**ABSTRACT**

Linear Regression is one of the most fundamental and widely used techniques in statistical modeling and machine learning. This project focuses on implementing Linear Regression to analyze the relationship between independent and dependent variables by fitting a straight line to observed data. The objective is to predict continuous outcomes based on input features using a best-fit linear equation.

The project involves training the model using a dataset, calculating the regression coefficients, and evaluating the model’s performance using metrics such as Mean Squared Error (MSE) and R-squared. Visualization tools are used to demonstrate the regression line and its fit to the data points.

Through this project, students gain practical experience in supervised learning, data preprocessing, model evaluation, and understanding the limitations and assumptions of Linear Regression. The simplicity and interpretability of the model make it an essential starting point for anyone exploring predictive analytics and machine learning.

**Key Words:**

* Linear Regression
* Predictive Modeling
* Regression Coefficients
* R-squared (R²)
* Data Preprocessing
* Model Evaluation
* Python
* Data Visualization

.

**INDEX**

**S.NO. CONTENTS PAGE NO**

1. **INTRODUCTION** 1
   1. NEED FOR THE PROJECT 1
   2. PROJECT DESCRIPTION 1
   3. COMPONENTS OF PROJECT 1
2. **REQUIREMENT ANALYSIS** 2

1. **SYSTEM DESIGN** 3
   1. ARCHITECTURE DIAGRAM 3
   2. FLOW DIAGRAM 4
2. **IMPLEMENTATION**  5
3. **RESULTS & DISCUSSION** 7
4. **CONCLUSION** 8
5. **REFERENCES** 9