

"Pratyaksh" An Innovative Approach for Streamlining field data Collection through Crowdsourcing Mobile App

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ABSTRACT

Acquiring and sharing information using a smartphone has taken the era of communication and networking into a whole new level. Organisations and departments are using crowdsourcing tools to gather information about their respective investments into various projects for sustainable development. The ultimate goal set for various projects in the watershed management directorate is to develop an effective Monitoring Evaluation Learning and Development (MEL&D) system. Collection of field data for various projects has always been a tedious task which consumes a considerable amount of time and money. The concept of participatory data collection has provided an effective data collection approach. With the advent of mobile technology and mobile in "each hand" scenario, the data collection process has got a new dimension. An android based mobile solution named "Pratyaksh" is developed for field data collection to validate the structures constructed as a part of treatment of a Micro WaterShed (MWS), under different projects of the Watershed Management Directorate (WMD). The mobile solution has encouraged the project staff to overcome the hurdles encountered in data collection, data sharing and data storage. The department corroborated field data with geo tagged photographs collected from project area for monitoring & evaluation purpose.

1. Introduction

Over the past decade telecom networks, internet services and the operating systems of the phones have altered the usage of a simple phone to an indispensable gadget which has become an integral part of various survey and monitoring project. These Smart devices and their associated mobile software apps are becoming increasingly ubiquitous in our daily life. Android phones have access to more than 1 million apps and enables its user to indulge in their choice of hobbies [1]. The growth in mobile apps has shown no signs of slowing, with as many as 15,000 new apps being released each week [2]. The websites apart from their research teams also use the public network, where people willingly provide information using their phones or tablets, commonly known as crowdsourcing [3].

Crowdsourcing is a nascent tool for streamlining the process of gathering, processing and analyzing research data in many fields. Numerous crowdsourcing platforms are now available to support research as well as commercial goals. Collection of information like natural disasters in remote areas, intellectual ideas or new concepts, periodic physical progress of projects are some of the aspects of crowdsourcing. However, crowdsourcing is not yet widely adopted by researchers for generating, processing or analyzing research data [4]. Crowdsourcing information could be categorized mainly into two, first as a public participation where a mass of people shares data i.e. Public to Government secondly a group of limited people who share it only for a special purpose i.e. Government to Government (G2G). Generally, crowdsourcing information was designed for desktop platform but recently there has been some development of tools to collect the information using a mobile phone or a tablet. These tools can

be developed very simply with a little knowledge of computer programming using open source platforms like ODK.

Open Data Kit (ODK) is a free and open source suite of tools that allows data collection using mobile devices and data submission to an online server, even without an Internet at the time of data collection [5]. ODK suite includes Collect, Aggregate Form, Build, Briefcase and Central tools. The user could create a data collection form, stored data over a server and analysis to produce information using these tools. This information is supported by geo-tagged photographs and GPS locations. This helps in identification of projects, infrastructure expansion and monitoring specially in remote areas.

2. Origin of Pratyaksh App:

Number of organizations working within the hill state of Uttarakhand for maximizing its natural resource utilization and providing a sustainable growth to the villages, especially in the secluded areas. Watershed Management Directorate (WMD) is a department of the state, targeted to micro watershed development programs through various national and international funded projects. Data collection for these projects have always been a costly matter, as it involved a lot of stationary and physical delivery of the data from remote areas. also, data maintenance, its aggregation and evaluation consumed a lot of time, money and manpower. Considering this WMD's officials decided to initiate "App" based data capturing through mobile devices. The App is based on Open Data Kit (ODK) technology for data collection from field survey commonly called as "Pratyaksh". Data entry form of the App was developed after number of discussions and feedback from field staff and trials. Hands-on training on different level were also given to ensure the quality of captured data.

