Cloud Computing Major Project

High Level Design Document

"Real Time Event Monitoring System using Apache Spark"

Team ID - 16

Team Members

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REQUIREMENTS AND HIGH LEVEL DESIGN (HLD) DOCUMENT

This document contains description of high level design and specifies the requirements that will be met by the proposed architecture and software. In this document, we will talk about the features that this project will address and how it will be implemented using the given set of technologies.

1.1 INTRODUCTION

The number of road accidents has increased considerably since last decade with an yearly increase in number of deaths and injuries. Some of these deaths can be attributed to the long response time required to reach an accident. This is due to the fact that the process of determining the location of an accident made by a communication between a person in the accident or a person near the accident and an emergency personnel as well as sending the nearest emergency service and/or police officers needed for reporting the accident can be quite lengthy. Moreover, the persons in a given accident may need an urgent treatment and the delay in response time can increase the severity of the accident.

1.2 AIM OF THE PROJECT

The main objective of this project is to reduce the time required to report an accident and to determine its location more precisely. This will reduce the time required for the police and the emergency personnel to reach the accident location. The proposed idea will make the location identification automatic and hence will be more precise and take less time.

The project addresses the following goals:

- Monitoring real-time GPS data to identify possible accidents.
- Monitoring sensor data for keeping a check on speed limits.
- Triggering an event in case of anomaly or potential accident.

Spark streaming is used to handle real time data input from vehicular sensors.

1.2.1 SUBJECT MATTER EXPERTS AGREEMENT LIST

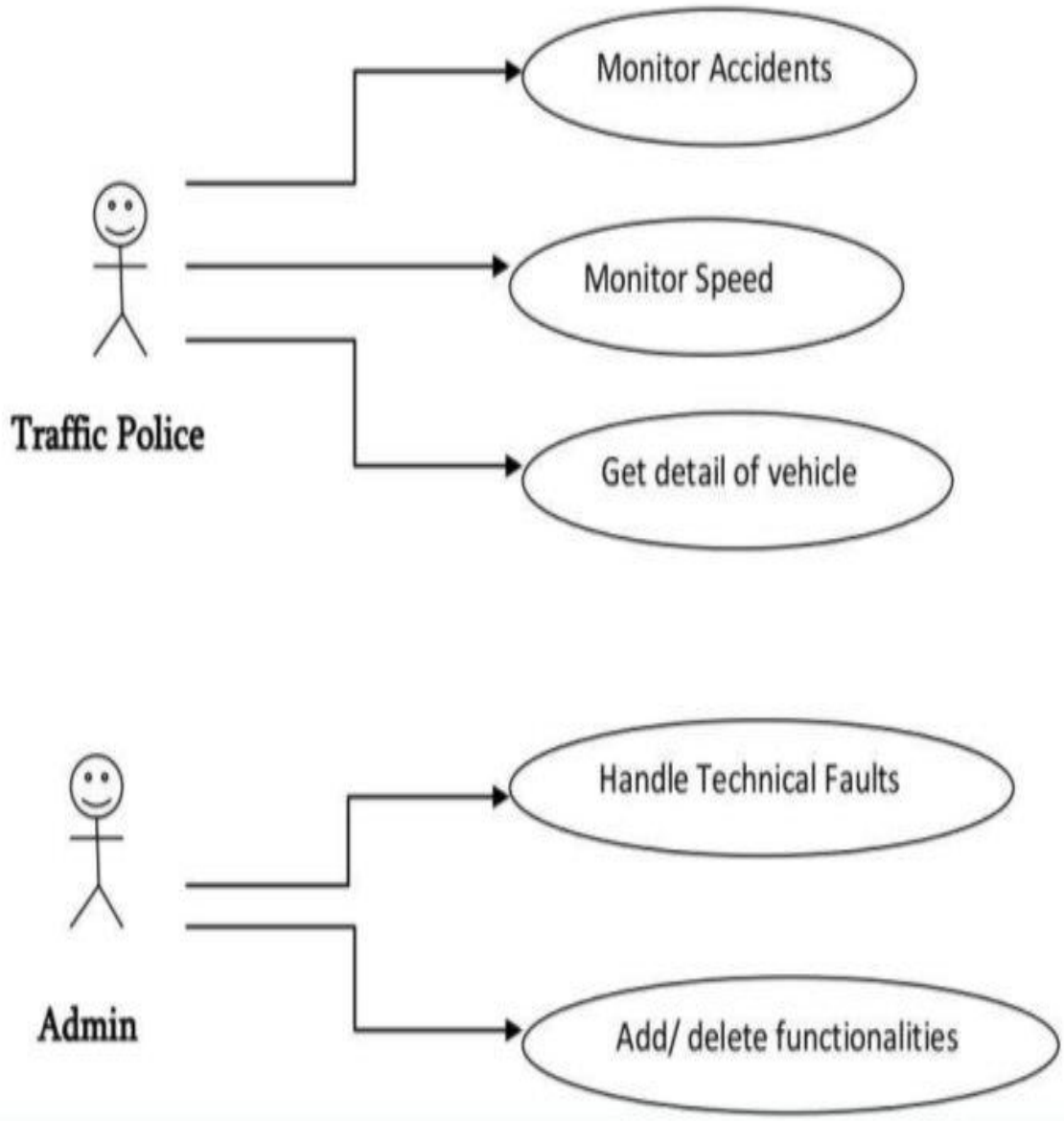
This section lists all key people involved in the project. It will ensure that all mandatory reviewers have reviewed and agreed to the requirements and proposed architecture.

