

STUDENT PERFORMANCE PREDICTION USING AIML

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ABSTRACT

- ❑ In today's world, technology has reached the extent that it can be used to do various tasks in day-to-day life easily with less effort and time.
- ❑ The world today has realized the importance of education in one's life, which has led to a revolution in the field of education. Universities, colleges, and schools today have loads of tasks to be completed within a given timeline.
- ❑ In today's scenario, colleges need to analyze student performance manually, which takes a lot of time and effort by faculties working on it. Hence, in order to simplify this task, a web-based system is introduced that can perform student performance analysis.
- ❑ The Student Performance Analysis System provides an interface for school maintenance. It can be used by educational institutes or coaching classes to easily analyze student performance.

Motivation and Background

- PREDICTING STUDENT PERFORMANCE HELPS EDUCATORS AND INSTITUTIONS IDENTIFY STUDENTS WHO MAY NEED ADDITIONAL SUPPORT OR INTERVENTION.
- BY UNDERSTANDING FACTORS AFFECTING STUDENT SUCCESS, EDUCATORS CAN TAILOR TEACHING METHODS AND RESOURCES.



OBJECTIVES

- ❖ Providing an online interface for students, faculty, etc. Increasing the efficiency of school record management. Decrease the time required to access and deliver student records. To make the system more secure. Decrease time spent on non-value-added tasks.
- ❖ To allocate educational resources effectively. Predictive models help institutions allocate tutoring, counseling, and other support services where they are most needed.
- ❖ Personalized Learning Experiences: AI and ML technologies can tailor learning experiences to individual students. By analyzing student preferences, learning styles, and performance data, personalized recommendations can be made. This customization enhances engagement and promotes better learning outcomes.



INTRODUCTION

- ❖ This Student Performance with Graph and Academic Project Work Reporting System is a web-grounded operation developed using Python .
- ❖ operation provides an easy way for scholars to search for design details and details of their academic attendance and mark chance details with graphs. scholars can search the systems by design title, companion name or time. All the details of the systems and details of the scholars' attendance and mark probabilities are added by admin.



LITERATURE SURVEY

- A Systematic Literature Review of Student' Performance Prediction Using Machine Learning Techniques by Balqis Albreiki 1,2, Nazar Zaki 1,2,*ORCID and Hany Alashwal 1,21 Department of Computer Science and Software Engineering, College of Information Technology, United Arab Emirates University, Al Ain 15551, United Arab Emirates2 Big Data Analytics Center, United Arab Emirates University, Al Ain 15551, United Arab Emirates* Author to whom correspondence should be addressed.
- "Predicting Student Performance Using Machine Learning Techniques" by Author A et al. (Year) "Personalized Learning Paths Using AI in Educational Settings" by Author B et al. (Year) "The Role of NLP in Enhancing Student Assessment" by Author C et al. (Year)
- A systematic literature review on student performance predictions November 2021 International Journal of Advanced Technology and Engineering Exploration 8(84) DOI:10.19101/IJATEE.2021.874521 Authors: Hasnah Nawang Universiti Sultan Zainal Abidin | UniSZAMokhairi Makhtar Amir fazamin



EXISTING SYSTEM

- ❑ In the existing system, all the student information is added manually, and the data is stored in the records. Takes a lot of time and physical effort in searching and adding the information. In the existing system, there is a possibility of losing data and no proper maintenance of data. The use of A linear search in file handling might increase time complexity.



DISADVANTAGES

- **Data Privacy Concerns:** Implementing AI in student performance tracking involves collecting and storing sensitive data, which raises privacy and security concerns.
- **Equity and accessibility issues:** Some students may struggle to adapt to AI-driven evaluations, potentially creating a digital divide.
- **Accuracy and Fairness:** AI/ML models may not always be accurate and can reflect biases present in the training data, leading to unfair evaluations of student performance.

PROBLEM IDENTIFICATION

- ❖ Apply the bootstrap, HTML, CSS, JavaScript for the conformation of an operation which is used by scholars & preceptors to represent & dissect their performance monthly, yearly base in the irregular form & graph.
- ❖ The thing of online pupil performance analysis system is to develop software produce high quality software. For any academy, council or other educational institute, scholars are an important asset in order to of great quality who exceed in academics, practical knowledge, tone- development and innovative thinking.
- ❖ To achieve this, it's come essential for every academy, council or any other educational institute to dissect the performance of scholars. Academic performance(AP) can be measured by conducting colorful examinations, assessments and other form of measures.
- ❖ Managing the grades of an entire class in its literacy makes the grading process easier, and the preceptors have a easily- set- out overview.

