Utilizing Real-Time Field Inspection Reporting in the Land Registration Process: A Case Study of the Lands Commission's Land Registration Division (LRD)

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SUMMARY

Land administration and management have long been recognized as crucial components of sustainable development [1]. In an era where technology is rapidly advancing, the use of real-time spatial data capture has revolutionized numerous industries, including land administration [5]. This paper explores the significance of utilizing real-time spatial data capture in the context of land administration. In Ghana, Lands Commission plays a pivotal role in the land registration process, which is essential for securing land tenure and facilitating land-related transactions.

This paper discusses the importance of real-time field inspection reporting within the context of land registration, focusing on the Land Registration Division (LRD) of the Lands Commission. Traditional land inspection methods often suffer from delays and inaccuracies due to reliance on manual processes [10]. By implementing real-time reporting systems, data collection becomes instantaneous, allowing for immediate processing and sharing of information among stakeholders.

The introduction of a mobile app for field inspection data capture represents a pivotal advancement in this process. By utilizing mobile devices, inspectors can collect data instantaneously, allowing for immediate processing and sharing of information among stakeholders. This shift not only enhances the accuracy of land records but also fosters greater stakeholder engagement.

The integration of Geographic Information Systems (GIS) further improves the precision of spatial data, while automated workflows significantly reduce processing times. Case studies illustrate that these advancements lead to increased efficiency in registration processes and higher satisfaction among stakeholders. The key objective of this study is to enhance the

efficiency and accuracy of land registration through real-time field inspection reporting facilitated by mobile technology

The mobile application, smart report, has been designed in an easy and user-friendly way that will give field officers some convenience and control over the application. Real-time reporting answers the following questions: What is trending on the field, why, and how? It allows the appropriate approval officers to promptly respond to and actively manage on-field data minute by minute.

The challenges Land Registration Division of the Lands Commission face in getting field inspection report on time are discussed and most safety guidelines on the field is given. Subsequently, the importance of field inspection reporting on real time basis is also discussed briefly and framework that has been used to design the application for field inspection reporting.

1. INTRODUCTION

Land administration and management have long been recognized as crucial components of sustainable development. In Ghana, the Lands Commission's Land Registration Division (LRD) plays a pivotal role in the land registration process, which is essential for securing land tenure and facilitating land-related transactions [1].

In an era where technology is rapidly advancing, the use of real-time spatial data capture has revolutionized numerous industries, including land administration [8]. This paper explores the significance of utilizing real-time spatial data capture in the context of land administration. By harnessing the power of real-time data, stakeholders in land management can make informed decisions, increase efficiency, and enhance transparency in land administration processes [7].

Traditionally, land registration involved a lengthy and cumbersome process, often plagued by delays and inaccuracies. The reliance on manual documentation and physical inspections made it challenging to maintain an up-to-date and accurate record of land ownership.

However, with the integration of real-time field inspection reports, the LRD has been able to streamline and expedite the land registration process. These reports provide immediate access to crucial information, eliminating the need for time-consuming paperwork and reducing the likelihood of errors.

Registration provides formal recognition of ownership, ensuring that the rights of landowners are legally protected. This reduces the risk of disputes over land ownership and helps establish clear property boundaries.

1.1 Problem statement

Inspection of properties, parcels, and other features that may matter in land registration processes plays a pivotal role in affirming major decisions. Over the years, staff or officers who undertake these inspections have delayed in bringing out inspection reports for onward submission to next milestone of application processing. This trend affects turnaround time for processing application.

The implementation of real-time spatial data capture in land management presents both significant challenges and promising opportunities [12]. Understanding these aspects is essential for optimizing the use of geospatial data collection tools to enhance decision-making, resource management, and overall land governance.

1.2 Key objective

The key objective of this paper is to enhance the efficiency and accuracy of the land registration process through the implementation of real-time field inspection reporting by the Lands Commission.

1.3 Specific objectives

Specific objectives to be achieved are to;

1. Ensuring that information gathered during field inspections is both accurate and current, thereby minimizing discrepancies in land records and accuracy in data collection.
2. Reducing the time required for land registration by enabling immediate reporting and processing of inspection results through mobile devices.
3. Promoting better collaboration among landowners, inspectors, and the Lands Commission through real-time updates and feedback mechanisms.

1.4 Significance of the study

The significance of leveraging real-time field inspection reporting in the land registration process, particularly in the context of the Lands Commission, can be outlined as follows:

By implementing real-time reporting, the land registration process can be significantly expedited. This leads to quicker turnaround times for landowners and reduces the backlog of applications, ultimately improving service delivery [5].