Name	Title/Role	Mandatory Reviewer (Y/N)	Agreed To
Ashish Kumar	Mentor	Y	Review Overall HLD Document
Arsh	Programmer	Y	
Madan	Programmer	Y	
Darpan	Programmer	Y	
Shrenik	Programmer	Y	

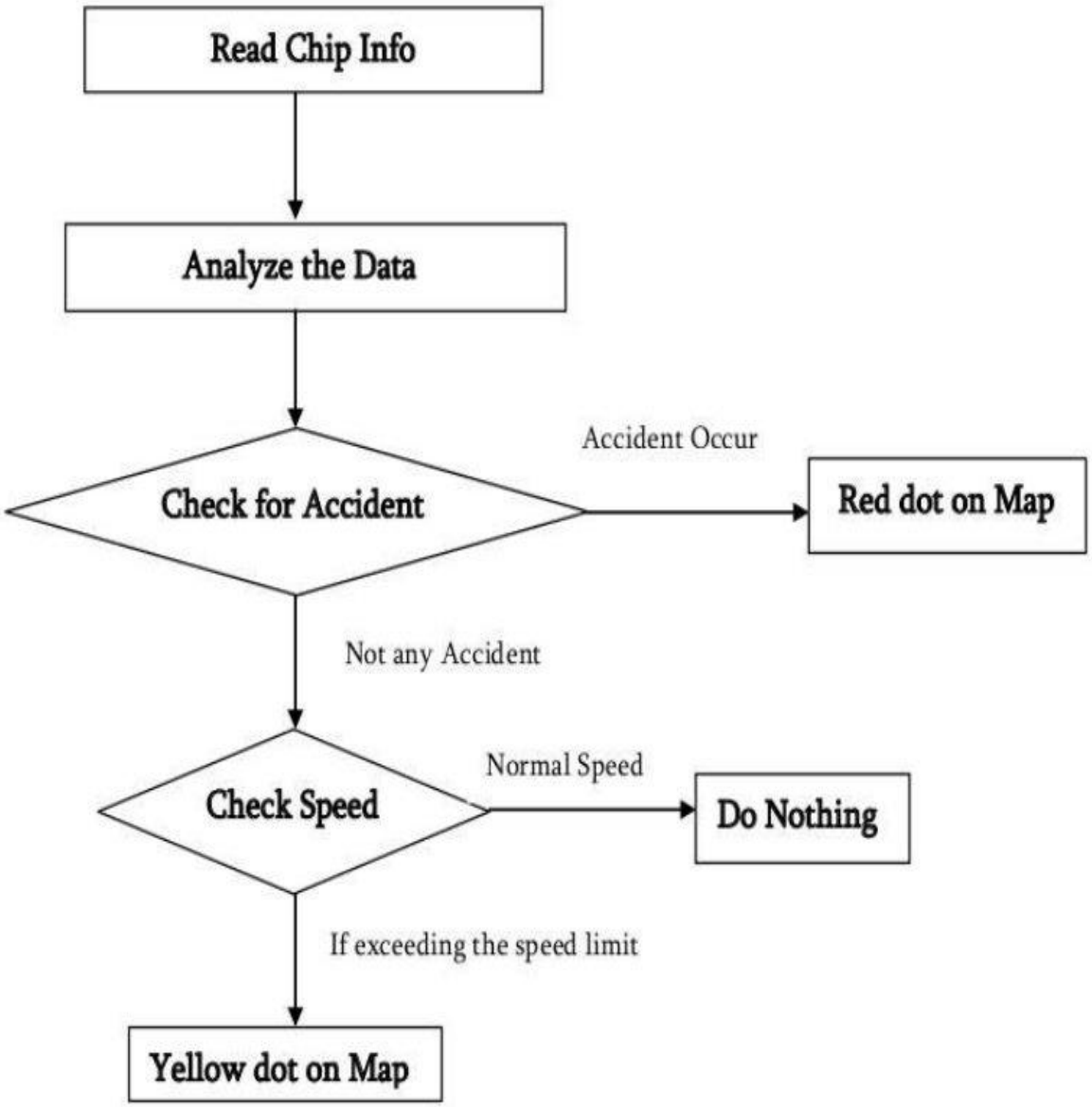
1.3 REQUIREMENTS

- Every vehicle should have a sensor to collect and send the data to the server.
- Requires a large amount of computational power to meet the real-time operations of a traffic monitoring system.
- Easy installation and calibration. This is important for on-site setup, reconfiguration and operation by non-expert personnel.
- Robust performance of the hardware involved.