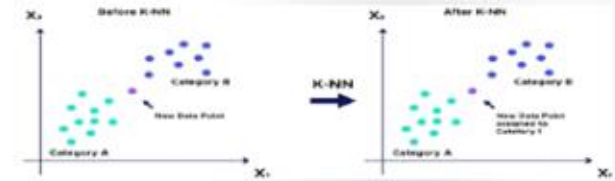


PROPOSED METHODOLOGY

- In machine learning, support-vector machines are supervised learning models with associated learning algorithms that analyze data for classification and regression analysis. It uses a technique called the kernel trick to transform your data and then based on these transformations it finds an optimal boundary between the possible outputs.
- We will use three kernel : Linear, polynomial and gaussian kernel.1) Linear kernel : Linear Kernel is used when the data is Linearly separable, that is, it can be separated using a single Line. It is one of the most common kernels to be used. It is mostly used when there are a Large number of features in a particular Data Set
- .2) the polynomial kernel is a kernel function commonly used with support vector machines and other kernelized models, that represents the similarity of vectors in a feature space over polynomials of the original variables, allowing learning of non-linear models.
- 3) Gaussian RBF(Radial Basis Function) is another popular Kernel method used in SVM models for more. RBF kernel is a function whose value depends on the distance from the origin or from some point. format:Using the distance in the original space we calculate the dot product (similarity) of X1 & X2.Note: similarity is the angular distance between two points.

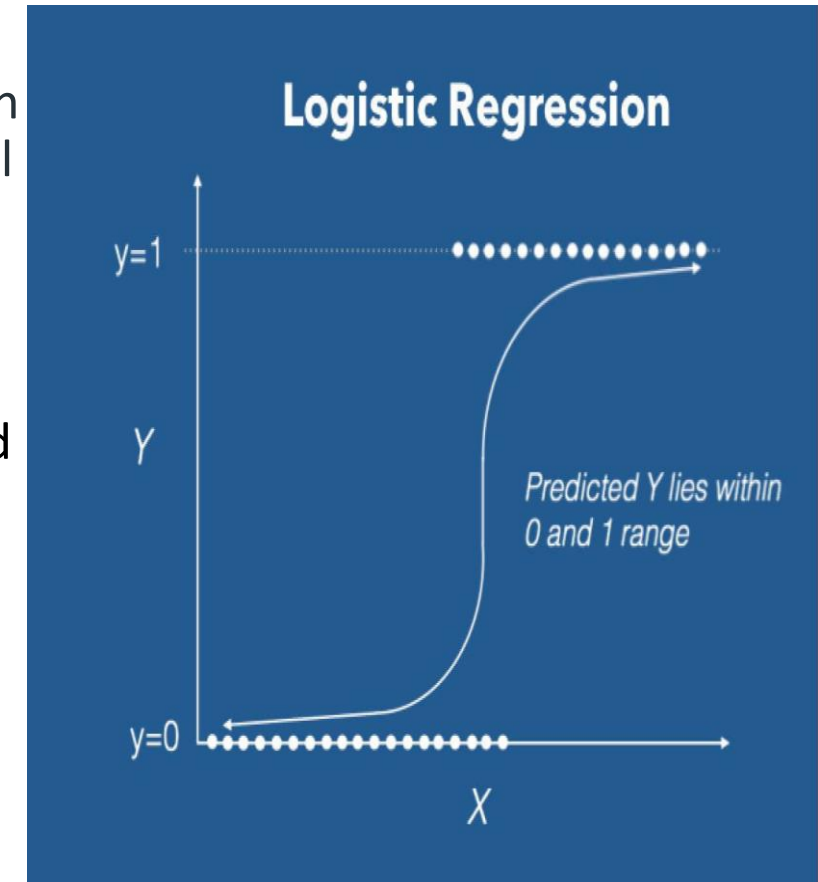
ALGORITHM EXPLANATION / ARCHITECTURE OF PROPOSED SYSTEM

- (K-NN) algorithm is a versatile and widely used machine learning algorithm that is primarily used for its simplicity and ease of implementation. It does not require any assumptions about the underlying data distribution. It can also handle both numerical and categorical data, making it a flexible choice for various types of datasets in classification and regression tasks. It is a non-parametric method that makes predictions based on the similarity of data points in a given dataset. K-NN is less sensitive to outliers compared to other algorithms.
- The K-NN algorithm works by finding the K nearest neighbors to a given data point based on a distance metric, such as Euclidean distance. The class or value of the data point is then determined by the majority vote or average of the K neighbors. This approach allows the algorithm to adapt to different patterns and make predictions based on the local structure of the data.