Real-time data collection minimizes the chances of errors and discrepancies in land records. This accuracy is crucial for maintaining the integrity of land ownership and preventing disputes, thereby fostering trust in the land registration system [11].

Streamlining the inspection and registration process can lead to reduced operational costs for the Lands Commission. Fewer resources may be needed for follow-up inspections and corrections, allowing for better allocation of funds and personnel.

This paper can serve as a case for the successful integration of technology in public sector processes, encouraging further innovation and modernization within the Lands Commission and other governmental agencies.

1.5. Land Registration Process and the Role of Field Inspections

The land registration process in Ghana is a structured procedure governed by legal requirements to ensure secure ownership and minimize disputes. The process involves several key steps, including field inspections, which play a crucial role in verifying the authenticity and suitability of the land.

1.6 Field Inspection:

As part of the efforts to confirm the physical condition of parcels submitted for title registration, the Lands Commission conducts field or suite inspections. These inspections are essential to verify that the actual condition of the land aligns with the documentation provided. This process ensures that the location and description of the land correspond accurately with what has been submitted, assuring that there are no discrepancies between the documentation and the physical property.

1.7 Role of Field Inspections

Field inspections are applied for a variety of purposes regarding land registration.

(i). Verification of land boundaries: The inspection helps confirm whether the physical boundaries of the land are as described in the submitted documents.

(ii) Land Condition Assessment: Assessors check whether the land can serve its intended purpose, be it residential or commercial, among other uses, and also check for any

environmental concerns.

(iii) Prevention of Fraud: By conducting on-site assessments, officials can identify potential fraudulent claims or discrepancies in ownership.

These inspections are vital in ascertaining that all transactions are valid and buyers receive clear titles free of disputes.

1.8 Real-Time Field Inspection Reporting

This activity refers to the process of collecting, analyzing, and disseminating data from field inspections as they occur, rather than relying on traditional methods that involve delayed reporting and data entry [5]. In the context of land registration, this approach utilizes technology to enhance the efficiency and accuracy of inspections related to land parcels [8]. This is characterized by;

(a) Immediate data collection

(b) Instant data transmission

(c) The use of technology

(d) Automated reporting

(e) Enhanced communication

(f) Data analysis and decision making

(g) Feedback mechanisms

2. REAL-TIME FIELD INSPECTION REPORTING IN LAND REGISTRATION

This section discusses the process of collecting, analyzing, and disseminating data from field inspections as they occur, leveraging technology to improve the efficiency and accuracy of inspections related to land parcels. The key characteristics of this approach include:

- Immediate Data Collection: Data is gathered on-site without delay.

Instant Data Transmission: Information is transmitted in real-time to relevant stakeholders.

- Technology Application: Advanced tools and software facilitate the inspection process.
- Automated Reporting: Reports are auto-generated reducing manual effort and work.
- Better Communication: Clear communication channels are made for timely information to each concerned party.

- Data Analysis and Decision Making: Real-time data analysis is performed for better decision-making.
- Feedback Mechanisms: There is a mechanism to provide feedback about the inspections for further improvement.

This modern approach to field inspection reporting is crucial for ensuring that land registration processes are both efficient and reliable.

2.1 Steps to Obtain Inspection Report

An Inspection Report for Land Title Registration Determination is a formal document prepared by technical officers of the Land Registration Division of the Lands Commission that assesses a property to determine its eligibility for title registration. This report is important to ensure that legal ownership is attached and the property meets all the necessary requirements for title registration. The key steps for obtaining the inspection report as indicated in Figure 1, are not limited to the following:

a) Application Submission: Submit a formal application to the Lands Commission or relevant authority requesting an inspection for title registration.
b) Provision of Required Documentation: Include necessary documents such as proof of ownership, identification, and any existing title documents.
c) Schedule an Inspection: Coordinate with the Lands Commission to set a date for the property/parcel inspection with a notification.
d) Conduct the Inspection: Allow the inspector to assess the property, verify ownership, and ensure compliance with regulations.
e) Receive the Report: After the inspection, the report detailing the findings and recommendations regarding title registration is sent to the approval office for consideration.