3. Dataflow in App

The ongoing projects in WMD are about natural resource utilization, sensitize the socio- economic community groups and treatment of micro watersheds using different types of construction of structures. The Pratyaksh

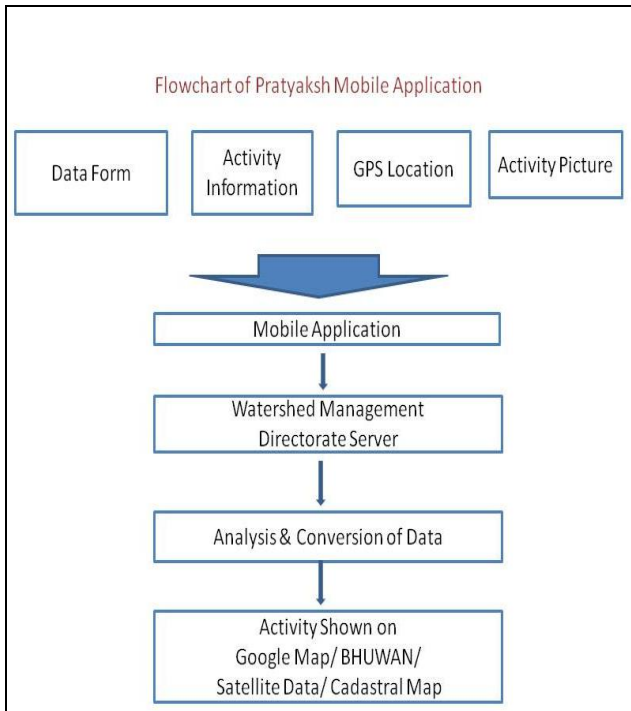


Fig.3.1

form App is used for online verification of these different activities within the micro watershed using a designed form and geo tagged photographs and GPS locations.. The flow diagram (fig. 3.1) shows how the form works for the surveys of WMD.

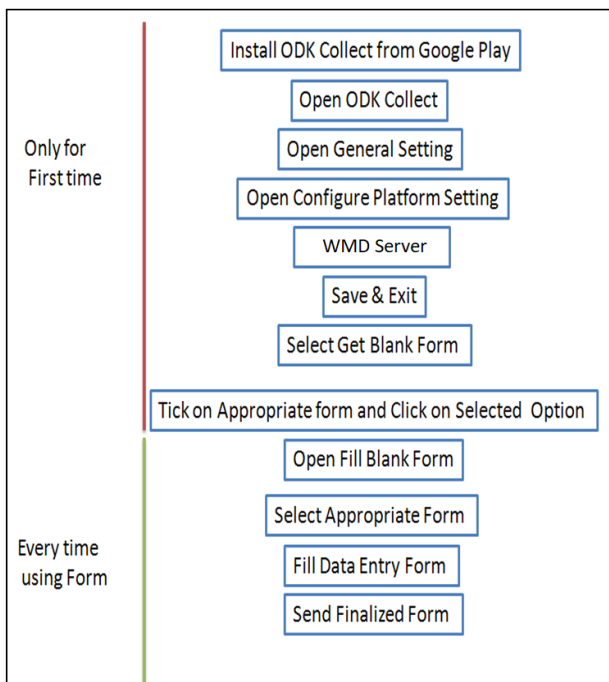


Fig.3.2

To use the "Pratyaksh" form the ODK Collect mobile App needs to be downloaded from thegoogle play store or concern website onto the android device. By using basic steps shown

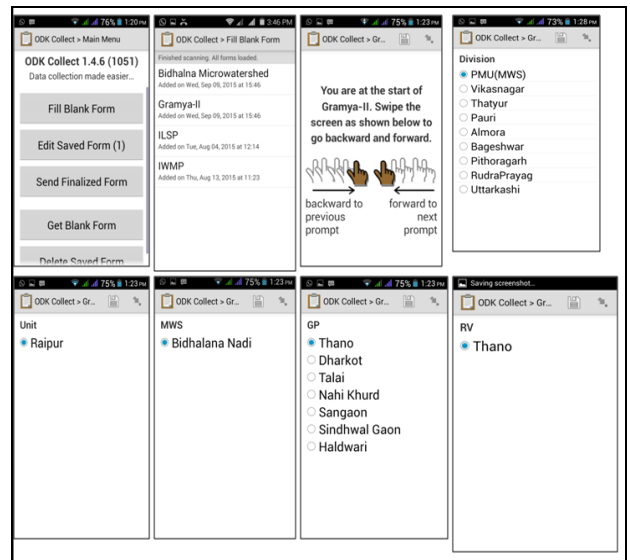


Fig.3.3

In figure 3.2 device is ready to capture the data from field. Data form is comprising of series of radio buttons, text box, location, photograph field as shown in figure 3.3 and 3.4. the