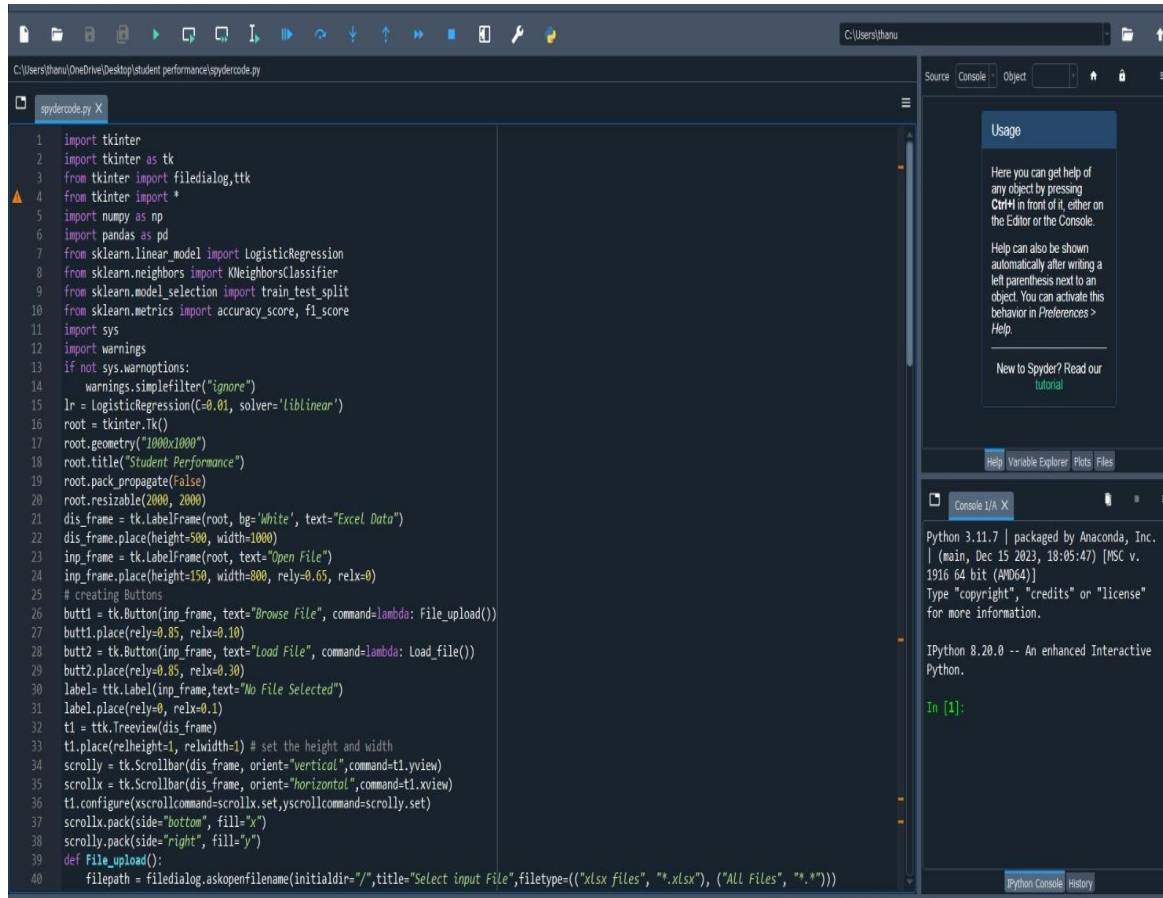


LOGISTIC REGRESSION

- Logistic regression is a supervised machine learning algorithm used for classification tasks where the goal is to predict the probability that an instance belongs to a given class or not. Logistic regression is a statistical algorithm which analyze the relationship between two data factors. The article explores the fundamentals of logistic regression, it's types and implementations.
- Logistic regression is used for binary classification where we use sigmoid function, that takes input as independent variables and produces a probability value between 0 and 1.
- For example, we have two classes Class 0 and Class 1 if the value of the logistic function for an input is greater than 0.5 (threshold value) then it belongs to Class 1 otherwise it belongs to Class 0. It's referred to as regression because it is the extension of linear regression but is mainly used for classification problems.

