

# Project Summary Report: University Admission Prediction

## 1. Project Objective

The primary goal of this project was to analyze the university\_admission.csv dataset to identify the key factors that influence a student's chance of university admission. A predictive model was built to accurately forecast a student's admission probability based on their academic and personal profile.

## 2. Model Performance & Key Findings

Three different machine learning models (Linear Regression, Random Forest, Gradient Boosting) were trained and evaluated. The **Linear Regression** model provided the best and most interpretable results.

### Best Model Performance (Linear Regression):

- **R<sup>2</sup> (R-squared): 0.8212:**

This means the model successfully explains **82.1%** of the variation in admission chances, indicating a very strong fit.

- **RMSE(Root Mean Squared Error): 0.0594**

This is the key performance metric. It means that, on average, the model's predictions are off by only **5.9 percentage points** (e.g., predicting 75.9% when the actual chance was 81.8%).

- **MAE(Mean Absolute Error): 0.0435**

On average, the model's prediction is about 4.4 percentage points away from the actual admission chance.

## 3. Key Drivers of Admission

The model identified a clear hierarchy of factors that contribute to admission chances. The importance of each feature is ranked below, from highest impact to lowest.

- **CGPA(Cumulative Grade Point Average):**

This is **by far the most significant predictor**. A student's CGPA has the largest single impact on their admission probability.

- **final\_term\_test & pre\_term\_test (Test Scores):**

Standardized test scores are the second most important group of factors.

- **has\_research\_exp (Research Experience):**

Having research experience provides a distinct and positive boost to a student's application.

- **lor\_score (Letter of Recommendation Strength):**

A strong LOR has a positive, but smaller, impact.

- **university\_rating & sop\_strength (Statement of Purpose):**

These factors had the least predictive power in the model, suggesting their influence may already be captured by more objective measures like CGPA and test scores.

#### **4. Conclusion**

The project was highly successful. A student's chance of admission is **highly predictable** using the given data.

The main takeaway is that **academic performance is paramount**. A high CGPA, backed by strong test scores, is the most direct path to securing a high chance of admission. While factors like research experience and strong letters of recommendation do help, they are secondary to a strong academic record.