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Location Based Asset Management Application for Railway: AMS-R

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Asset Management

- Definition

According to British Standards Institution

- *Systematic and coordinated activities and practices through an organization optimally manage its assets and their associated performance, risk and expenditures over their lifecycle for the purpose of delivering the organization's business objectives (BSI 2008).*

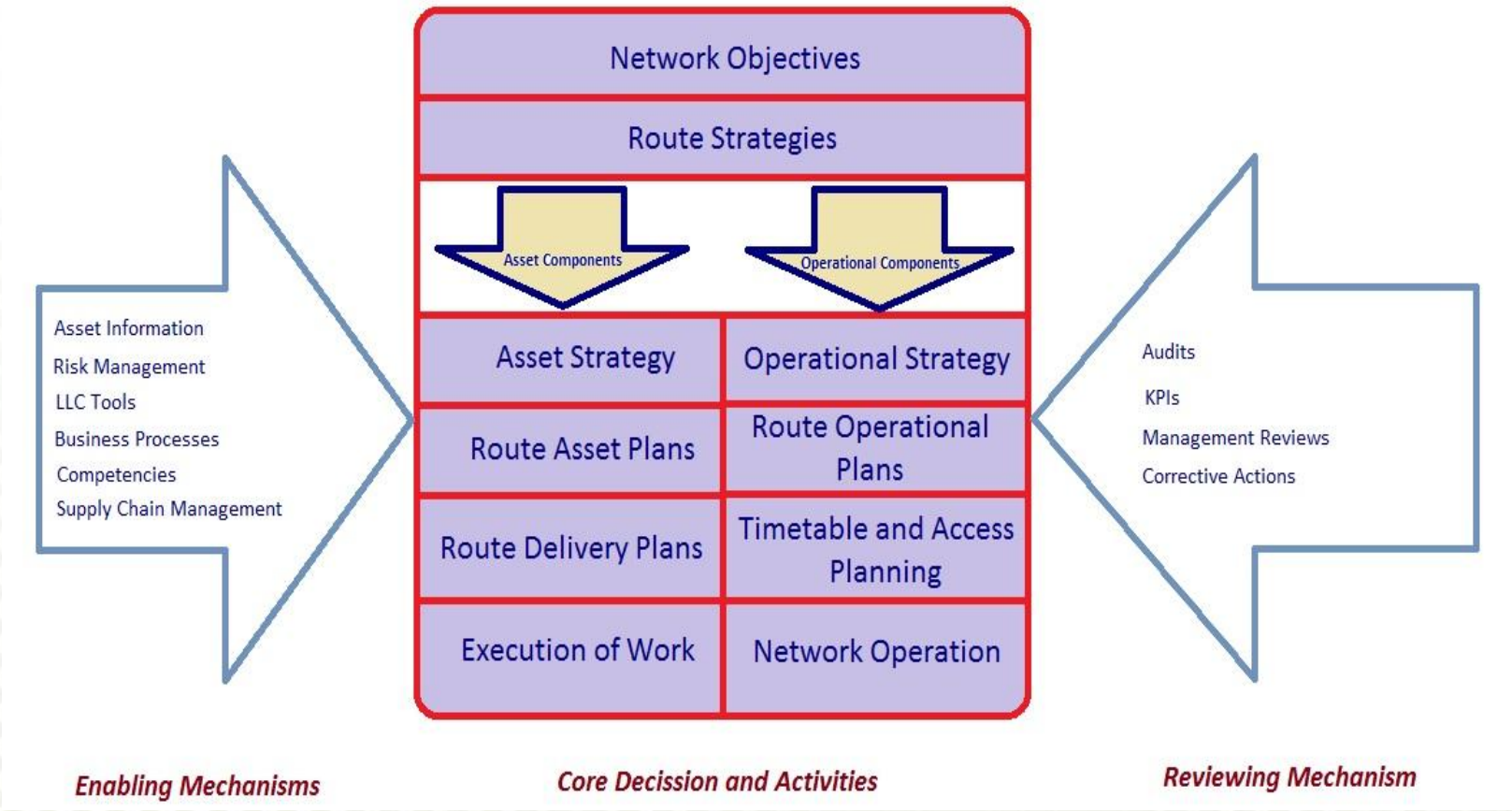


Fig 1: Asset Management System Framework (UIC, 2010)

Location Based Services (LBS)

LBS requires five basic components:

- Service provider's software application.
- A mobile network to transmit data and requests for service.
- A content provider to supply the end user with geo-specific information.
- A positioning component.
- End user's mobile device.

Location Based Asset Management for Railway

- Location based asset management system is an important instance, in which, the type, quality, and positions of massive amount of assets can be managed.
- Railway organizations have massive amount of assets which have to be managed, reinstall, renovate and maintain properly.
- To accomplish these tasks an asset management system is required which provide necessary information about desired asset.

