.form-right-decoration:before {
```

```
top: -20px;
right: 0;
}
.form-right-decoration:after {
top: 20px;
right: 10px;
}
.circle {
position: absolute;
bottom: 80px;
left: -55px;
width: 20px;
height: 20px;
border-radius: 50%;
background: #B1A296;
```

```
}
.form-inner {
padding: 40px;
}
.form-inner input,
.form-inner textarea {
display: block;
width: 100%;
padding: 15px;
margin-bottom: 10px;
border: none;
border-radius: 20px;
background: #d0dfe8;
}
.form-inner textarea {
resize: none;
}
button {
width: 100%;
padding: 10px;
margin-top: 20px;
border-radius: 20px;
border: none;
border-bottom: 4px solid #05386C;
```

```
background: #1adb87;
font-size: 16px;
font-weight: 400;
color: #fff;
}
button:hover {
background: #FC4445;
}
@media (min-width: 568px) {
form {
width: 60%;
}
}
</style>
</head>
<body>
<form action=/predict method="post">
<div class="form-left-decoration"></div>
<div class="form-right-decoration"></div>
<div class="circle"></div>
<div class="form-inner">
<h1 align="center"> Advanced Student Grades Prediction System</h1>
<h3> By using machine learning algorithms, we can predict how well the
```

