ProjectReportFormat

Enchanted wings: marvels of butterfly species

Team Members

S.Revathi,S.UmmeSalma,S.NagendraPrasad,V.Subramani

# INTRODUCTION

* 1. ProjectOverview

TrafficTelligenceisamachinelearning-basedsystemforestimatingvehiclevolumesinrealtime.It aims to support traffic authorities with actionable insights using data-driven predictions and visualizations.

* 1. Purpose

The purpose of this project is to develop a smart, scalable, and automated traffic monitoring toolthatleveragesMLmodelstoestimatecongestionlevels,manageurbantrafficefficiently, and minimize manual surveillance.

# IDEATIONPHASE

* 1. ProblemStatement

Urbanareasfacesignificanttrafficcongestion,especiallyduringpeakhours.Manualtraffic control is inefficient and prone to delays. A scalable solution is needed to estimate and analyze traffic volume using smart technology.

* 1. EmpathyMapCanvas
  2. Brainstorming

Useofvideo/image-basedMLfortrafficdetection Real-time dashboard and alerts

Predictivemodelingusinghistoricaldata

Integrationwithexistingtrafficcamerainfrastructure

---

# REQUIREMENTANALYSIS

CustomerJourneyMap Solution Requirement

Accuratereal-timevehiclecounting Historicaltraffictrendvisualization User and admin authentication

APIforsensor/videoinput

* 1. DataFlowDiagram

[User]-->[FrontendReactApp]-->[APIServer(Node.js)]-->[MLModel+MongoDB]

↑

* 1. TechnologyStack

Frontend:React.js,Material-UI Backend: Node.js, Express.js Database: MongoDB

MachineLearning:Python(OpenCV,TensorFlow/YOLO) Tools: GitHub, Postman, VS Code, Heroku (or similar)

---

# PROJECTDESIGN

* 1. ProblemSolutionFit Problem-SolutionFit

Currentmanualtrafficmanagementisinefficient.AsmartML-basedsystemreducesmanual effort and provides data-backed insights.

* 1. ProposedSolution

full-stackwebapplicationwherevideofeedsareprocessedviaMLmodelstoestimatetraffic volume and visualize data in real time.

* 1. SolutionArchitecture

Frontend(React)<--->Backend(Node+Express)<--->MongoDB

|

|-->PythonMLService

---

# PROJECTPLANNING&SCHEDULING

* 1. ProjectPlanning

# FUNCTIONALANDPERFORMANCETESTING

* 1. PerformanceTesting

BackendAPIloadtestingusingPostman/Newman ML inference speed: ~20 FPS on live feed

DatabasequeryoptimizationtestedviaMongoDBAtlas

---

# RESULTS

* 1. OutputScreenshots OutputScreenshots

Includescreenshotsof: Dashboard view

Loginpage

Trafficpredictionoutput Alerts interface

---

# ADVANTAGES&DISADVANTAGES

**Real-time analytics Scalableandmodular**

**Minimalmanualintervention**

**Predictivecongestionalerts DISADVANTAGES**

**Depends on video quality and lighting High initial setup cost (if camera-based) MayrequireGPUforreal-timeprocessing**

**---**

# CONCLUSION

**TrafficTelligenceprovidesanintelligent,ML-drivensolutionforreal-timetrafficvolume estimation.Itenablessmarterdecisionsfortrafficmanagementauthoritiesandpavesthe way for smart city infrastructure.**

# FUTURESCOPE

**IntegrationwithgovernmenttrafficAPIs Mobile app support**

**Real-timeheatmaps**

**AI-basedtrafficlightcontrol**

**Vehicleclassification(bikes,cars,trucks)**

# APPENDIX

SourceCode(ifany) Dataset Link

GitHub&ProjectDemoLink Source Code

GitHubRepository:[🔗InsertGitHubLinkHere] Dataset Link

Publictrafficsurveillancedatasets(e.g.,[CityFlow,DETRAC]) Custom-labeled data for model training

ProjectDemoLink

[🔗InsertDemo/YouTubeVideoLinkHere]

---