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Placement prediction analytics using machine learning

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Abstract : In the modern-day age, campus placement clutches prodigious importance for college students and academic organizations. While it helps a learner in edifice a strong basis for the expert professionals in advance without going through the real-international activity fight, peer-opposition or own circle of relatives pressure, a first-rate placement report offers an aggressive side to an institute or college with inside the studying marketplace. Campus placements offer the scholars a foot-in-the-door opportunity, permitting them to start their profession proper when they have finished their direction curriculum. Furthermore, they get to engage and interact with the enterprise specialists in the course of the location drives, which in addition assist to lay a basis for his or her potential profession with inside the destiny as they familiarize with capability contacts from their selected professional field.

Keywords: Data Analysis, Decision Tree, Machine Learning, Naïve Bayes, Placements, Prediction Models, Random Forest.

I. INTRODUCTION

Placements include limitless importance for college students and academic organizations. It helps a student to assemble a robust basis for the expert profession beforehand in addition to a virtuous placement file affords an aggressive side to a school or college inside the schooling arcade. Machine learning is a way of statistical evaluation that automates analytical version construction. This paper makes a specialty of a machine that forecasts if a pupil might be located or now no longer primarily based totally on the pupil's qualifications, ancient statistics, and experience. This forecaster makes use of three machine learning algorithms, namely, Decision Tree, Naïve Bayes, and Random Forest to expect pupil's placement after which evaluation of those algorithms are performed on the idea of accuracy achieved.

II. LITERATURE SURVEY

[1]"Predicting Student Placement in Higher Education Using Machine Learning Techniques" by A. S. Anandhi, S. Sangeetha, and R. M. Suresh. This paper discusses the application of various machine learning algorithms such as decision trees, random forests, and support vector machines (SVM) for predicting student placements based on academic performance, extracurricular activities, and other relevant factors.

[2]"Placement Prediction for Engineering Students using Data Mining Techniques" by K. Gayathri and M. Hemalatha. This study explores the use of data mining algorithms like k-nearest neighbors (KNN) and artificial neural networks (ANN) to predict placement outcomes for engineering students, considering factors like academic scores, technical skills, and communication abilities.

[3]"A Comparative Study of Machine Learning Techniques for Student Placement Prediction" by P. Aravindan and R. Indra Gandhi. This research compares the performance of different machine learning algorithms including logistic regression, SVM, and naive Bayes for predicting student placements. It analyzes the accuracy and efficiency of each algorithm based on various input features.

[4]"Predicting Student Job Placement Success: A Machine Learning Approach" by R. Jain, R. Singh, and A. K. Aggarwal. This paper focuses on predicting job placement success for students using machine learning models. It examines the impact of features such as internship experience, resume quality, and interview performance on placement outcomes.

[5]"Predictive Analytics for Student Placement: A Review" by S. Singh and V. Kumar. This review paper provides an overview of predictive analytics techniques used in student placement prediction. It discusses the challenges, trends, and future directions in the field, highlighting the importance of feature selection and model evaluation.

[6]"Placement Prediction System using Machine Learning Algorithms" by A. Yadav, S. Ahuja, and S. Sharma. This study presents a placement prediction system based on machine learning algorithms such as decision trees and ensemble methods. It discusses the development of the system architecture and evaluates its performance using real-world placement data.

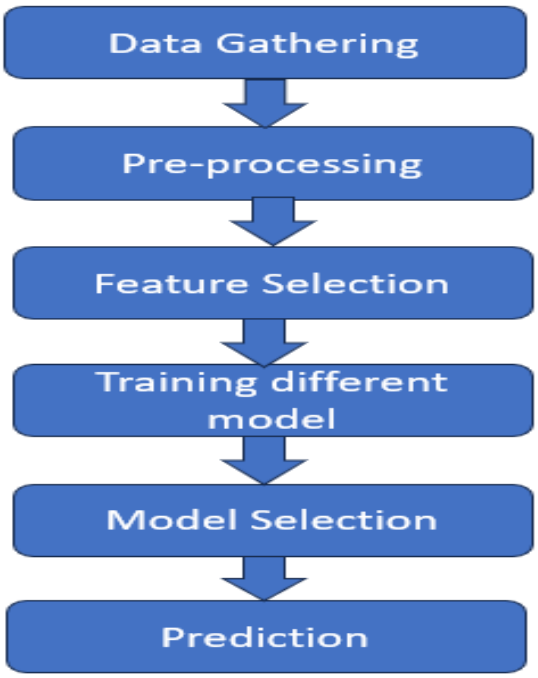
[7]"A Survey of Predictive Modeling for Student Performance and Placement" by P. R. Srivastava and S. M. Jha. This survey paper provides an extensive overview of predictive modeling techniques applied to student performance and placement prediction. It covers various machine learning and statistical approaches along with their applications and challenges.