2.2 Causes of delays in field inspection reports

Delaying report submissions can be for reasons other than the length of time it takes to compile and submit the report. Here are some essential factors that may cause delays:

i. Laziness on the part of field officers. There is a tendency to neglect the writing of the report when it comes back from the field.
ii. Lengthy approval processes for report drafts can delay final submission.

iii. Inefficient bureaucratic procedures may slow down necessary sign-offs or documentation processing.
iv. Issues with software or hardware used for data analysis and report writing can cause significant delays.
v. Data loss due to technical failures may require re-collection of information.
vi. Burnout among team members due to excessive workload can lead to decreased productivity and delays.

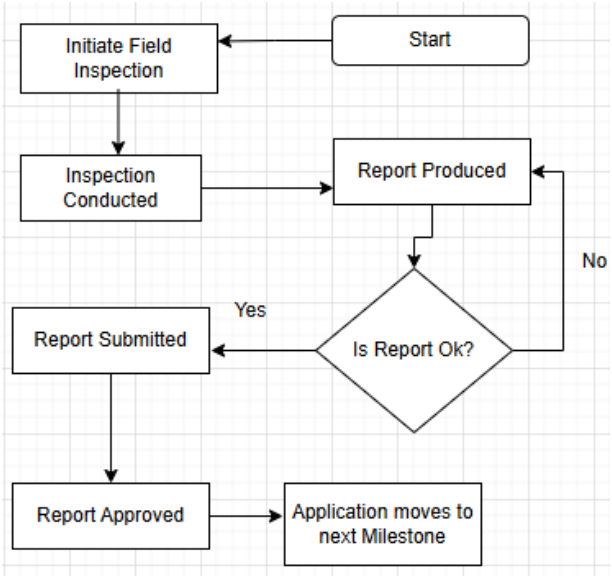

Figure 1: Field inspection reporting manual workflows

3 METHODOLOGY

3.1 Design and development of the app

In technology design and development, systems are not created overnight but go through a detailed development process that begins with a clear idea of their purpose and scope [10]. First, one has to identify the objectives of the system. The foundation set by this understanding prepares the ground for the entire project, defining the frontier between what would be in the system and what would not be. It is followed by the design phase which

requires a clear set of requirements. The architecture of the system is crafted carefully, choosing an appropriate framework based on the needs of the project. Data design is another critical activity that defines the data model, including how data will flow and be stored [5]. Simultaneously, user interface design shapes via wireframes and prototypes; stakeholders can actually see what the end product would look like [13]. Figure 2 demonstrates the design and the development considerations for the application.

