**Project Design Phase-I**

**Proposed Solution Template**

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| Date | 06 May 2023 |
| Team ID | NM2023TMID15467 |
| Project Name | Project – Traffic Intelligence: Advanced Traffic Volume Estimation with Machine Learning |

**Proposed Solution Template:**

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

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| **S.No.** | **Parameter** | **Description** |
|  | Problem Statement (Problem to be solved) | Traffic problem is one of the major problem now a days, In the increase in no of vehicles and non –usage of public transport leading to traffic related issues, Making a eye on count of traffic at each level enables the government  to take the further decisions such as building new roads, increasing infrastructure ,developing mutli-channel connectivity . |
|  | Idea / Solution description | To address such problems to tracking the vehicle count in each and every place AI-ML has given a solution to such kind of traffic related issues, which are able to measure the volume of traffic, identify the violations of traffic rules etc.ML models could give early alerts of severe traffic to help prevent issues related to traffic problems. Hence, there is needs to develop ML algorithms capable in predicting Traffic volume with acceptable level of precision and in reducing the error in the dataset of the projected Traffic volume from model with the expected observable Traffic volume. |
|  | Novelty / Uniqueness | Random Forest is a versatile algorithm, and there are various extensions and enhancements that can be applied to traffic volume estimation. For instance, incorporating gradient boosting techniques, integrating deep learning models within the ensemble, or exploring hybrid models that combine Random Forest with other algorithms can introduce novelty and potentially improve the accuracy of the predictions. |
|  | Social Impact / Customer Satisfaction | The social impact of using Random Forest for traffic volume estimation lies in the potential to enhance traffic management, improve safety, address environmental concerns, optimize resource allocation, and promote equity and accessibility in transportation systems. By leveraging accurate traffic volume predictions, transportation authorities can make informed decisions that positively affect the well-being and quality of life of individuals and communities. |
|  | Business Model (Revenue Model) | Companies can offer traffic analytics services by utilizing Random Forest models to estimate traffic volumes. These services can provide valuable insights to businesses in various sectors, such as retail, real estate, logistics, and urban planning. Clients can leverage the traffic volume predictions to make informed decisions about site selection, supply chain optimization, marketing campaigns, and infrastructure investments. |
|  | Scalability of the Solution | The scalability of Random Forest models depends on the size of the training dataset. As the volume of traffic data increases, the model's training time may also increase. However, Random Forest can handle large datasets reasonably well, especially with parallelization techniques that allow for distributed training across multiple computing resources.  The number of features or variables used in the model can impact scalability. If the feature dimensionality is high, the model's training and prediction time may increase. Feature selection or dimensionality reduction techniques can be applied to reduce the computational complexity and improve scalability. |