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PRESENTATION ON THESIS PROPOSAL

FUEL CONSUMPTION ANALYZER

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Department : CSE
Date : 21/1/2026
Keywords : Fuel Consumption ,
Fuel Efficiency ,
Predictive Modeling

ABSTRACT

- ▶ Problem : Car fuel costs a lot , difficult to calculate by hand
- ▶ Solution : Fuel Consumption Analyzer will automatically track consumption
- ▶ Method : Collect data of graph and chart will show efficiency
- ▶ Expected Results : Costs will reduced , Environment will be safe , Driving will be smarter

INTRODUCTION AND BACKGROUND

- ▶ Topic Overview
 - ▶ Reducing car fuel consumption is now must for everyone
 - ▶ Fuel Consumption Analyzer is a tool that tracks car mileage / fuel efficiency
- ▶ Current Situation
 - ▶ People usually calculate mileage manually
 - ▶ There are some apps , but many times they are not accurate

INTRODUCTION AND BACKGROUND (CONT.)

▶ Gap

- ▶ Real time data analysis is not available in many apps
- ▶ Predictive & smart fuel saving suggestions are not available
- ▶ Simple , mobile-friendly and user-friendly app is needed

PROBLEM STATEMENT

- ▶ Nowadays , people do not understand exactly how much fuel their car is consuming
- ▶ If more fuel is consumed , the pocket is empty
- ▶ Car owners do not know which car consumes less fuel
- ▶ So we need a smart Fuel Analyzer
- ▶ That will tell you how much fuel a car consumes easily

MOTIVATION

- ▶ The number of cars increased a lot of these days
- ▶ Oil prices are skyrocketing . So everyone is worried
- ▶ More fuel consumption means more money wasted
- ▶ Environment Pollution is also increasing due to smoke
- ▶ Why it is needed now
 - ▶ Now there is smart technology
 - ▶ Data can be easily analyzed
 - ▶ So we need a smart fuel analyzer

MOTIVATION (CONT.)

▶ Practical Impact

- ▶ Car companies can be able to know which car is efficient
- ▶ Drivers will be able to travel more distances with less fuel
- ▶ Families will be able to save money
- ▶ The environment will be less polluted

MOTIVATION (CONT.)

- ▶ Academic Value
 - ▶ Data Analysis can be learned
 - ▶ Machine Learning can be used
 - ▶ Different cars can be compared
 - ▶ Experiment with new datasets

OBJECTIVES

- ▶ Collect and prepare dataset
 - ▶ Collect fuel data from vehicles , clean and organize it
- ▶ Create baseline model
 - ▶ Predict fuel consumption with simple ML method
- ▶ Propose new method
 - ▶ Create better and smarter method than before

OBJECTIVES (CONT.)

- ▶ Verify performance
 - ▶ Measure results with Accuracy , MAE , RMSE
- ▶ Compare with related work
 - ▶ Compare my results with other research

METHODOLOGY

- ▶ Data

- ▶ Source

- ▶ Fuel Data Dataset from Kaggle
 - ▶ Dataset size 500 + approximately

- ▶ Features

- ▶ Engine Size
 - ▶ City MPG
 - ▶ Highway MPG
 - ▶ Combined MPG
 - ▶ Cylinders

METHODOLOGY (CONT.)

- ▶ Label
 - ▶ Fuel Consumption (High/Low/Medium)
- ▶ Preprocessing
 - ▶ Clean missing data
 - ▶ Normalized data
 - ▶ Train data 70 %
 - ▶ Validation 15 %
 - ▶ Test 15 %

METHODOLOGY (CONT.)

- ▶ Models

- ▶ Baseline Model

- ▶ Linear Regression / Random Forest. Simple, works fast, gives good results

- ▶ Advanced Model (Optional)

- ▶ Gives more accurate and smart predictions

- ▶ Training & Evaluation

- ▶ Training

- ▶ Use Cross-validation

- ▶ Hold-out split

METHODOLOGY (CONT.)

- ▶ Metrics

 - ▶ Accuracy

 - ▶ Precision

 - ▶ Recall

 - ▶ F1-score

 - ▶ MAE / RMSE

- ▶ Evaluation

 - ▶ Confusion Matrix

 - ▶ Model Comparaison

METHODOLOGY (CONT.)

- ▶ Tools
 - ▶ Python
 - ▶ Scikit-learn
 - ▶ Pandas , NumPy
 - ▶ Google Colab / Kaggle Notebook

EXPECTED OUTCOMES

- ▶ Trained ML Model
 - ▶ Fuel Consumption Prediction Model
- ▶ Code Repository (GitHub)
 - ▶ All Python Code and Notebook
- ▶ Clean Dataset
 - ▶ Ready to clean dataset

EXPECTED OUTCOMES (CONT.)

- ▶ Final Report (PDF)
 - ▶ Complete Project Report
- ▶ Simple UI / Demo App
 - ▶ User input will show fuel

EXPECTED OUTCOMES (CONT.)

