**Project Design Phase-I**

**Proposed Solution Template**

| Date | 26 October 2023 |
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| Team ID | PNT2022TMID591995 |
| Project Name | Project - Car Purchase Prediction Using ML |
| Maximum Marks | 2 Marks |

**Proposed Solution Template:**

Project team shall fill the following information in proposed solution template.

| **S.No.** | **Parameter** | **Description** |
| --- | --- | --- |
| 1. | Problem Statement (Problem to be solved) | The main aim of this project is to predict the price of used cars using the various Machine Learning (ML) models. This can enable the customers to make decisions based on different inputs or factors namely  -> Brand or Type of the car one prefers like Ford, Hyundai  -> Model of the car namely Ford Figo, Hyundai Creta  -> Year of manufacturing like 2020, 2021  -> Type of fuel namely Petrol, Diesel  -> Price range or Budget  -> Type of transmission which the customer prefers like Automatic or Manual |
| 2. | Idea / Solution description | ->Data Collection and preparation  Like Gathering extensive data on customer demographics, income levels, location, previous purchase history, social media activity, and online behavior  Integrating data from reliable sources such as dealerships, online car listings, and customer surveys.  ->Implementing various machine learning algorithms like Decision Trees, Random Forest, Logistic Regression, and Neural Networks to build predictive models.  Train the models using labeled data to predict the probability of a customer purchasing a car. |
| 3. | Novelty / Uniqueness | We feel that uniqueness for car purchase system lies in its innovative approach and features that set it apart from existing solutions so we include  -> Multi Algorithm Fusion: Instead of relying on a single machine learning algorithm, the system employs an ensemble approach that combines the strengths of various algorithms. This fusion increases prediction accuracy and ensures robust performances across diverse customer profiles.  ->Real time Data Integration: The system integrates real-time data from various sources, such as Social media platforms and online car listings. By analyzing the most recent customer behaviors and market trends, the predictions are highly adaptive and reflective of the current market dynamics.  ->Continuous Learning and Adaptability:The system incorporates reinforcement learning techniques, allowing it to learn from its predictions and user interactions. Over time, this continuous learning process refines the models, making them increasingly accurate and adaptive to changing market conditions. |
| 4. | Social Impact / Customer Satisfaction | The implementation of a car purchase prediction system using machine learning technology can have significant social impact and enhance customer satisfaction in several ways:  ->Reduced Decision-making Stress:  Social impact: car buying can be stressful, especially for the first-time buyers.By providing personalized recommendations, the system reduces decision-making stress, making the process more enjoyable and less intimidating.  Customer Satisfaction: Customers appreciate guidance tailored to their needs and financial capabilities, enhancing their overall satisfaction.  -> Financial Empowerment:  Social impact: Ensuring customers make informed decisions regarding their financial commitments fosters financial literacy and responsibility.  Customer Satisfaction: Buyers are satisfied when they make purchases with their budget avoiding financial strain.  ->Enhanced personal safety:  Social impact: Recommending vehicles with advanced safety improves road safety standards, reducing accidents and fatalities.  Customer Satisfaction:Knowing they are driving a safe vehicle enhances customer’s peace of mind and satisfaction with their purchase. |
| 5. | Business Model (Revenue Model) | Developing a sustainable revenue model is crucial for the success of a car purchase prediction system. Here's a detailed breakdown of potential revenue streams for this service:  ->Subscription-Based Model:  Description: Offer subscription packages to dealerships and automotive marketing agencies, granting them access to the prediction system. Packages can vary based on usage limits,features, and customer support levels.  Revenue Generation: Monthly or annual subscription fees.  Licensing and Intellectual Property:  Description: License the technology and algorithms to other software companies or automotive businesses for use in their applications.  Revenue Generation: Licensing fees and royalties based on product sales. |
| 6. | Scalability of the Solution | The scalability of a car purchase prediction solution using machine learning is a critical aspect to consider, especially as the volume of data and the number of users increase. Here's how the solution can be designed for scalability:  Model Scalability:  -> Algorithm Selection: Choose machine learning algorithms that are inherently scalable, such as Random Forest or Gradient Boosting, which can handle large datasets without compromising accuracy.  Distributed Training: Utilize distributed machine learning frameworks like TensorFlow or pyTorch, which training complex models across multiple machines or GPUs simultaneously. |