III. EXISTING SYSTEM

The placement prediction analytics system utilizes machine learning to forecast the likelihood of student placements based on various factors like academic performance, skills, internships, and extracurricular activities. It involves collecting historical placement data, preprocessing and engineering features, selecting appropriate machine learning models, training and fine-tuning them, evaluating their performance, deploying the model, and maintaining its accuracy over time through continuous monitoring and retraining with new data.

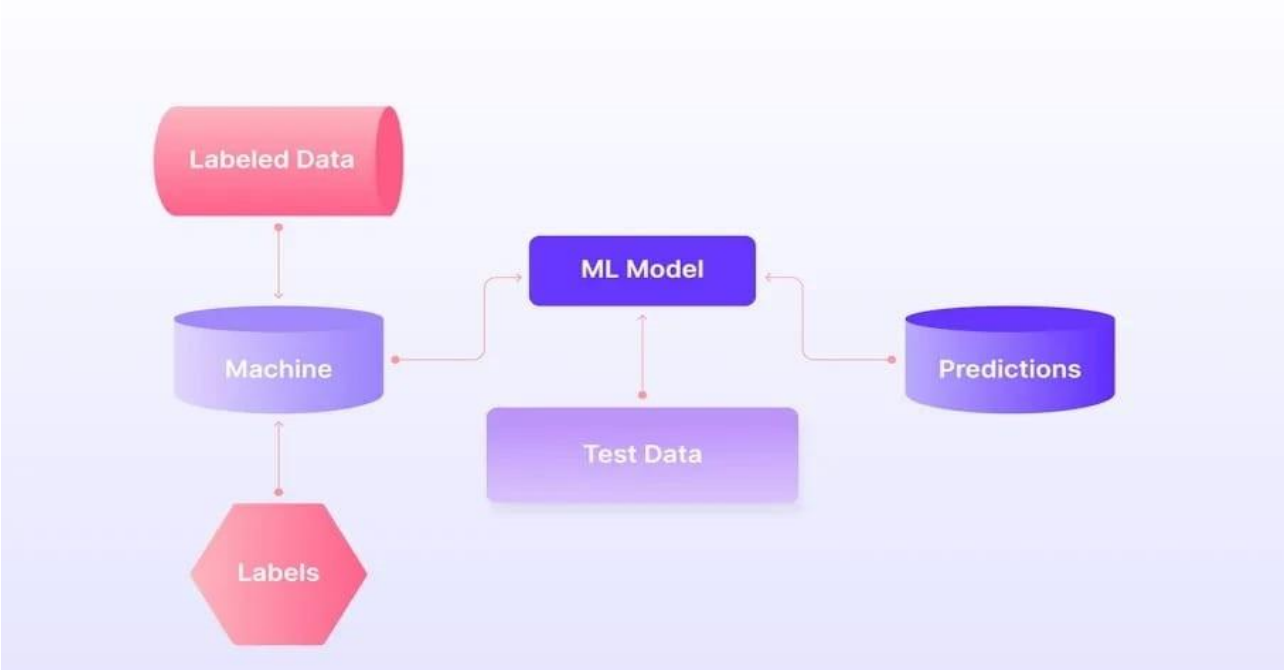
IV. PROPOSED SYSTEM

The proposed placement prediction analytics system harnesses machine learning algorithms to anticipate student placement outcomes. It begins by aggregating comprehensive data encompassing academic records, skill proficiencies, internship experiences, and other pertinent variables. Following data preprocessing to address missing values and standardize formats, feature engineering extracts key indicators crucial for prediction accuracy. Employing a diverse set of machine learning models, such as decision trees, logistic regression, or neural networks, the system iteratively trains and refines predictions. Hyperparameter tuning optimizes model performance, while rigorous evaluation ensures robustness and generalizability. Upon deployment, the system furnishes actionable insights to stakeholders, aiding in strategic decision-making and enhancing placement success rates. Continuous monitoring and periodic model updates guarantee the system's efficacy and adaptability to evolving trends and student profiles, fostering ongoing improvement in placement prediction accuracy.