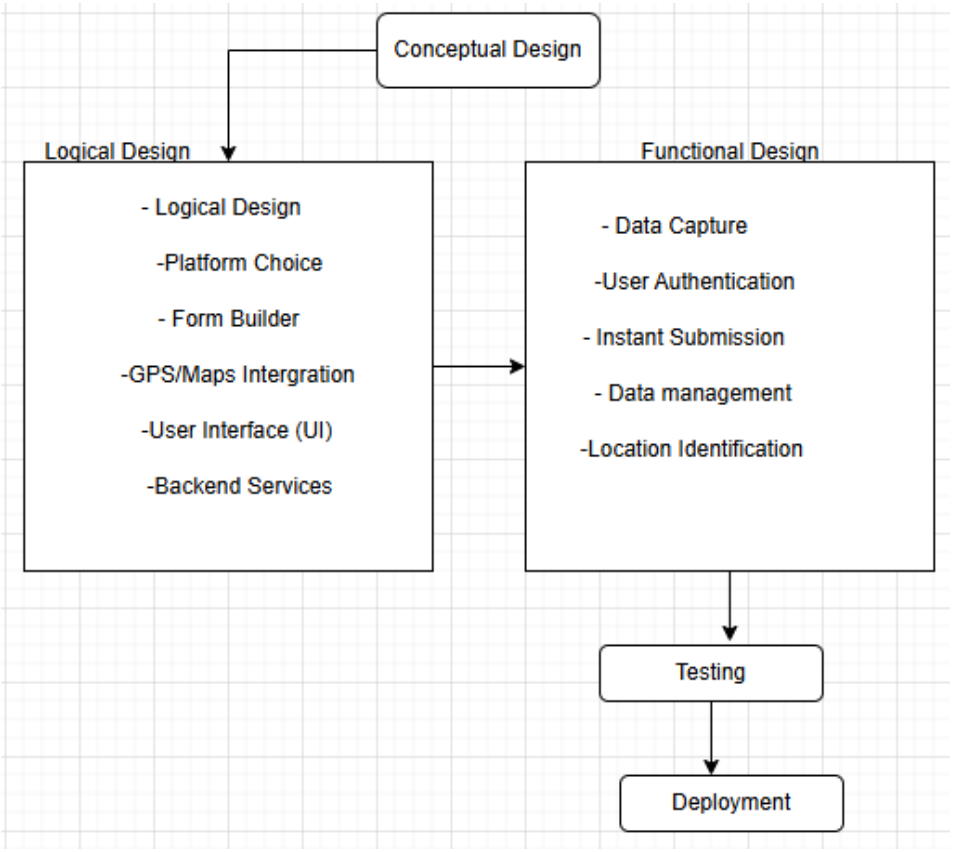

Figure 2: Design and development of the App (Smart Report)