Physical Assets of Railway Infrastructure

- Ground area.
- Track.
- Engineering structures: tunnels, bridges, culverts and other overpasses etc.
- Level crossing.
- Superstructures: rails, grooved rails, sleepers, ballast etc.
- Access way for passengers and goods.
- Safety, signaling and telecommunication installations.
- Lighting installations for traffic.
- Electric power plant.

Benefits of Location Based Asset Management System

- Location information about an asset can be updated to central server remotely.
- User can view all asset location information in the mobile device.
- Staking is very easy of an asset.
- Real time location synchronization of an asset.
- Cost effective.
- Very less training required.
- User can take pictures of assets.

Architecture

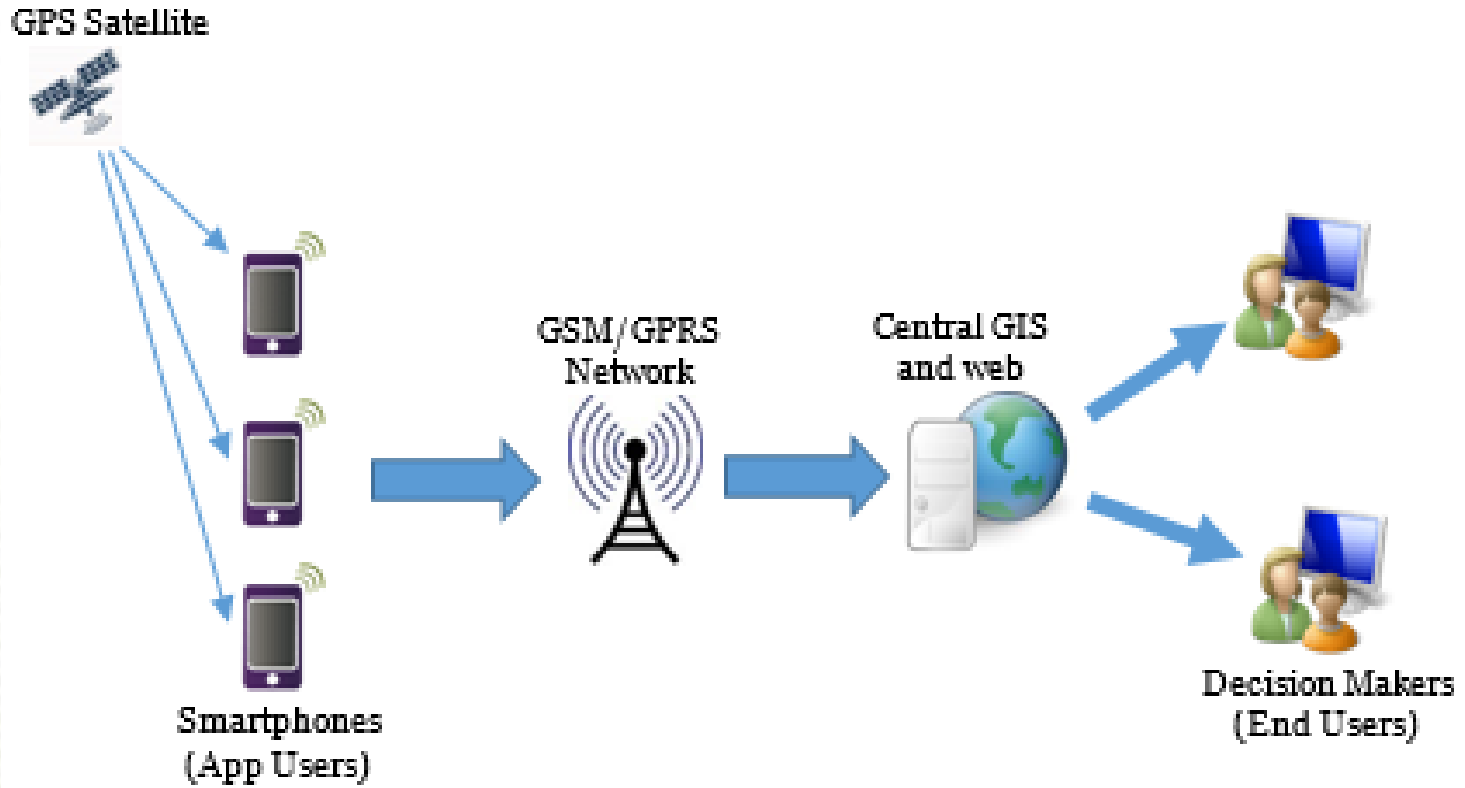


Fig 3: Architecture of AMS-R

Development of Remote Device Application

The design and development of this application is done in java language and eclipse editor.