Fig.3.4

Captured data stored in device could be uploaded simultaneously or later depends on the availability of network. One major setback of this App based data collection was its data storage and retrieval. Captured data, photographs with GPS locations all were programmed to be stored in the Google cloud server.

However, Google cloud server provided very limited space for free access. For this a new server was designed and developed in WMD and the form data is now routed to the WMD server, from the Google cloud. Initially the process of

routing data was done manually but later it was done by simple programming script.

4. Advantages of Pratyaksh :

The development and application of Pratyaksh App has brought about a much-needed

ID	Model	MWS	GP	RV	Activity	Date	Latitude	Longitude	Altitude	Accuracy	pic	Observer
uid:423958f-8b4d-4485-b2d3-8644e67a3006	Bidhaha	GP/Tharo	RV/Kainrawa	Maychak	Seed and seeding	Mon Jan 12 2015	00:00:00.00	232038158	78.21469899	659.5969759	5.0	Dpt
uid:4507793d-8c07-473f-bc3e-3038a2cb9888	Bidhaha	GP/Tharo	RV/Charkot		High value agri crop wheat	Mon Jan 12 2015	00:00:00.00	27105754	78.20589402	1122.6996117	5.0	Cp stama
uid:4578205af-2954-4841-bc3e-0cab5abd30c6	Bidhaha	GP/Tharo	RV/Charkot		Driedor	Fri Jan 09 2015	00:00:00.00	31901943	77.99881029	594.40002441	5.0	Dpt
uid:4c07958e-8757-40aa-8703-b203639586c4	Bidhaha	GP/Tharo	RV/Kainrawa	Maychak	High value agri crops demonstration	Mon Jan 12 2015	00:00:00.00	232038962	78.21652496	687.79899779	5.0	Dpt
uid:459966a0d-8b26-4211-9c7e-45eac0899f9f	Bidhaha	GP/Tharo	RV/Tharo		High value agri crops wheat	Mon Jan 12 2015	00:00:00.00	228020819	78.2087303	785.40002441	5.0	Cp stama
uid:40c79e1d-45e4-47f5-b061-9fac08950c2	Bidhaha	GP/Tharo	RV/Tharo		High value agri crops wheat	Mon Jan 12 2015	00:00:00.00	23627898	78.2087094	797.60002441	5.0	Cp stama
uid:4c09a47c-48e4-491e-9126-22ca9f11a09f	Bidhaha	GP/Tharo	RV/Tharo		Seed and seeding	Mon Jan 12 2015	00:00:00.00	236299209	78.20876027	781.0	5.0	Cp stama

Fig.4.1

transparency to the ongoing projects. Its cost effectiveness and time saving capabilities have encourage the funding agencies to take more

