Public Grievance Redressal & Accident Reporting System for Rural Roads under PMGSY

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Abstract:
Government of India (GoI) have launched a massive rural roads development scheme—Pradhan Mantri Gram Sadak Yojna (PMGSY) in year 2000 with the objective of providing all-weather road to unconnected habitations having population of more than 250. Madhya Pradesh Rural Road Development Authority (MPRRA) is the nodal agency in M.P. for implementation of PMGSY. So far approximately 74,000 Kms road length has been sanctioned and 65,000 Km of road length has been constructed which is currently under maintenance.

This Paper describes the GIS-enabled process for Public Grievance redressal / Accident reporting module developed for eMARG (electronic Maintenance of Rural Roads under PMGSY). For Grievance submission mechanism, the citizen has to upload Geo-tagged photograph to raise the grievance on road condition (Quality, Pot holes, sign board, shoulder cuts, etc.) or accident on road. Grievance description can be submitted in bilingually (English/Hindi) along with Mobile Number which is mandatory. GIS System extracts geographical coordinates from the Geo-coded image and routes the grievance/accident reporting automatically to the concerned road Officer (General Manager). SMS alert sent to the Officer & the applicant along with Compliant Id. Applicant can track the grievance/accident report by using the compliant Id. It rejects the application if the image is outside of state of M.P. Concerned Road Officer logins into and looks its location on GIS. If the road is PMGSY road, Officer is supposed to take appropriate actions to redress the grievance / escalate the accident reporting to the concerned Police Station. Officer can also view the same on Google. Officer has to take corrective action.

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and upload the Geo-tagged photo so that applicant can view the action taken. System ensures to safeguard the personal identity of the applicant in case of grievances. Accidents (black spots) will help to identify Accident Prone Zones.

It has been developed using Java Spring Framework, Java Script under ESRI ArcGIS Server on Windows environment. Its running on EAP JBOSS and can be accessed through internet using Google Chrome browser. Spatial data comprises of all Villages/Habitations, all roads (NH to Rural Roads), Forest, Railway etc.

*DDG & SIO*
Introduction

Rural connectivity is a key component of sustainable rural development in India, and is a key ingredient in ensuring poverty reduction. Government of India launched a massive rural roads development program — Pradhan Mantri Gram Sadak Yojna (PMGSY) in year 2000 with the objective of providing all-weather road to unconnected habitations having population of 500+ in normal blocks & 250+ in tribal blocks. Madhya Pradesh Rural Road Development Authority (MPRDA) is the nodal agency for implementation of PMGSY in Madhya Pradesh.

In MP approximately 69000 Km road length has been sanctioned under this program, of which about 57700 Km road length has been completed. At the end of program, after providing rural connectivity to all eligible habitation the total road length of block top road under PMGSY would be roughly 74,000 km. At current value the NAV of road length constructed in the state is estimated at Rs. 53000 Cr. Maintenance of all completed road is essential to preserve the huge asset created, currently roughly Rs 400-450 crore is being spent on this activity which is likely to go up to Rs 1200 crore by 2018-19 and reach up to Rs 2500 crore by the year 2015.

The USP of PMGSY roads is that after construction there is a five year performance guarantee, which lies with the contractor. During this period the contractor has to maintain the road and gets six monthly payments at predefined rates. The quality of maintenance works being done by the contractors and submission/payment of bills thereof has been sometimes under dispute and needed more transparency. With increase in road length network, it became a challenge for MPRDA to monitor the status of maintenance of roads. Various issues were faced by MPRDA from Contractors, citizens on multiple aspects. The stakeholders had no feedback mechanism on the on-site condition of the roads as well as the payment status. The information gap between the Project Implementation Unit (PIU), Contractors and the Nodal Agency needed to be bridged. The manual system gave rise to unnecessary litigations, between Contractors and PIUs. Thus, the system required improvement in the delivery of services and removal of unnecessary litigations.

eMARG is an e-Governance solution to monitor maintenance of roads and assist the MPRDA officials, Contractors, Banks. A facility has also been created to register citizens’ complaints. Department & other stakeholders are currently using eMARG for monitoring of around 58,000 Km of road as an effective tool for asset and financial management.

It’s a fusion of new & emerging technologies like Cryptography (Digital Signature & SSL), GIS & Remote Sensing, Mobile, Open Web technology, SMTP & SMS technology. It is a first of its kind product in India. eMARG is both Decision Support and Transaction Support System.

