



## **Employee Attrition Prediction Using DJANGO Web Application**

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### **ABSTRACT**

The Employee Attrition Predictor project is a strategic initiative aimed at predicting employee attrition within organizations. By harnessing machine learning, specifically the Random Forest algorithm, this tool accurately forecasts the likelihood of employee departures. Integrated into a user-friendly website developed using Django, HTML, CSS, and JavaScript, it caters specifically to HR professionals seeking to anticipate potential attrition and mitigate its impact on workforce stability. Anticipating attrition is critical for organizations to sustain a strong and resilient workforce while minimizing disruptions. The website's impressive accuracy rate of 80% to 90% in attrition prediction provides valuable insights and actionable data for companies to proactively manage staff turnover. Predicting employee departures is paramount for maintaining organizational stability and continuity. This tool empowers HR teams by offering sophisticated analytics and data-driven insights to strategize effective retention efforts. Ultimately, this predictive tool serves as a proactive solution to enhance workforce planning and foster a stable and productive organizational environment.

Keywords: Employee Attrition Predictor Web Application Using Django HTML CSS JS

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### **1. Introduction**

The Employee Attrition Predictor project is crucial for businesses seeking effective management of employee turnover. Attrition signifies employees departing an organization, whether voluntarily or due to downsizing or other factors. High attrition rates bring about increased recruitment expenses, loss of expertise, diminished morale, and decreased productivity. Organizations prioritize initiatives aimed at curbing attrition and preserving talent. This project aids in proactive identification and resolution of attrition issues by elucidating reasons for employee departure and suggesting preventive measures. Through data analysis, companies can tailor retention strategies. The objective is to uphold a stable workforce and bolster organizational effectiveness. This project furnishes HR teams with invaluable insights for strategic decision-making, ultimately striving to alleviate the adverse effects of employee turnover on enterprises.

- Essential for Managing Turnover
- Understanding Attrition
- Targeted Retention Efforts
- Enhancing Organizational Performance
- Strategic Decision-Making