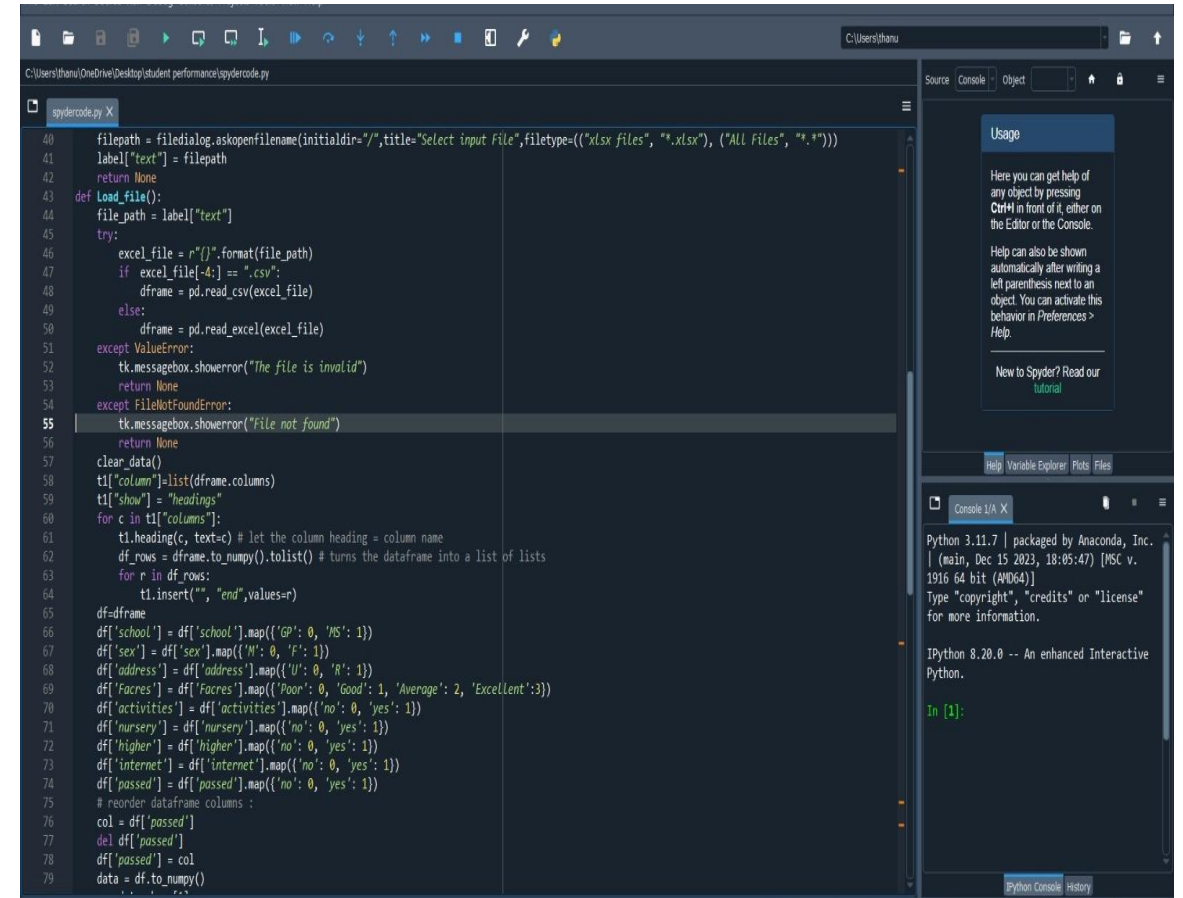


IMPLEMENTATION AND RESULTS



The screenshot shows the Spyder IDE interface with the 'spydercode.py' file open. The code implements a Tkinter-based GUI for loading an Excel file. It includes imports for Tkinter, filedialog, numpy, pandas, and sklearn. A Tk window titled 'Student Performance' is created with a 'dis_frame' containing a 'dis_frame' (for data) and an 'inp_frame' (for file selection). Two buttons are added: 'Browse File' (calls 'File_upload()') and 'Load File' (calls 'Load_file()'). The 'File_upload()' function uses 'filedialog.askopenfilename()' to select an Excel file. The 'Load_file()' function reads the Excel file into a DataFrame and displays it in the GUI.

```
1 import tkinter
2 import tkinter as tk
3 from tkinter import filedialog, ttk
4 from tkinter import *
5 import numpy as np
6 import pandas as pd
7 from sklearn.linear_model import LogisticRegression
8 from sklearn.neighbors import KNeighborsClassifier
9 from sklearn.model_selection import train_test_split
10 from sklearn.metrics import accuracy_score, f1_score
11 import sys
12 import warnings
13 if not sys.warnoptions:
14     warnings.simplefilter("ignore")
15 lr = LogisticRegression(C=0.01, solver='liblinear')
16 root = tk.Tk()
17 root.geometry("1000x1000")
18 root.title("Student Performance")
19 root.pack_propagate(False)
20 root.resizable(2000, 2000)
21 dis_frame = tk.LabelFrame(root, bg='White', text="Excel Data")
22 dis_frame.place(height=500, width=1000)
23 inp_frame = tk.LabelFrame(root, text="Open File")
24 inp_frame.place(height=150, width=800, rely=0.65, relx=0)
25 # creating Buttons
26 butt1 = tk.Button(inp_frame, text="Browse File", command=lambda: File_upload())
27 butt1.place(rely=0.85, relx=0.10)
28 butt2 = tk.Button(inp_frame, text="Load File", command=lambda: Load_file())
29 butt2.place(rely=0.85, relx=0.30)
30 label = ttk.Label(inp_frame, text="No File Selected")
31 label.place(rely=0, relx=0.1)
32 t1 = ttk.Treeview(dis_frame)
33 t1.place(relheight=1, relwidth=1) # set the height and width
34 scrolly = tk.Scrollbar(dis_frame, orient="vertical", command=t1.yview)
35 scrolly.pack(side="right", fill="y")
36 t1.config(scrollcommand=scrolly.set, yscrollcommand=scrolly.set)
37 scrolly.pack(side="bottom", fill="x")
38 scrolly.pack(side="right", fill="y")
39 def File_upload():
40     filepath = filedialog.askopenfilename(initialdir="/", title="Select input File", filetype=(("xlsx files", "*.xlsx"), ("All Files", "*.*")))