The platform for development / deployment is:

- ArcGIS Server
- Open Web Technology (J2EE & Adobe Flex)
- Open Source Apache JBOSS Web server
- Enterprise Geodatabase
- Secured Hash Algorithm 2 (SHA 2) SSL compliant
- Secured Hash Algorithm 2 (SHA 2) Signing tools
- Token services for consuming web services.
- High-end Rack mounted Servers support by SAN
Objective (s) of the Project

To provide the citizens good quality rural road infrastructure and to provide an ICT tool for asset management of 74000 km road length. It gives a robust tool for planning, execution, monitoring, e payment and financial management, using geo spatial and other advance technologies. eMARG is unique in its own way as it is a convergence of e governance using GIS, mobile messaging services and secure encryption. It has the following features:

1. Development of eMARG for maintenance of rural roads.
2. Geospatial functionality based on spatial data of roads (NH to Village roads), railway, rivers, forest etc.
3. Online monthly bill generation, submission & tracking by the Contractors
4. Road Inspection based on Geo-tagged photographs
5. Inspection linked Payments to the Contractors through National Bank using Digital Signature.
6. Facilitate packaging of roads for maintenance
7. Query/ search/ reports
8. Notification/ alerts through SMS/ SMTP services.
9. Public grievance redressal module

Public Grievance

eMARG application incorporates a module named Public Grievance Module in public domain for citizens/public. Any citizen can use this module to register his/her complaint (along-with geo-tagged photograph) w.r.t. poor condition of any road in M.P. Such complaints get registered with General Manager, MPRRDA of concerned district (on the basis of Geo-tagged photograph uploaded by the citizen).

Public Grievance Submission & tracking

Module facilitates submission of road related grievances directly by citizens by accessing https://gismp.nic.in/eMarg. Citizen has to submit details (Name, address, Mobile No., Email & description of grievance). It supports bilingual and citizen can submit in Hindi also. Mobile number is mandatory. Citizen has to submit OTP received on mobile for verification purpose refer Fig 1.

Once mobile No. verification is done, citizen has to upload Geo-tagged image (.jpeg) of the location. After successful upload of the image, a Reference-id is generated & assigned for future reference enabling tracking of the grievance. An SMS is sent by the system for acknowledgement.

If citizen uploads and image of location which do not pertain to M.P., system rejects and error message is displayed on the screen.

Citizen can track complaint with the help of “Track Grievance” link available on screen of Public Grievance Form. Citizen need to enter the Reference ID and mobile number as shown in Fig.2.

If the compliant is redressed, citizen will receive an SMS alert and can view as in Fig.3.
Public Grievance Redressal by Road Officer

Once Road Officer receives SMS about grievance, he visits the eMARG and login into the system. Option is available in the GIS module to see the location of the grievance. Once Reference-ID is submitted, location of the problem can be seen in the GIS map as in Fig. 4 along with the photo as in Fig. 5.

Based on the location of grievance as seen on the GIS Map, the Road Officer is able to identify the road. Further Road Officer examines and directs sub-ordinate staff & concerned Contractor for suitable action. Once the remedial action is taken, Geo-tagged photo of the same location is uploaded into the system with remarks. Subsequently, SMS is sent by the system to the citizen about redressal of the complaint refer Fig. 6 and Fig. 7.

Black Spots mapping for Accidents on roads

As per the data cited in the report published by Ministry of Road Transport & Highways, Government of India, the country recorded at least 4,80,652 accidents in 2016, leading to 1,50,785 deaths. The number suggests that at least 413 people died everyday in 1,317 road accidents. Further breaking down the statistics, the data reveals that at least 17 deaths occurred in road accidents in 55 accidents every hour in the given time period. The report further revealed that Highways are not the “biggest killers”. As per the report, 34.5 per cent accident deaths occurred on National Highways, while 27.9 per cent accident deaths took place on State Highways, while maximum percentage of deaths occurred on other roads (37.6).

A Report on Road Accidents in India 2016 has revealed that more people died on roads accidents in India last year, as compared to the number of deaths in 2015. The data has further revealed that the states of Uttar Pradesh and Tamil Nadu have accounted for maximum number of deaths this year.

Accident statistics is the basis for accessing Road Safety scenarios and for implementing required interventions to reduce accidents. Accident data system is the first step towards achieving scientific road safety management. Effective accident Black Spots improvement can not be implemented without a reliable & powerful GIS-based Road Accident Data Management System (RADMS).

GIS-based framework is already developed for reporting and management of road accidents as described above in Public Grievance Redressal System. Accident image as in Fig. 8 can be uploaded by citizen.

CONCLUSION

eMARG is a Enterprise Geomatics-based decision support system for maintenance of rural roads developed by National Informatics Centre, M.P. State Centre, India for MPPRDA using ArcGIS server under Java ADF in a efficient & cost-effective manner. Public Grievance redressal & Accident Black Spots mapping module is well tested and it provides a GIS-based framework for grievance redressal & Black Spot mapping efficient & transparent manner.

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Figure 1: Grievance Entry Form in Hindi

Figure 2: Reference number page

Figure 3: Grievance Resolved
Figure 4: Grievance Image location along the road

Figure 5: Grievance photo seen on GIS

Figure 6: Redresser Detail
Figure 7: upload redressed image

Figure 8: Road Accident