1.1 Structure

I. Flow Chart

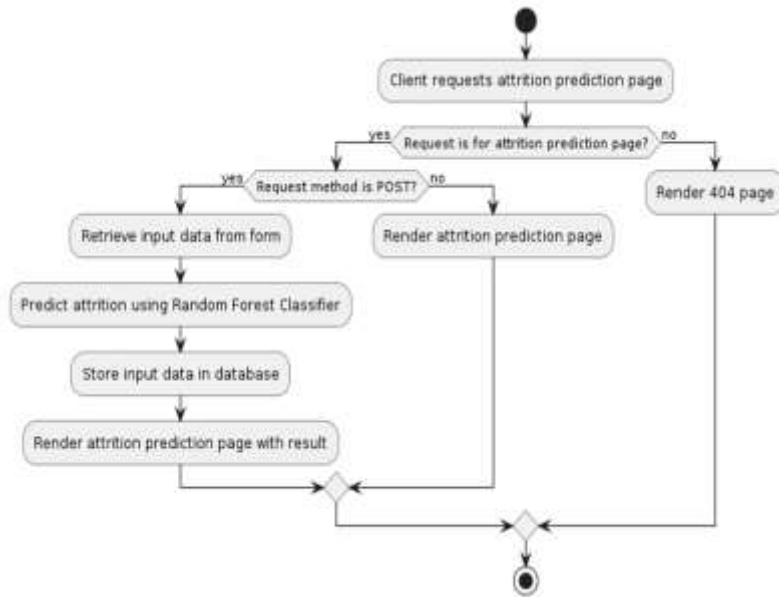


Fig. 1: Flow Chart

II. System Architecture

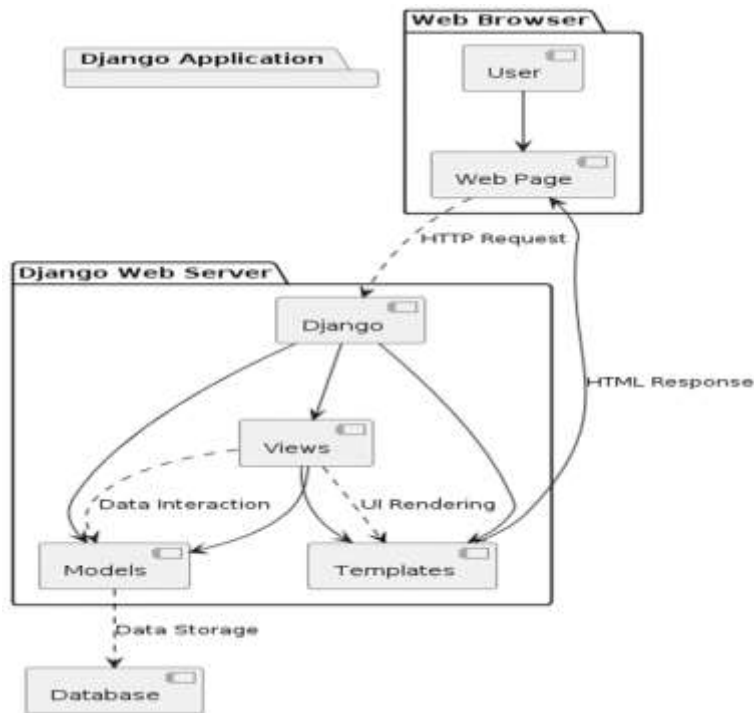


Fig. 2: System Architecture

1.2 Key Points

- Python is compatible with various platforms such as Windows, macOS, Linux, Raspberry Pi, and more.
- Python boasts a straightforward syntax that closely resembles the English language.
- Python's syntax enables developers to write programs using fewer lines compared to certain other programming languages.
- Python operates on an interpreter system, enabling immediate execution of code upon writing. This facilitates rapid prototyping and development.

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## 2. Module Description

### User Authentication and Profiles

**Login:** The login function processes POST requests from a login form, obtaining user credentials, attempting authentication, and logging in users upon success. It shows error messages for invalid credentials and re-renders the login form for another attempt.

**Register:** The register function oversees user registration, verifying form inputs including password complexity and uniqueness of username and email. It shows pertinent error messages and re-renders the registration form if validations fail. Upon successful registration, a new user is created and saved to the database with suitable feedback displayed to the user.

### Predicting Employee Attrition

**Handling POST Requests:** The provided Django view function `attritionpredict` is designed to manage a POST request containing various form fields related to employee data, such as age, job details, and work-related factors, with the aim of predicting employee attrition.

**Data Extraction and Storage:** Upon receiving a POST request, the function extracts the user-submitted data from the request. It then appends this data to an existing Excel file named "EmployeeData.xlsx" to maintain a record of employee information. The extracted data is stored in specific columns corresponding to different employee attributes within the Excel sheet.

**Model Training:** Next, the function employs machine learning techniques, specifically a Random Forest Classifier from `scikit-learn`, to train a predictive model using the stored employee data. It reads the updated Excel file into a `pandas DataFrame`, preprocesses the data by handling missing values, and separates the input features (`X_train`) from the target variable (`y_train`) for training the model.

**Prediction Generation:** The Random Forest Classifier (`ran`) is trained on the extracted features (`X_train`) and target (`y_train`) data. Subsequently, the function proceeds to predict the attrition status (whether an employee is likely to leave or stay) based on the user-submitted data using the trained model.

**Database Interaction:** Furthermore, the function stores the user-submitted prediction input data in a Django database model named `Data`, capturing all the employee attributes for record-keeping purposes. This ensures that the prediction inputs are retained for future analysis or reference.

**Rendering Results:** Finally, the function renders the `attritionpredict.html` template, displaying the predicted attrition status along with the original input data. The template receives the prediction result (`prediction`) and all user-submitted attributes to present a comprehensive view of the prediction outcome and input details to the user.

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## 3. Screenshots

**Home page:** This is the central hub of our platform, serving as the primary destination for users upon accessing our website.