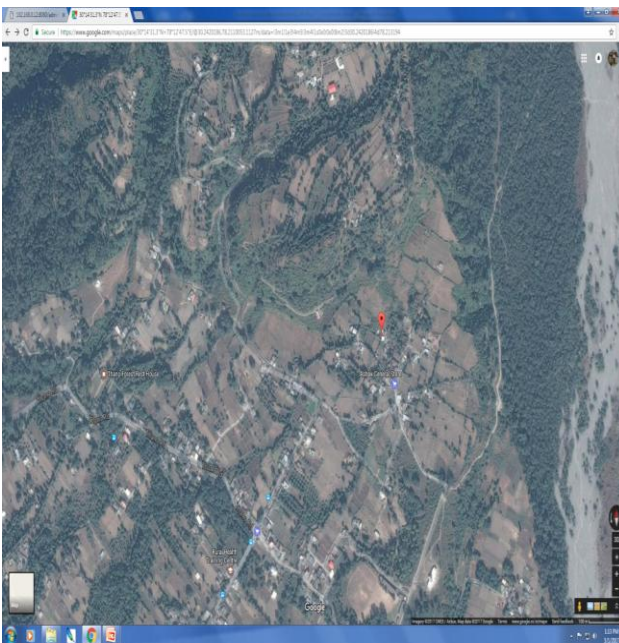


Fig.4.2

interest in the project’s activities. Monitoring agencies could verify the physical structures with geo tagged photographs. As discussed earlier this “Pratyaksh” Form App is basically lies on Government to Government (G2G) category so only authorized officers of the projects could upload and verify data (fig 4. 1).

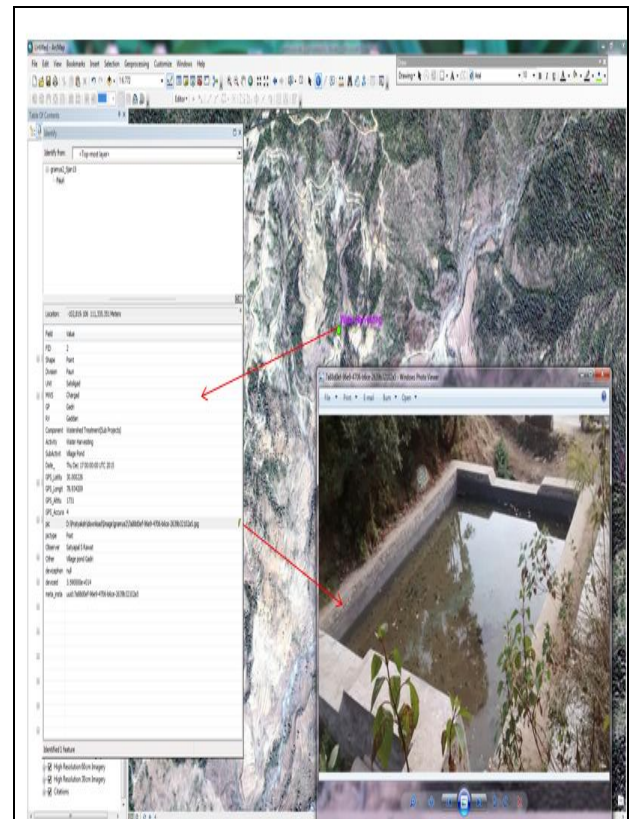


Fig.4.3

This data is also brought into the GIS domain in WMD where it is being linked with the other existing datasets (fig 4.2 & 4.3). The Pratyaksh form App provided timely and systematic information of the project.

5. Results and discussion

Traditionally, paper-based methodology for data acquisition from field surveys followed by the field data entry into the computer, had its own set of errors while App based data collection reduced the typographical error. Captured data is readily available in digital format with uniformity in the column headings. This systematic approach has reduced the data correction work, and enables the user to start with the statistical analysis without much delay.

The relevance of Pratyaksh form and its convenience have encouraged other departments of the state to learn about the ODK based development tools and its functionalities. Many departments have approached WMD for viewing and learning about the app. The WMD developer team had sensitize has enabled them to conceptualize similar applications for systematic monitoring and evaluation of their projects.

6. Conclusion

Crowdsource App like ODK Kit are successfully using in a range of projects. The most obvious benefit of crowdsourcing is the ability to collect or analyse data on a much greater scale [6]. Flow of authenticated real time information with geo tagged photographs through Apps could reduce the response time of decision makers. These initiatives are gaining momentum due to its cost effectiveness and time saving benefits [7]. States like Uttarakhand where connectivity is poor and natural disaster are unavoidable part of life, monitoring of development projects were always challenging. with the help of “Pratyaksh” form like

crowdsourcing App we could generate an alternative of reporting for development projects.

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