Project Design Phase-I
Solution Architecture

Date	13th November 2023
Team ID	PNT2022TMIDxxxxxx Team-592951
Project Name	Car Purchase Price Prediction
Maximum Marks	4 Marks

Solution Architecture:

Solution architecture is a complex process – with many sub-processes – that bridges the gap between business problems and technology solutions. Its goals are to:

- Find the best tech solution to solve existing business problems.
- Describe the structure, characteristics, behavior, and other aspects of the software to project stakeholders.
- Define features, development phases, and solution requirements.
- Provide specifications according to which the solution is defined, managed, and delivered.

Car price prediction

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1) Data Collection and Preprocessing:

Gather customer data, including age, income, and historical purchase patterns.

Collect data on car values without consideration for specific models.

Clean and preprocess the data to handle missing values and outliers.

Normalize or scale numerical features to ensure consistency in the dataset.

Encode categorical variables if necessary.

2) Feature Engineering:

Extract relevant features from the data, such as creating a composite metric for historical purchase patterns.

Possibly derive additional features that might contribute to prediction accuracy.

3) Model Development:

Utilize advanced machine learning algorithms such as ensemble methods, regression, or gradient boosting for accurate predictions.

Train the model on the preprocessed data, using a portion for training and another for validation.

Optimize hyperparameters to enhance predictive performance.

4) Model Integration:

Implement an API for the trained model to make predictions based on input data.

Create a seamless integration with the user interface for easy accessibility.

5) User Interface:

Design an intuitive and user-friendly interface for users to input their demographic data.

Enable users to receive precise purchase likelihoods in a clear and understandable format.

6) Backend Services:

Develop backend services to handle user requests and communicate with the machine learning model.

Implement security measures to protect user data and ensure the integrity of the system.

7) Database Management:

Set up a database to store and manage customer data securely.

Implement mechanisms for data retrieval and storage as needed

8) Scalability and Performance:

Optimize the system for scalability to handle an increasing number of users and data.

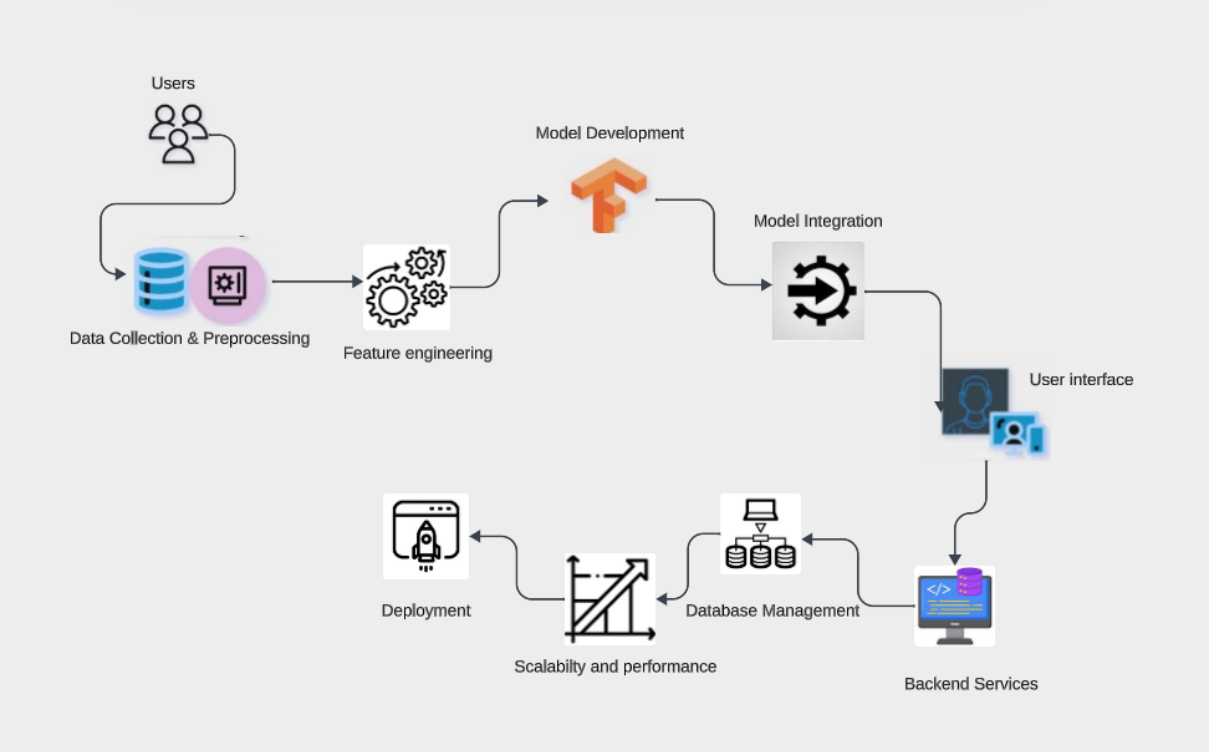
Monitor and maintain performance to ensure predictions are generated efficiently.

9) Deployment:

Deploy the solution on a cloud platform or on-premises infrastructure.

Ensure continuous monitoring and updates to keep the system running smoothly.

Solution architecture diagram:



Reference link:
https://lucid.app/lucidspark/5604fb5c-a6e4-419f-b89f-3c56bea7c676/edit?view_items=VtdMvbIWzAX_&invitationId=inv_782bffef-f232-4153-ba78-cc0fb2b39610