```
students are going to perform so that we can help the students whose grades are
predicted low. Student Grades Prediction is based on the problem of regression in
machine learning.</h3>
 <input type="number" min=0 max= 100 name="Sum of Internal 1 & 2"
placeholder="Sum of Internal 1 & 2 in %" required="required" />
 <input type="number" min=0 max= 100 name="Assignment Mark"
placeholder="Assignment Mark in %" required="required" />
 <input type="number" min=75 max= 100 name="Attendance"
placeholder="Attendance in %" required="required"/>
 <button type="submit" class="btn btn-primary btn-block btnlarge">Predict</button>
 <br><h2 align="center"><b>{{pred}}</b></h2>
 </div>
 </form>
 </body>
</html>
```

CHAPTER 7

CONCLUSION

The project was successfully completed within the time span allotted. All the modules are tested separately and put together to form the main system. Finally, the modules were tested with real data and they worked successfully. The system has fulfilled the entire objective defined. Nowadays, e-education and e-learning are highly influenced. Everything is shifting from manual to automated systems. Student grade prediction is a way of predicting a student's grade based on his/her previous marks. This also makes the student know whether he/ she is in a position to reach his/her expected marks or not. Some students need a lot of attention from instructors because if special attention will not be given to those students who are not getting good grades, it could be detrimental to their emotional state and their career in the long run. By using this system, we can predict how well the students are going to perform so that we can help the students whose grades are predicted low.

The objective of this project is to predict the performance of a student based on certain attributes of the student such as his semester attendance, unit-test marks and assignment marks. This would result in finding out a more efficient and time-saving algorithm to predict the performance of a student.

CHAPTER 8

FUTURE ENHANCEMENTS

The system has been designed in such a way that it can be modified with very little effort when such needs arise in the future. New features can be added with slight modifications to software which makes it easy to expand the scope of this project. Though the system is working on various assumptions, it can be modified easily to any kind of requirement. The system is also expected to be improvised by adding various features. Now the system works on a single algorithm in future if we use more than one algorithm to predict the grade then the grade will be more accurate.

CHAPTER 9

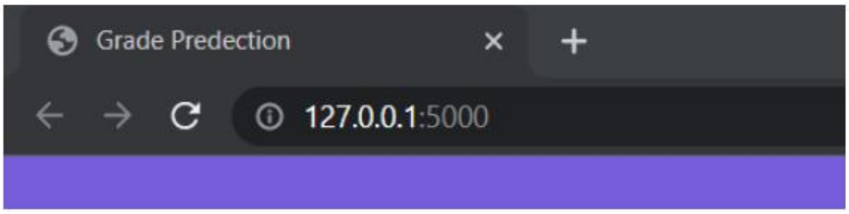
REFERENCES

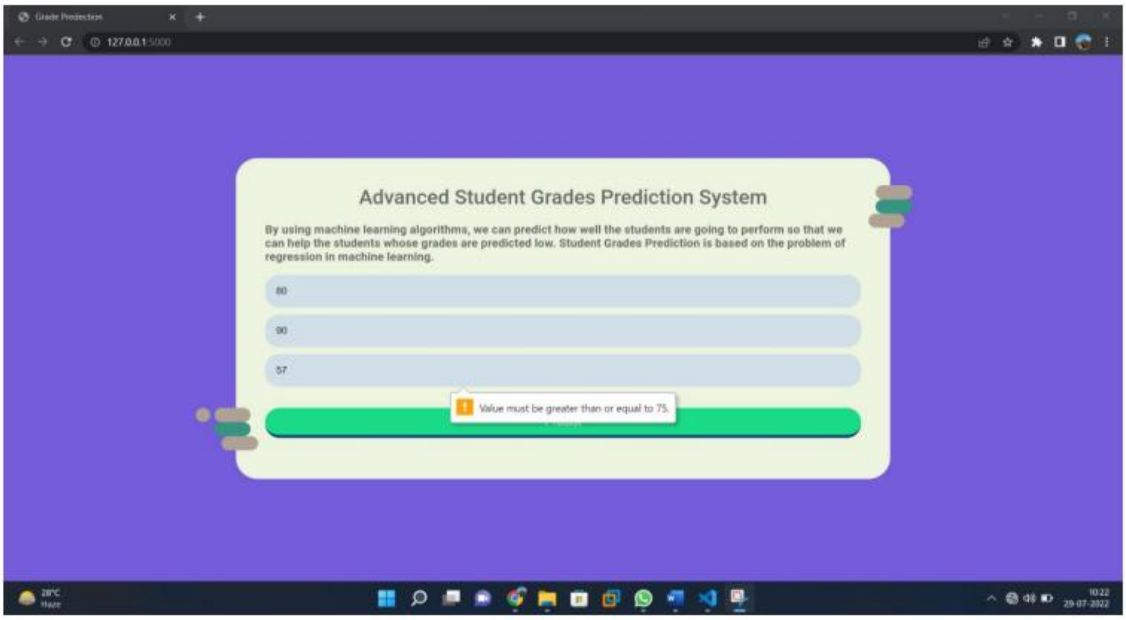
1. Pedregosa, F., et al. (2011). Scikit-learn: Machine Learning in Python.
2. Breiman, L. (2001). Random Forests. Machine Learning Journal.
3. Galgotias University Academic Records (2023).

CHAPTER 10

APPENDIX

10.1 SCREENSHOTS





Advanced Student Grades Prediction System

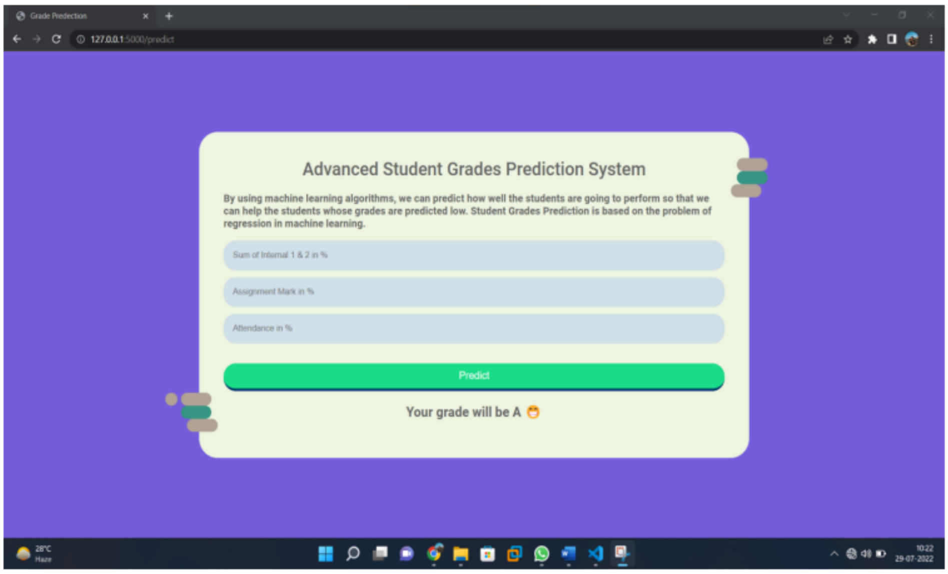
By using machine learning algorithms, we can predict how well the students are going to perform so that we can help the students whose grades are predicted low. Student Grades Prediction is based on the problem of regression in machine learning.

80

90

57

Value must be greater than or equal to 75.



Advanced Student Grades Prediction System

By using machine learning algorithms, we can predict how well the students are going to perform so that we can help the students whose grades are predicted low. Student Grades Prediction is based on the problem of regression in machine learning.

Sum of Internal 1 & 2 in %

Assignment Mark in %

Attendance in %

Your grade will be A 😁