Department of Computer Science and Engineering

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PRESENTATION ON

THESIS PROPOSAL

FUEL CONSUMPTION ANALYZER

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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

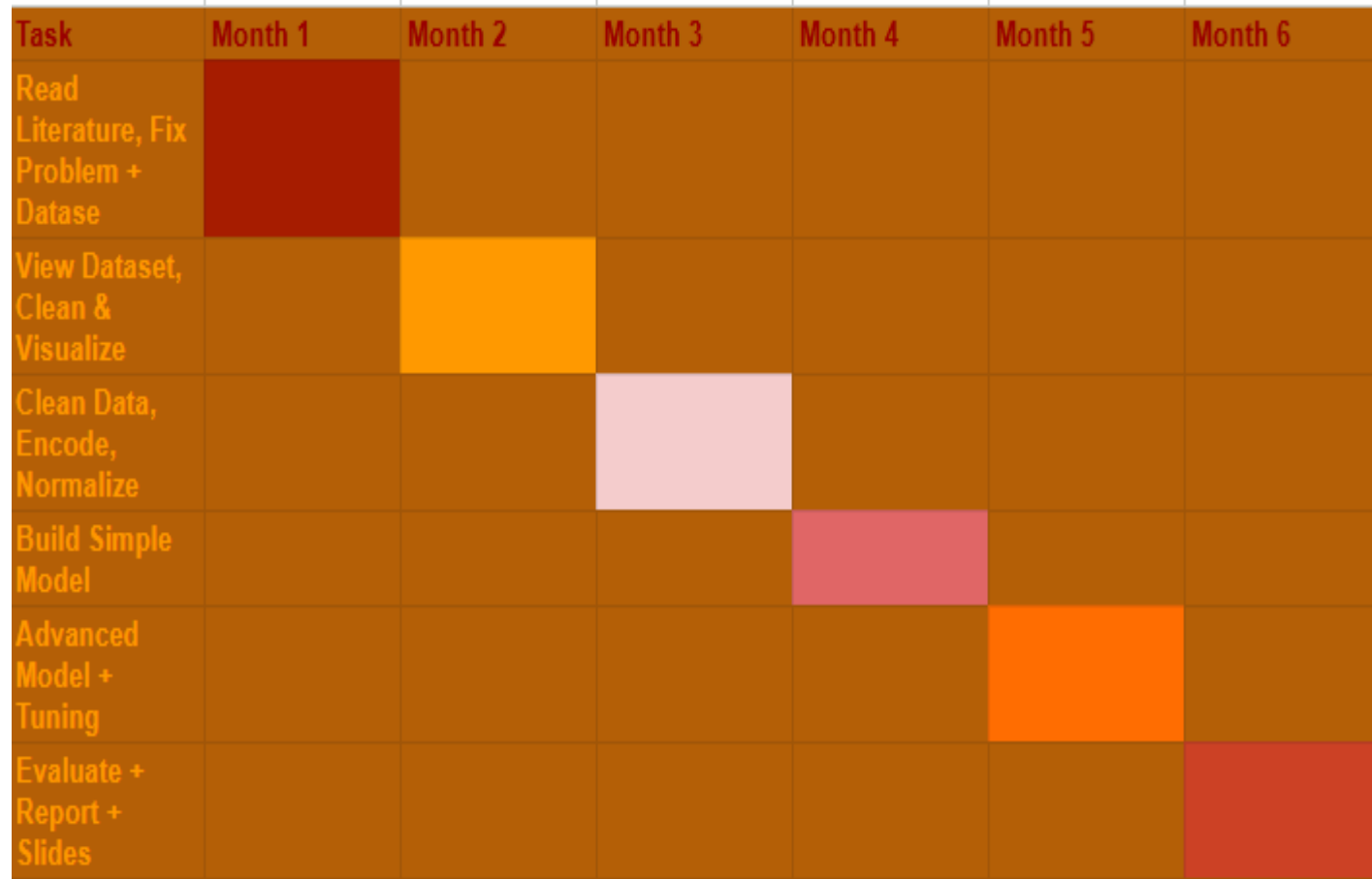| Task	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6
Read Literature, Fix Problem + Datase						
View Dataset, Clean & Visualize						
Clean Data, Encode, Normalize						
Build Simple Model						
Advanced Model + Tuning						
Evaluate + Report + Slides						

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