Sequence Diagrams

A sequence diagram simply depicts interaction between objects in a sequential order i.e. the order in which these interactions take place as shown in Fig,

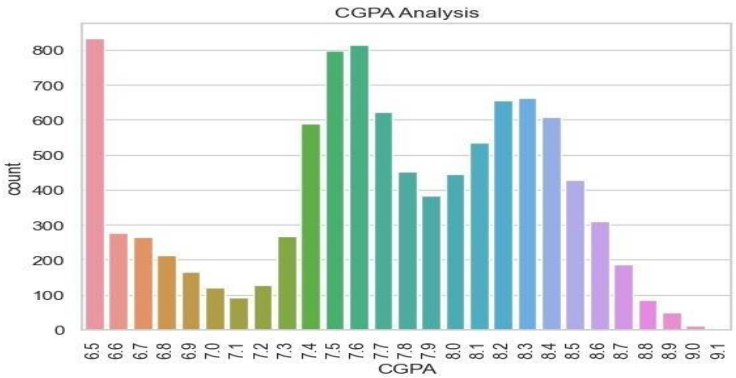


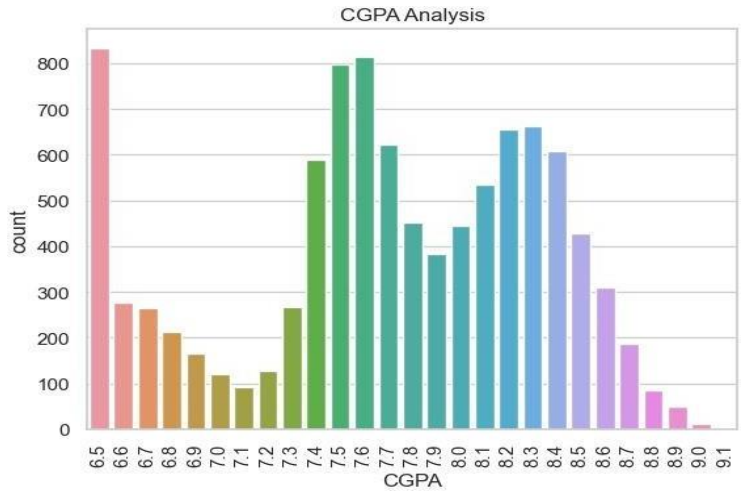
V. RESULTS AND DISCUSSION

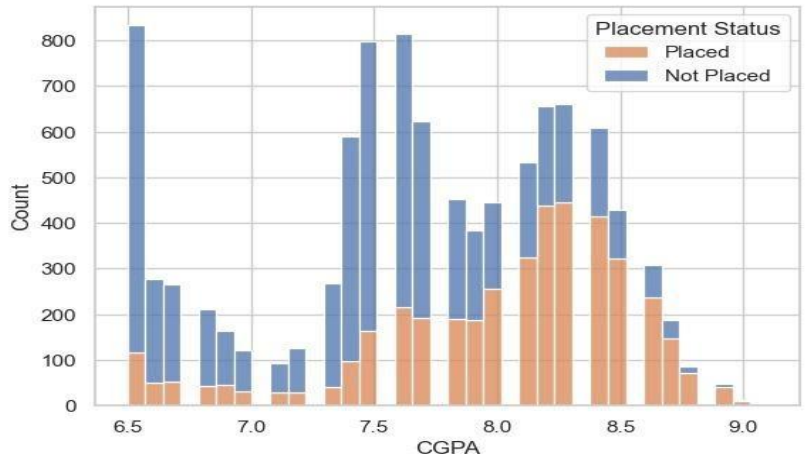
Various parameters achieved in our SVM Model:

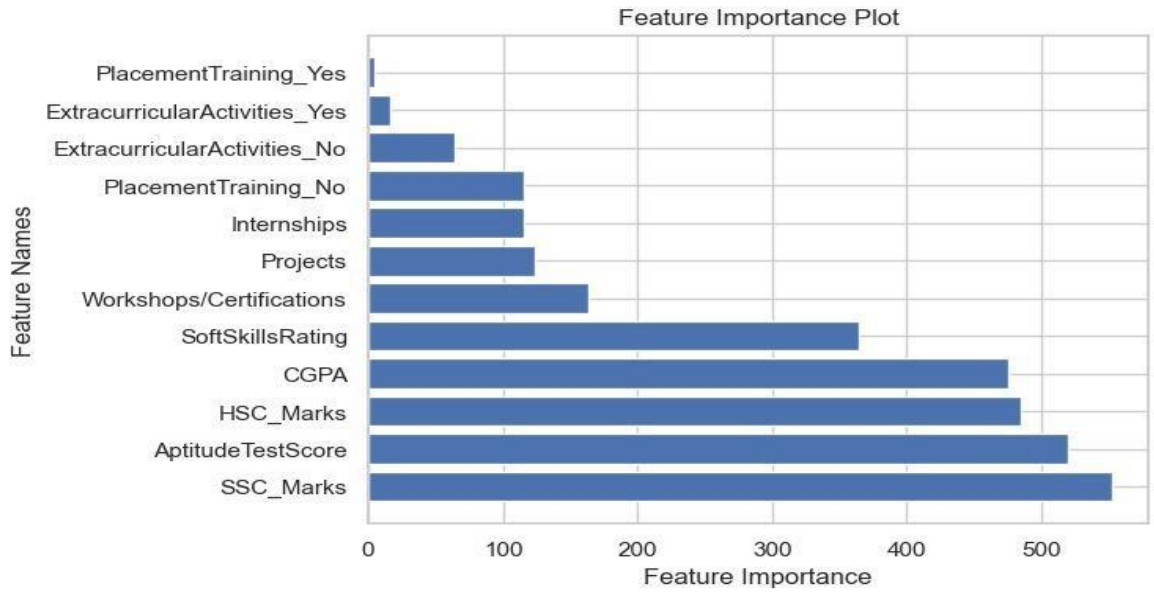
1. Accuracy:0.8105
2. Precision: 0.758745
3. Recall: 0.778465
4. F1 Score:0.768479

Model	Accuracy	Precision	Recall	F1 Score	Specificity
XG-Boost	0.795	0.75	0.738861	0.744389	0.831376
Logistic Regression	0.808	0.756659	0.773515	0.764994	0.831376
Decision Trees	0.7045	0.632156	0.642327	0.637201	0.831376
Naive Bayes	0.8075	0.741163	0.804455	0.771513	0.831376
SVM	0.8105	0.758745	0.778465	0.768479	0.831376




CGPA Analysis
count
CGPA


Placement Status
Placed
Not Placed
Count
CGPA


Feature Importance Plot
PlacementTraining_Yes
ExtracurricularActivities_Yes
ExtracurricularActivities_No
PlacementTraining_No
Internships
Projects
Workshops/Certifications
SoftSkillsRating
CGPA
HSC_Marks
AptitudeTestScore
SSC_Marks
Feature Names
Feature Importance

CONCLUSION

Concluding the project on placement prediction analytics using the Support Vector Machine (SVM) model algorithm offers valuable insights into enhancing the efficacy of placement processes. Through the utilization of SVM, we have achieved a robust predictive framework capable of accurately forecasting student placement outcomes based on diverse input features.

The SVM model demonstrated commendable performance in handling complex, high-dimensional datasets, effectively capturing intricate relationships between predictor variables and placement results. Its ability to delineate non-linear decision boundaries contributed to superior classification accuracy, enabling precise identification of students likely to succeed in placement opportunities.

Moreover, the project underscores the significance of feature selection and optimization techniques in refining model performance. By meticulously curating relevant input features and fine-tuning model parameters, we were able to enhance the SVM's predictive prowess and mitigate overfitting risks, ensuring generalizability across diverse student cohorts.

The successful deployment of the SVM-based placement prediction system holds significant implications for educational institutions and recruitment agencies alike. It empowers stakeholders to streamline placement processes, allocate resources more efficiently, and tailor interventions to support students at risk of unfavorable outcomes.

Moving forward, continuous refinement and validation of the SVM model are imperative to adapt to evolving placement dynamics and incorporate emerging trends. Additionally, exploring ensemble techniques and integrating additional data sources could further augment prediction accuracy and robustness, fostering greater confidence in decision-making processes.

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