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# PRESENTATION ON THESIS PROPOSAL

# FUEL CONSUMPTION ANALYZER

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# 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 Comparison

# 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

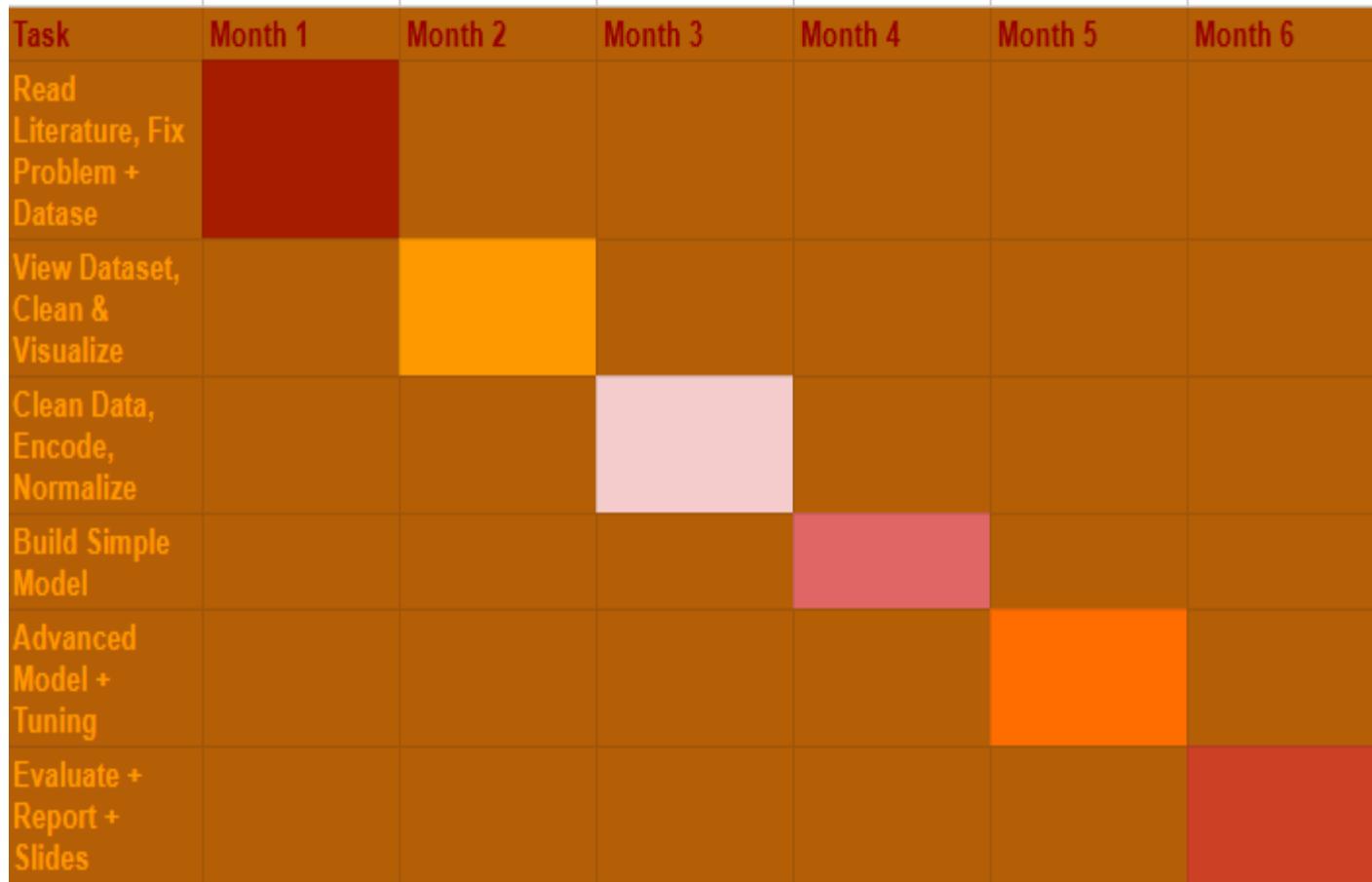


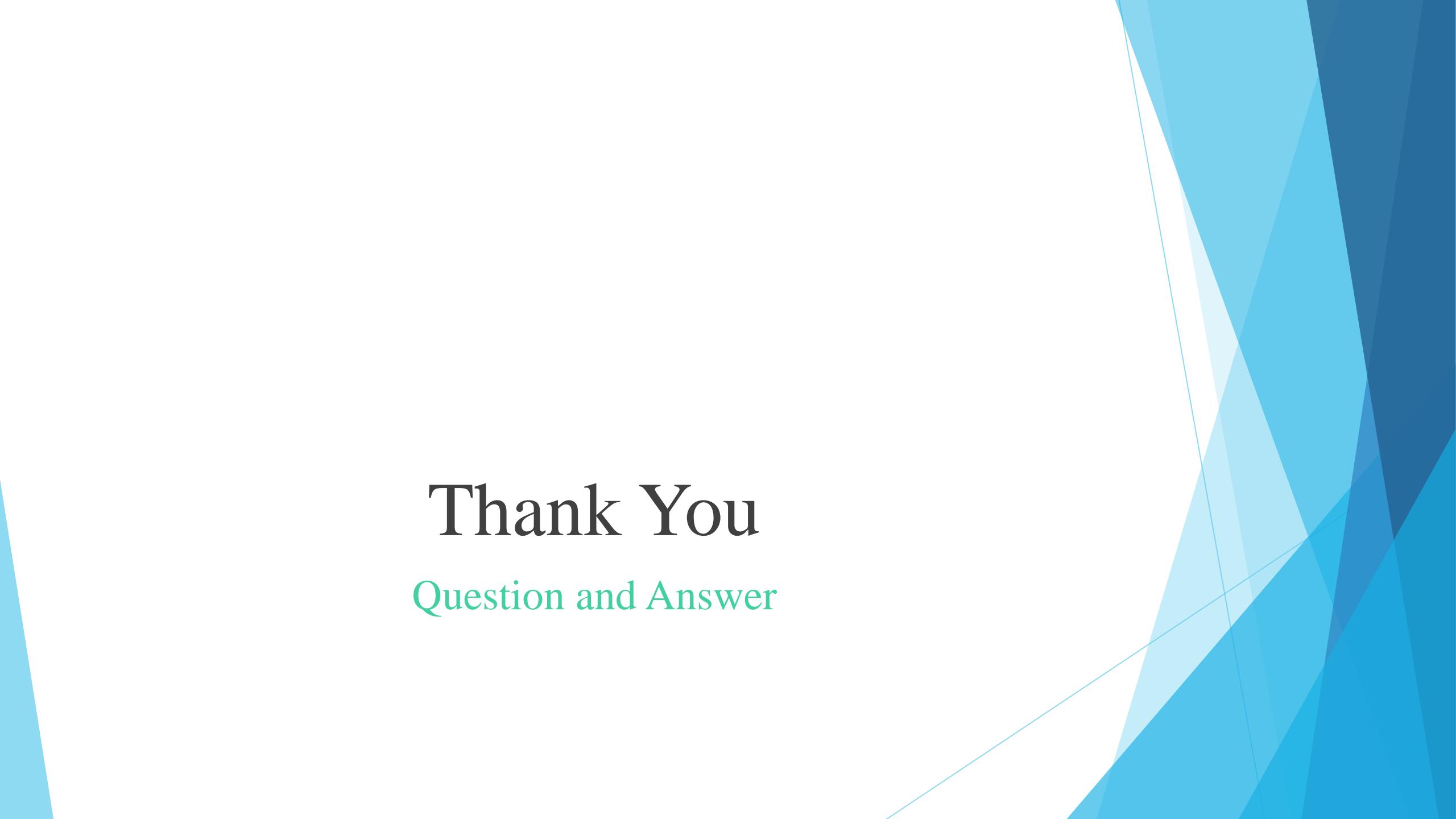
Figure : Timeline Gantt Chart

# 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