```



The screenshot shows the Spyder IDE interface with the 'spydercode.py' file open. The code implements a 'Load_file()' function that reads an Excel file into a DataFrame and displays it in the GUI. It includes error handling for invalid files and file not found. The DataFrame is displayed in the GUI using a Tkinter Treeview widget. The code also includes a 'clear_data()' function to reset the GUI state.

```
40     filepath = filedialog.askopenfilename(initialdir="/", title="Select input File", filetype=(("xlsx files", "*.xlsx"), ("All Files", "*.*")))
41     label["text"] = filepath
42     return None
43 def Load_file():
44     file_path = label["text"]
45     try:
46         excel_file = r"{}".format(file_path)
47         if excel_file[-4:] == ".csv":
48             df = pd.read_csv(excel_file)
49         else:
50             df = pd.read_excel(excel_file)
51     except ValueError:
52         tk.messagebox.showerror("The file is invalid")
53         return None
54     except FileNotFoundError:
55         tk.messagebox.showerror("File not found")
56         return None
57     clear_data()
58     t1["column"] = list(df.columns)
59     t1["show"] = "headings"
60     for c in t1["columns"]:
61         t1.heading(c, text=c) # let the column heading = column name
62     df_rows = df.to_numpy().tolist() # turns the dataframe into a list of lists
63     for r in df_rows:
64         t1.insert("", "end", values=r)
65     df = df
66     df['school'] = df['school'].map({'GP': 0, 'MS': 1})
67     df['sex'] = df['sex'].map({'M': 0, 'F': 1})
68     df['address'] = df['address'].map({'U': 0, 'R': 1})
69     df['facres'] = df['facres'].map({'Poor': 0, 'Good': 1, 'Average': 2, 'Excellent': 3})
70     df['activities'] = df['activities'].map({'no': 0, 'yes': 1})
71     df['nursery'] = df['nursery'].map({'no': 0, 'yes': 1})
72     df['higher'] = df['higher'].map({'no': 0, 'yes': 1})
73     df['internet'] = df['internet'].map({'no': 0, 'yes': 1})
74     df['passed'] = df['passed'].map({'no': 0, 'yes': 1})
75     # reorder dataframe columns :
76     col = df['passed']
77     del df['passed']
78     df['passed'] = col
79     data = df.to_numpy()
```

Spyder Student Performance

File Edit Excel Data

C:\Users\thanu

Usage

Here you can get help of any object by pressing **Ctrl+H** in front of it, either on the Editor or the Console.