Fig 3. Home Page

**Register Page:** This is the enrollment section of our platform, facilitating user registration.

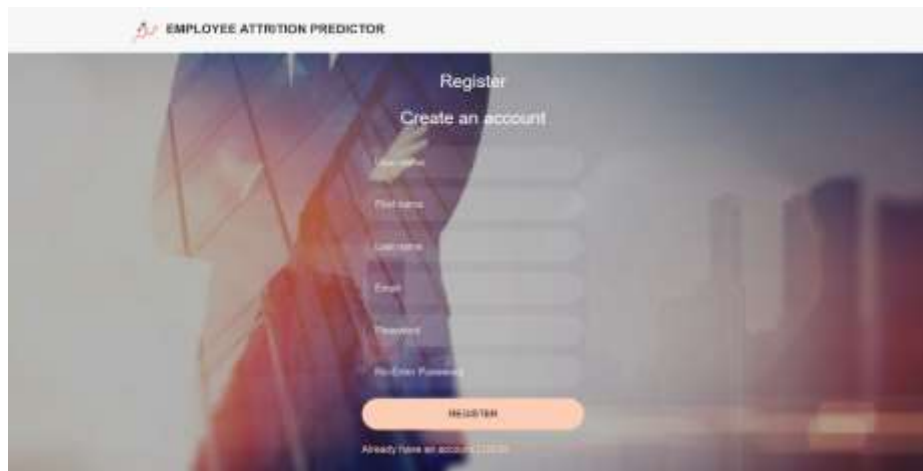


Fig 4. Register Page

**Login Page:** This is the gateway to access our website, serving as the entry point for user authentication.