- ▶ Expected Improvement
 - ▶ Prediction Accuracy is about 85% – 92%
 - ▶ Fuel Consumption Error will be reduced (MAE will be reduced)
 - ▶ More smart prediction than the previous system
 - ▶ Real Usable system for life cars

TIMELINE TABLE

Month	Task
Month 1	Read Literature, Fix Problem + Dataset
Month 2	View Dataset, Clean & Visualize
Month 3	Clean Data, Encode, Normalize
Month 4	Build Simple Model
Month 5	Advanced Model + Tuning
Month 6	Evaluate + Report + Slides

TIMELINE GANTT CHART

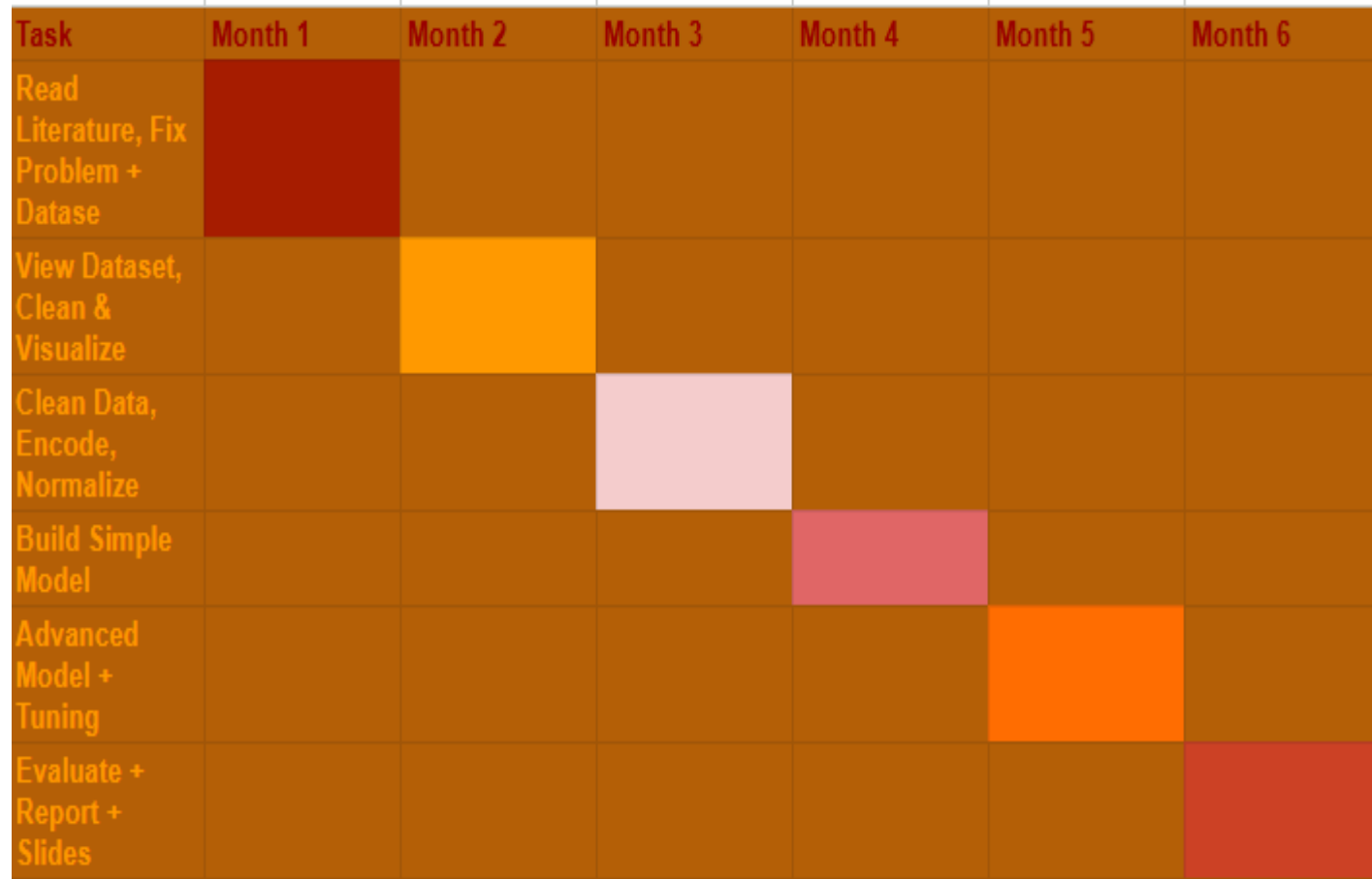


Figure : Timeline Gantt Chart

REFERENCES

- ▶ Fuel Consumption Prediction Model using Machine Learning
- ▶ Fuel Consumption Prediction Of Cars Using ML
- ▶ Fuel Consumption Analysis using Machine Learning
- ▶ Trip Based Fuel Consumption Prediction Using Machine Learning
- ▶ Average Fuel Consumption of Heavy Vehicles Using Machine Learning

REFERENCES (CONT.)

- ▶ MODELING AND ENHANCING FUEL ECONOMY OF FLEET VEHICLES BASED ON DATA ANALYTICS
- ▶ A Review of the Data-Driven Prediction Method of Vehicle Fuel Consumption
- ▶ Personalized Driving Behaviors and Fuel Economy over Realistic Commute Traffic: Modeling, Correlation, and Prediction

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Thank You

Question and Answer