Idea/Approach Details

Technology Bucket : Smart Communication
Category : Software
Company Name : Robert Bosch Eng. & Business Solutions Pvt. Ltd.
Problem Code : DG4
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Solution Proposed

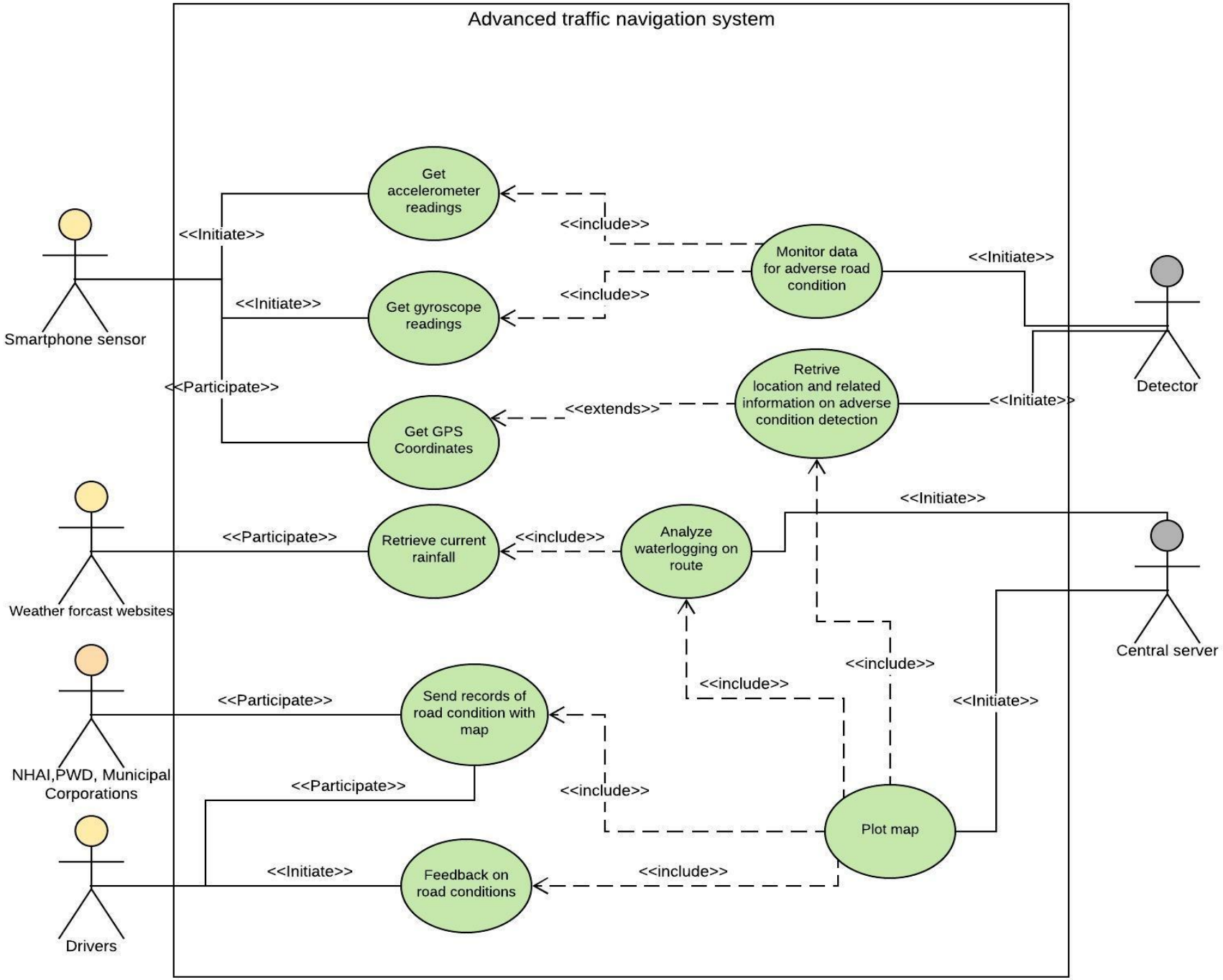
We propose an advanced navigation system which takes into account unsafe road conditions that will lead to more comfortable and safe travel. Following is the model :

- Mapping of low-lying areas and historic trends of amount of rainfall which leads to waterlogging in a particular area using which if that much of rainfall or higher happens in real time in the area then issuing warning about the waterlogging that is bound to happen on that route.
- Using crowd sourced data from smartphone sensors like accelerometers, gyroscope and GPS to map potholes and speed breakers.
- The above mentioned sensors obtain outputs in form of graphical variations which can be analysed using machine learning / AI to detect whether it is a pothole or speed breaker.
- Whenever such findings are obtained they can be marked up using GPS coordinates of mobile phones. Mapping can be made more accurate by keeping a track of number of times the same pothole is reported in a give location.
- The map so made can assist drivers to take safer routes beforehand and plan their routes accordingly thereby bringing down vehicle maintenance cost.
- Also, the details regarding road conditions will be made available to government agencies such as PWD, NHAI to carry out essential maintenance work and ensure safer roads.

Technology Stack

- Android Studio (for building an Android App)
- Google Maps API
- Cloud Server
- Python and some of its libraries;
    - Pandas, Numpy.
    - Scikit Learn for Machine Learning Models.
    - Tensorflow for analysing potholes and speed-breakers.
    - Matplotlib for plotting graphs to analyse the data generated.

Use Case Diagram



Dependencies / Show Stopper

- Mapping Of low lying area and historical trends of rainfall pattern and water logging.
- Centralised Server for storing of data.
- Smart Phone Sensors:
  - Accelerometer
  - Gyroscope Sensor