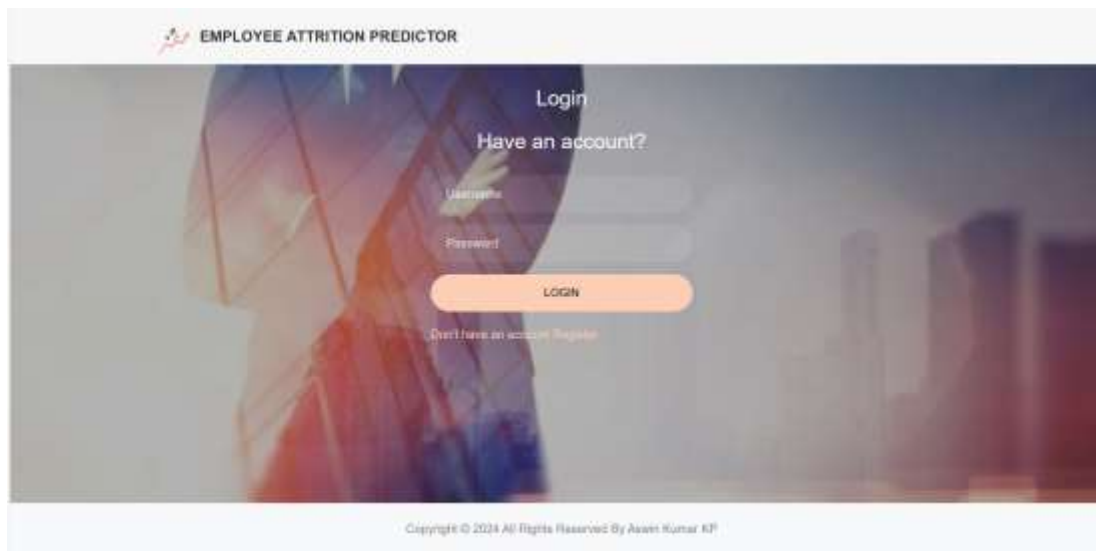


Fig 5. Login Page

**Home Page:** This is the main page of our website that displays after the user has successfully logged in.

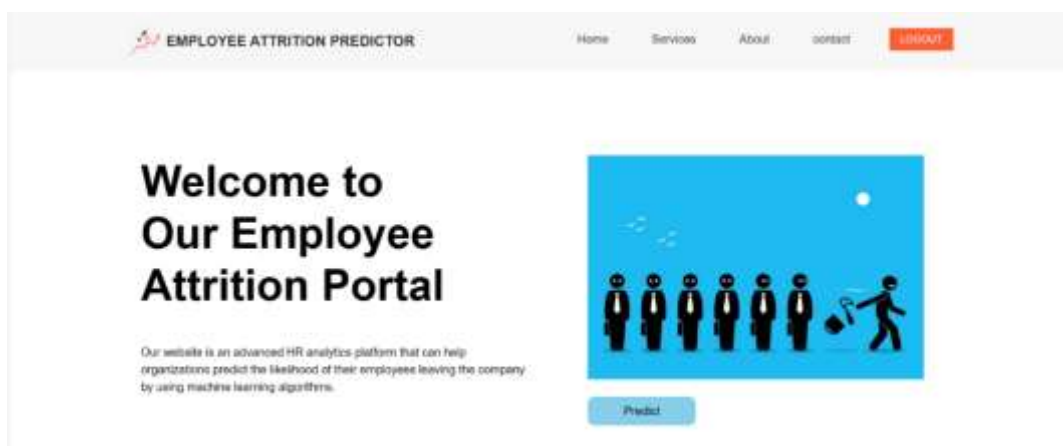
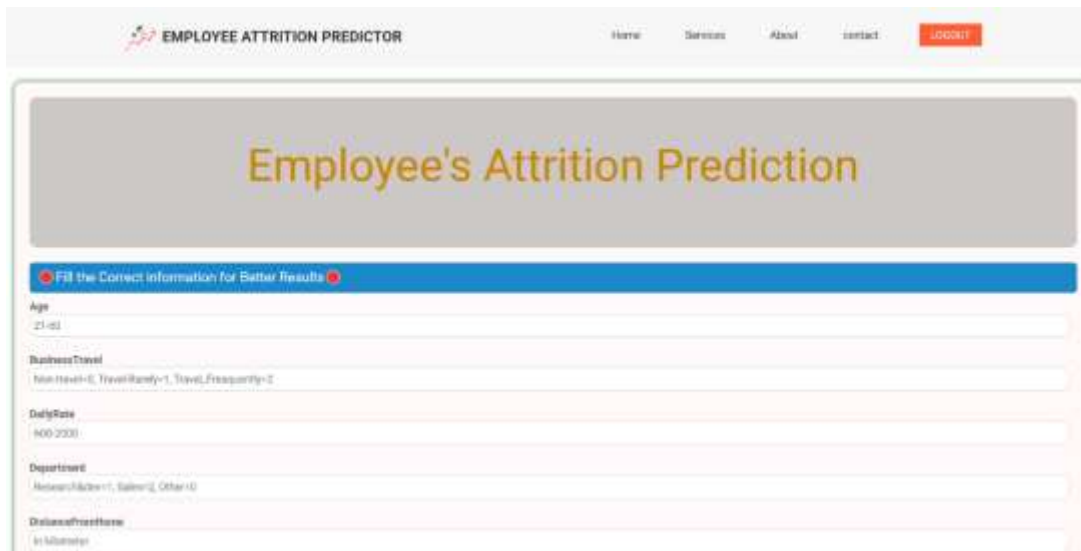


