SOFTWARE REQUIREMENT SPECIFICATION

The Software Requirement Specification is the description of the software system. It includes the functional and non-functional requirements to perform specific goals. It also provides the use cases for user interaction that software must provide. It is the end of requirement engineering process.

VANET - Vehicular ad Hoc Network enables exchange of information from vehicle-to-vehicle and vehicle-to-Road Side Unit (RSU). Information is conveyed to the destination through single or multiple hops. It uses a routing protocol to forward the packets with maximum lifetime and less delay.

It also describes project for implementing major application of VANET- Smartphone integrated driving safety application along with a traffic signal priority control method also to clear the path for emergency vehicle is modeled.

The project can be implemented with the following hardware and software requirements:

1.1 Functional Requirements:

The Functional Requirements defines the function of a system which describes set of inputs, the behavior, and its outputs to carry out the project smoothly. Below is the functional hardware requirements considered for carrying out simulation:

System	:	Personal Computer or Laptop
Processor	:	i3 Processor with 1.90GHz
RAM	:	4 GB
Secondary memory	:	500 GB

The other hardware requirements for the system development are as given below:

- Onboard unit
- Road Side Unit
- Bluetooth
- Wi-Fi
- Mobile Vehicle – 4 wheeler

The project can be carried out to produce the expected outcomes using the following software requirements:

Software requirements:

Operating System	:	Ubuntu 14.01
Simulator	:	NS-3
Packages	:	SUMO, MOVE, Vanet mobilesim, pygtk, pygocanvas, pygraphviz, SDN controller
Languages	:	c++ , python

1.2 **Functional Requirements:**

The Functional Requirement defines the function of a system which describes the set of inputs, the behavior and its output to carry out the project smoothly. Below is the functional requirements used in our project.

1. **Map Editor:** The Map Editor is software which is used to design levels, maps. This is also called as Level Map. This should contain the following Requirements.

    1.1 Node:

    A node is a point in a network at which the path meet also called as junction, which can even have dead end.

    A node must include a Node ID, X and Y co-ordinates in order to track the vehicle, Traffic Pattern, Automatic ID in order to add or remove the nodes.

    1.2 Edge:

    Here we consider the edge as the road which is in turn the outside limit of an object.

    The edge must contain the Edge ID, Destination and Source node, type of road editor, Speed of the vehicle, priority given to the vehicle.

    1.3 Edge Type:

    Edge Type is also called as Road Type as we considering edge as road.

    This must contain Edge Type Editor ID, Edge Editor Name, Capacity, and Parking.

    1.4 Configuration:

    In this section we need to configure the map.

    It includes Nodes file, Roads file, Lane number, Maximum speed, Roads priority.

1.5 Map Configuration:

We are using the Road Side Unit (RSU) which is attached in every junction, in order to collect the information of vehicle; we need to make use of visualization using 2D or 3D.

This includes Open Map Configuration files.

2. Simulation:
It is the imitation of the operation of real world process, the act of simulating first requires the model to be developed which represent the key behavior of abstract system. This should contain the following requirements.

2.1 Configuration :

Here the configuration is performed within the simulation section.

This section must contain input file, map file, route file.

This being the configuration stage under simulation section, it must contain begin and end for simulation interval.

2.2 Visualization:

As the name suggest the vision must be either 2D or 3D.

2.3 Run Simulation:

In this step we make use of confined simulators in order to run.

We need to specify the SUMO configuration file to get the output.

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1.3 Non Functional Requirements

The non functional requirements considered for simulating the VANET is as below:

1.3.1 Scalability

VANET should be supportive to handle the growing process with hybrid architecture with aggregation technique and p2p technologies to make information exchange more scalable.

1.3.2 Availability

Due to the interaction with vehicular network and physical world developed architecture will be robust enough to withstand unexpected system failure and attacks.

1.3.3 Usability

Growth of VANET used to provide comfort and safety of the passenger.

1.3.4 Security

VANET growing interest and reaches the effort in area of VANET. The project idea offers best service and safety.

1.3.5 Context-Awareness

Protocols should be adaptable to real time environment changes, vehicle density and movement, traffic flow and road topology change. And also the possible consequences the protocol may have on physical world.