This is an Android application which is mainly consist of:

- Java classes that are subclasses of main Android SDK classes (View, Activity, ContentProvider, Service, BroadcastReceiver, Intent) and Java classes that have no Android SDK ancestors.
- Android manifest.
- Resources like strings, images etc.
- Files.

Mode of the Application

The remote device application having two modes:

- Online Mode
  - When GPS is working.
- Offline Mode
  - When GPS is not working.

AMS-R Remote Application

Fig 4: Dashboard of AMS-R

Dashboard activity to select mode of data acquisition.

Cont…

Fig 5: Setting options

User can configure application using setting menu.

Cont…

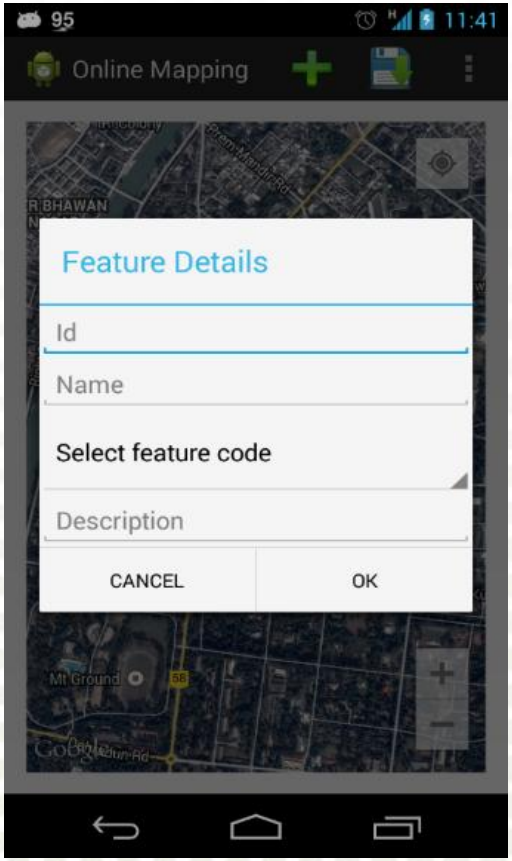


Fig 6: Asking feature details

While data acquisition of an asset application ask to give feature details.

Cont…

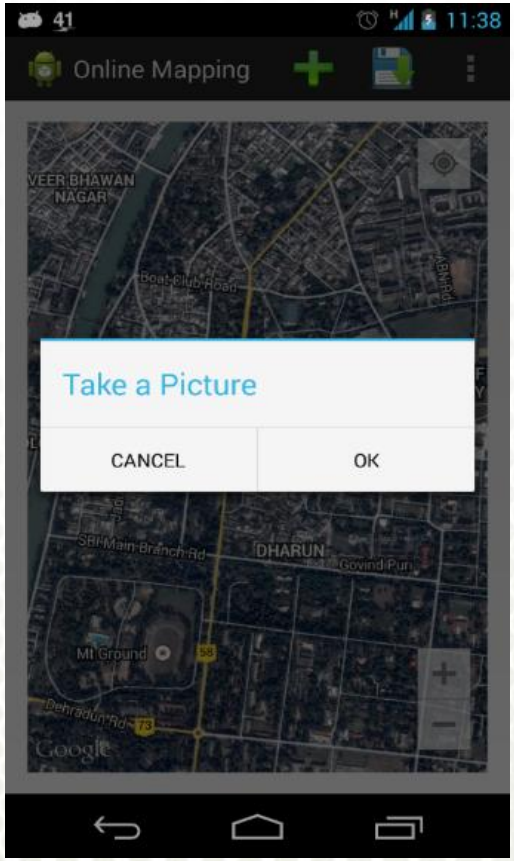


Fig 7: Asking to take picture

While data acquisition if user want to take a picture of asset user can click on ok button and take picture.