Fig 6. Home Page

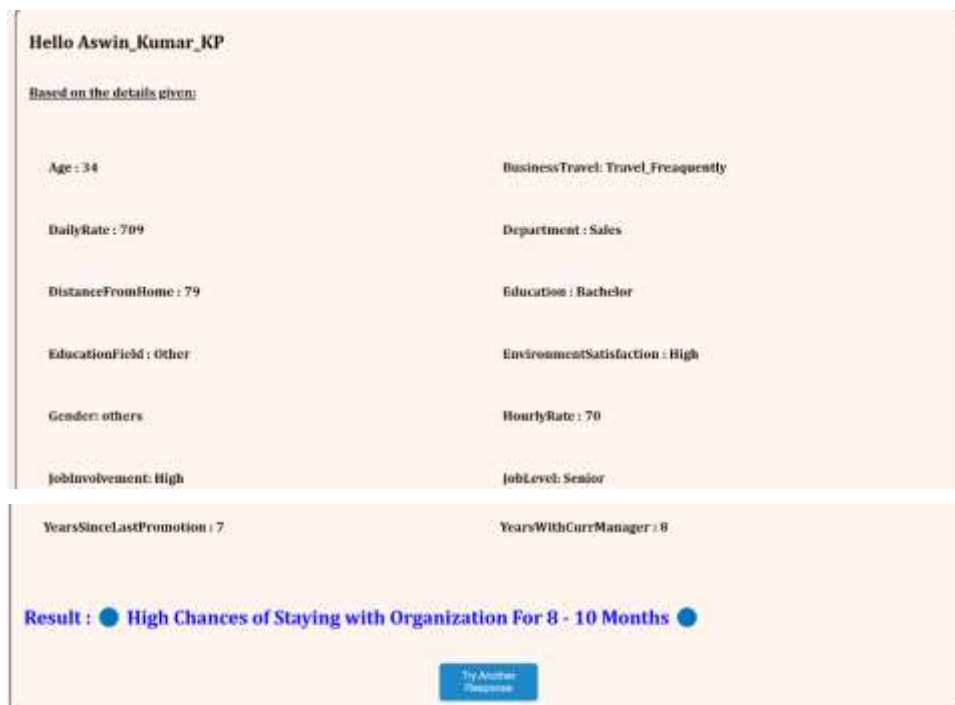
**Attrition Predict Page:** This is the Attrition Predict page of our website, dedicated to forecasting employee attrition.



The screenshot shows the 'EMPLOYEE ATTRITION PREDICTOR' website. The main heading is 'Employee's Attrition Prediction'. Below the heading is a blue banner that says 'Fill the Correct Information for Better Results'. The form contains several input fields: Age (23-63), BusinessTravel (BusinessTravel: Travel Frequently), DailyRate (500-2000), Department (Sales, Marketing, Finance, HR, Operations, IT, Support, Other), DistanceFromHome (0-100), and EducationField (Bachelor, Master, Doctorate, Other).

Fig 7. Attrition Predict Page

**Result Page:** This is the Results page of our website, intended for determining employee attrition.



The screenshot shows the results page for a user named 'Hello Aswin\_Kumar\_KP'. The page displays the following details:

Age : 34	BusinessTravel: Travel Frequently
DailyRate : 709	Department : Sales
DistanceFromHome : 79	Education : Bachelor
EducationField : Other	EnvironmentSatisfaction : High
Gender: others	HourlyRate : 70
JobInvolvement: High	JobLevel: Senior
YearsSinceLastPromotion : 7	YearsWithCurrManager : 8

**Result :** ● High Chances of Staying with Organization For 8 - 10 Months ●

At the bottom of the page, there is a blue button labeled 'Try Another Prediction'.

Fig 8. Result Page

#### 4. Conclusion and Future Enhancement

##### Conclusion:

This project aims to reduce employee attrition by providing insights into potential departures before they occur, fostering company growth and the retention of valuable employees. Key strategies include recognizing and appreciating employee contributions, creating a positive work environment, and effectively addressing conflicts. Organizations can further benefit by conducting exit interviews to understand attrition reasons and improve retention strategies based on this feedback. Ultimately, this project helps companies minimize employee losses and optimize workforce stability.

##### Future Enhancement:

Enhancing the Employee Attrition Predictor involves enriching data sources and implementing advanced machine learning techniques. Interactive dashboards and real-time alerts improve user experience and enable proactive interventions. Compliance with ethical AI standards and scalable

infrastructure are essential for reliability and efficiency. An employee self-service portal promotes transparency and aids in retention efforts with personalized development plans.

### ***Acknowledgement***

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### **References**

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