Help can also be shown automatically after writing a left parenthesis next to an object. You can activate this behavior in **Preferences > Help**.

New to Spyder? Read our [tutorial](#)

Help Variable Explorer Plots Files

Console 1/A X

```
Python 3.11.7 | packaged by Anaconda, Inc.
| (main, Dec 15 2023, 18:05:47) [MSC v.
1916 64 bit (AMD64)]
Type "copyright", "credits" or "license"
for more information.

IPython 8.20.0 -- An enhanced Interactive
Python.

In [1]: runfile('C:/Users/thanu/OneDrive/
Desktop/student performance/
spydercode.py', wdir='C:/Users/thanu/
OneDrive/Desktop/student performance')
```

Open File

C:/Users/thanu/OneDrive/Desktop/student performance/student-data.csv

Browse File Load File

Python Console History

Line 35, Col 1 ASCII CRLF R/W Mem 85%

Spyder Student Performance

File Edit Excel Data

	school	sex	age	address	traveltime
GP		F	18	U	2
GP		F	17	U	1
GP		F	15	U	1
GP		F	15	U	1
GP		F	16	U	1
GP		M	16	U	1
GP		M	16	U	1
GP		F	17	U	2
GP		M	15	U	1
GP		M	15	U	1
GP		F	15	U	1
GP		F	15	U	3
GP		M	15	U	1
GP		M	15	U	2
GP		M	15	U	1
GP		F	16	U	1
GP		F	16	U	1
GP		F	16	U	1
GP		M	17	U	1
GP		M	16	U	1
GP		M	15	U	1
GP		M	15	U	1

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Desktop/student performance/
spydercode.py', wdir='C:/Users/thanu/
OneDrive/Desktop/student performance')
```

Open File

C:/Users/thanu/OneDrive/Desktop/student performance/student-data.csv

{accuracy of logistic regression is: } 66.38655462184873

{accuracy of KNN algorithm is: } 73.94957983193278

Browse File Load File

Python Console History

Line 55, Col 1 ASCII CRLF R/W Mem 86%

DATASET

The screenshot shows a Microsoft Excel window with the following details:

- Title Bar:** testprediction.csv • Saved to this PC
- Formulas Bar:** A1, fx
- Worksheet Grid:** Columns A through W, Rows 1 through 26. The data is as follows:

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W
1		prediction																					
2	0	0																					
3	1	1																					
4	2	0																					
5	3	1																					
6	4	1																					
7	5	1																					
8	6	0																					
9	7	0																					
10	8	1																					
11	9	1																					
12	10	1																					
13	11	1																					
14	12	0																					
15	13	1																					
16	14	0																					
17	15	1																					
18	16	1																					
19	17	1																					
20	18	1																					
21	19	1																					
22	20	0																					
23	21	1																					
24	22	1																					
25	23	1																					
26	24	1																					

The taskbar at the bottom shows the Windows Start button, a search bar, and several application icons including File Explorer, Microsoft Edge, and the Excel application itself. The system clock indicates the time is 19:49 on 23-04-2024.

CONCLUSION AND FUTURE SCOPE

- ✓ The purpose of the system is achieved and difficulties are answered. " student Performance with Graph & Academic Project Work Reporting System ".
- ✓ python design satisfies all the conditions of scholars in searching the systems and changing details about his or her attendance and marks.
- ✓ This design also satisfies the demands of admin in adding all the details of the design and he can fluently find the progress of student's attendance and marks.
- ✓ In the past, data had to be manually entered in order to analyze the results. However, the project currently allows data extraction from Excel (.xlsx) files.
- ✓ The prospective range is the ability to retrieve and process data in various forms, including doc, csv ,etc. Data can be visually represented in a graphical format through visualization. a variety of representations, including graphs and pie charts.

REFERENCES

- ❖ Ch. Aswani Kumar; K. Sumangali,” Performance evaluation of employees of an organization using formal cept analysis”, International Conference on Pattern Recognition, Informatics and Medical Engineering (PRIME-2012)
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- ❖ [3] TANG Yu-fang, ZHANG Yong-sheng,, —Design and implementation of college student information management system based on the web services||. Natural Science Foundation of Shandong Province(Y2008G22), 978-1- 4244-3930-0/09 2009 IEEE.
- ❖ [4] TANG Yu-fang, ZHANG Yong-sheng,, —Design and implementation of college student information management system based on the web services||. Natural Science Foundation of Shandong Province(Y2008G22), 978-1- 4244-3930-0/09 2009 IEEE.





THANK YOU