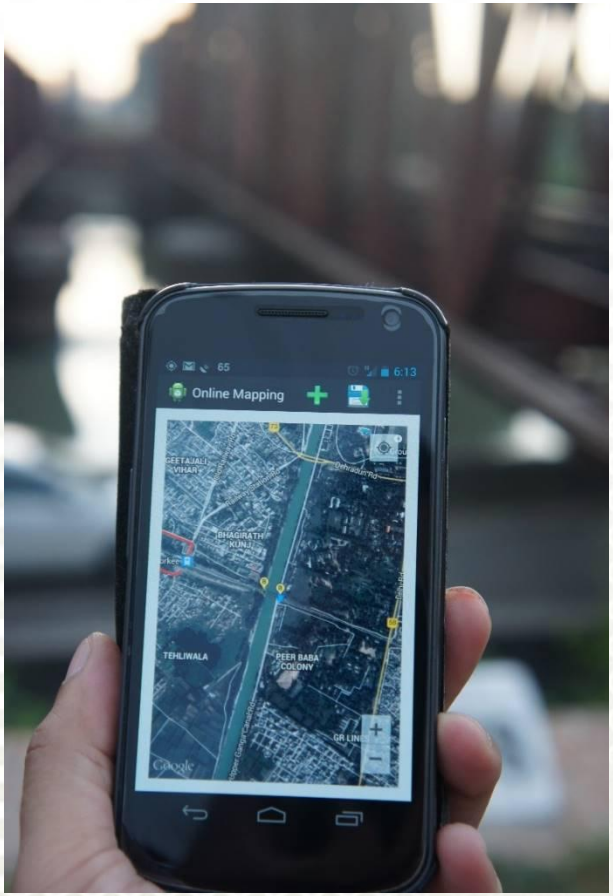
Field Study

- A field survey was conducted to collect the location information about roads, buildings, bridges, signals etc.
- The developed AMS-R application is used with Samsung Galaxy Nexus i9250 smartphone, which is running on Android 4.3.3 (Jelly Bean).
- Railway station at Roorkee and its surrounding was selected as a study area, which is located at 29°51'7.72"N and 77°52'30.01"E.

Study Area

Figure 8. Roorkee Railway Station

Data Collection



During the study Samsung Nexus i9250 Smartphone is used for data collection.

Fig 9: Data Collection using Google Nexus Phone

Results

While data collection left image shows data in Online mode and the right image shows data in Offline mode.

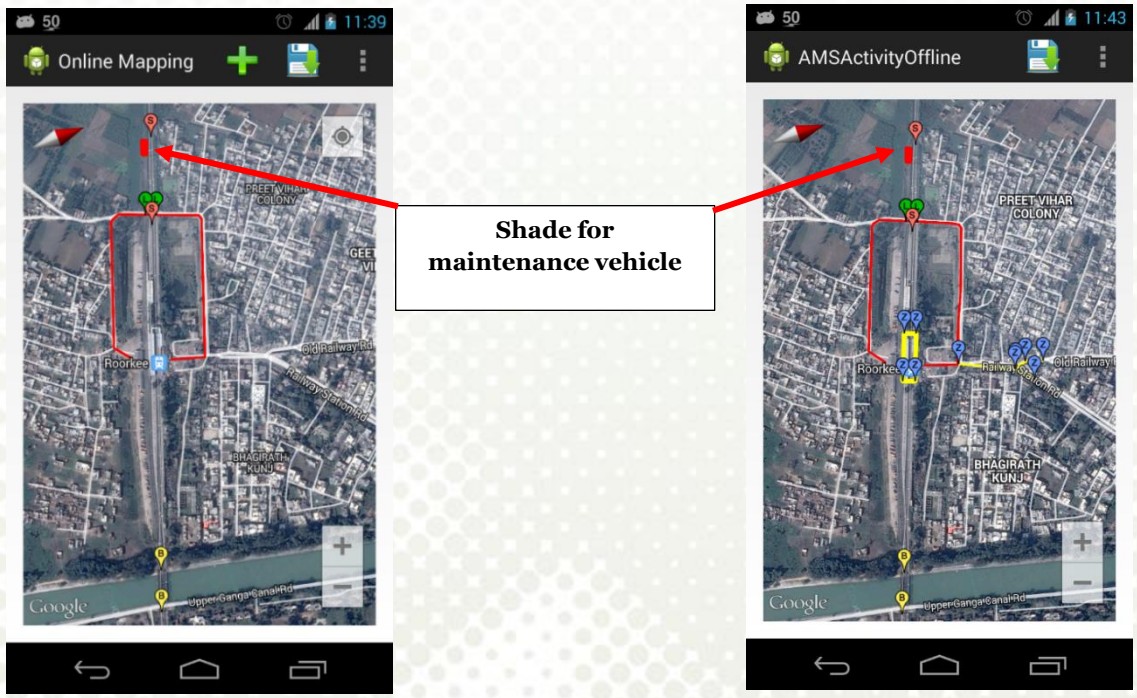


Fig 10: Collected Railway Assets in Online and Offline Mode.

Summary & Conclusions

- Railway have the massive amount of assets so the developed application is the suitable option for collecting location information of railway assets.
- Android smartphones and devices are cost effective due to open source license of this software. So using developed application with Android powered smartphones or devices could be the cost effective solution for asset management system in railway industry.
- This application have the capability bringing field and office activities into collaborative environment that can improve productivity and reduce cost.

Thank You for your kind Attention