USE CASE DIAGRAM



BLOCK DIAGRAM OF THE SYSTEM



1.4 DESIRED BEHAVIOR

It would allow traffic police to constantly monitor the system for the alerts whenever vehicles cross the maximum speed limits and during the accidents. Also, nearby hospitals will be alerted to send an ambulance to the accident locations.

1.5 IMPLEMENTATION DETAILS

The detailed implementation structure is given below:

1.5.1 CONSTRAINTS

- Vehicles should have a sensor to collect and send the data.

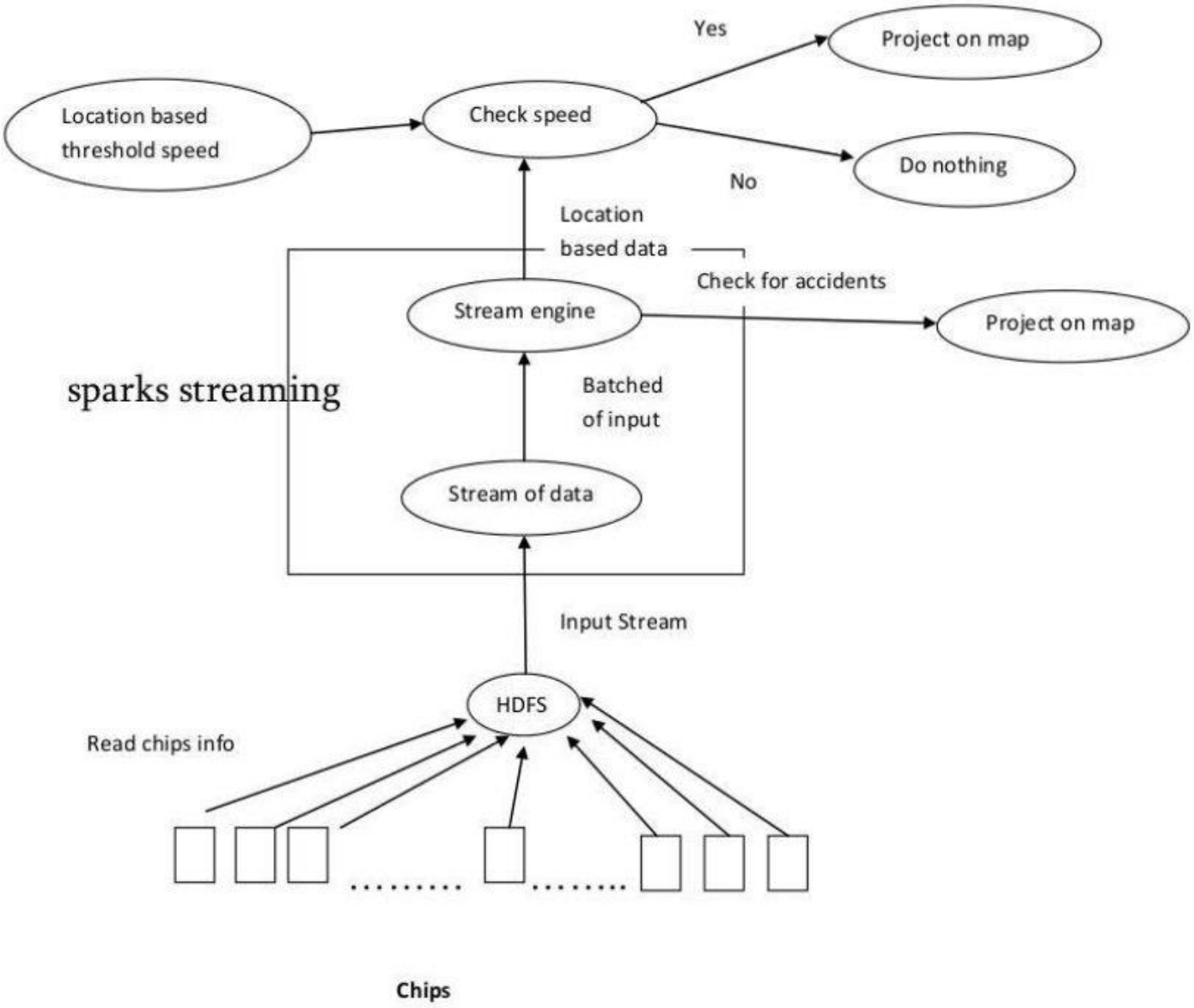
1.5.2 ASSUMPTIONS

- We assume that the data obtained from the sensors is available to us.

1.5.3 TECHNOLOGIES USED

- Apache Spark
- Open Street Maps/Google Maps
- Python
- HTML

1.6 DETAILED PROGRAM WORKFLOW



1.7 DELIVERABLES

The following are our final set of deliverables by 22th November, 2015

- Final code on Github
- Final Presentation slides on SlideShare
- A Demo Video presenting the workflow uploaded on YouTube.