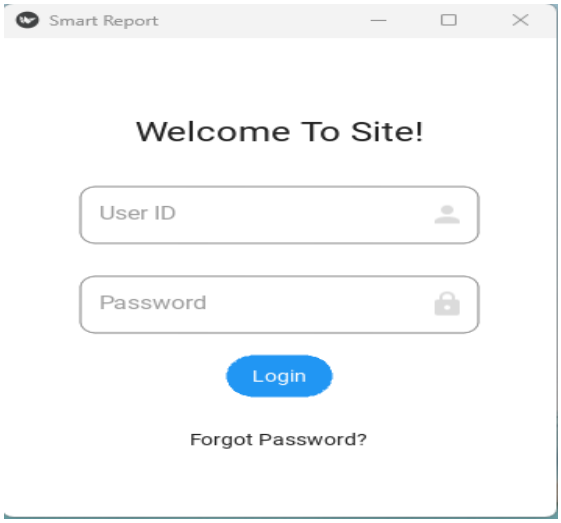

Figure 3: Login screen of Smart Report

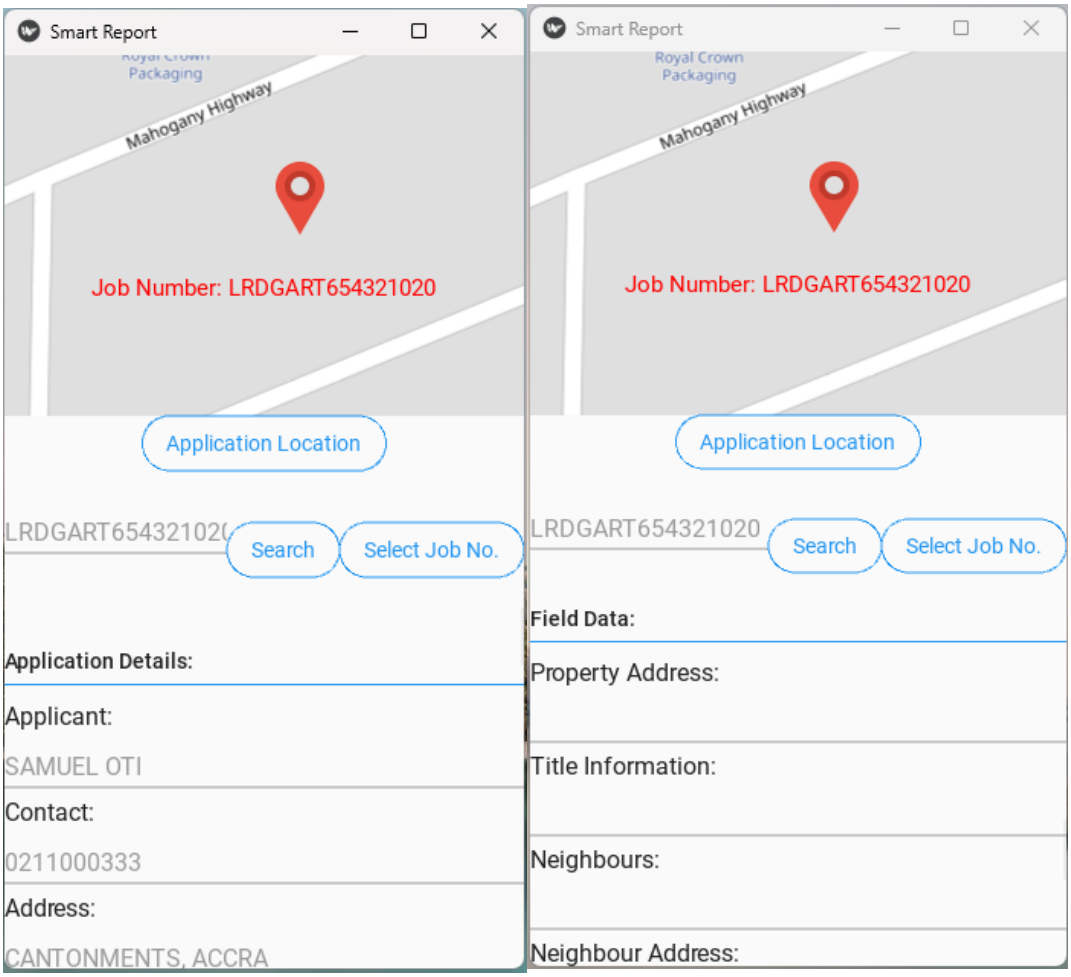

Figure 4: The general interface of the app (Smart Report) developed

3.2 Capabilities of the mobile app (Smart Report) developed

The mobile app developed was designed using python framework and google colab.

The mobile app (Smart Report) opens/runs on mobile devices with a user login screen shown in figure 3 for which a user has to authenticate by providing username and password.

The app developed has various unique capabilities which are described as follow;

i. Querying for application details using job number: When login is successful, the user (field officer) will have access to all applications assigned to him with a drop-down of the job numbers. If a job a number is selected, all other details of the application can be obtained with a search button in figure 4.

ii. Converting the centroid of the parcel: The centroid of the parcel submitted for registration which is termed which is termed Ghana Land Parcel Identification Number (GLPIN) is converted into geographical coordinates of latitude and longitude in figure 4.

iii. Locating application location on a map: The geographical coordinates are used to locate the application on OpenStreetMap (OSM) in figure 4.

iv. Adding field data: The other field data of the parcel/property/land can be added by the field officer and submitted to a database.

v. Taking picture of property/parcel/site: Images of the parcel/property/land can be taken and converted to pdf for attachment to the selected application in figure 5. Each picture is identified with a unique description/

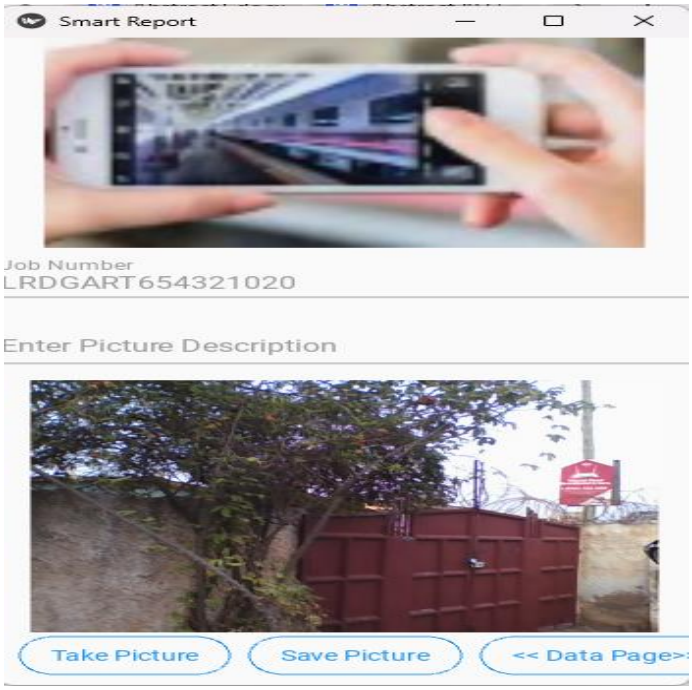

Figure 5: The Camera screen of the app

4.0 DISCUSSIONS

By leveraging technology, field inspectors can now collect data on-site using mobile devices or tablets. This data is then transmitted in real time to the LRD, where it is processed and incorporated into the land registry database. This seamless transfer of information ensures that the records remain current and reflective of the latest property developments

Moreover, the use of real-time field inspection reports enhances the accuracy and reliability of land registration [2]. The digital format allows for standardized data collection, eliminating the inconsistencies that can arise from manual transcription [12]. Additionally, inspectors can attach photographs, GPS coordinates, and other relevant documentation directly to the report, providing a comprehensive and verifiable report as shown in appendix A.

The benefits of this approach extend beyond the LRD itself. Improved efficiency in land registration translates into enhanced service delivery for citizens, as the process becomes faster and more transparent [6]. Additionally, the availability of up-to-date and accurate land ownership records reduces disputes and conflicts over property rights, contributing to social stability and economic growth.

5.0 CONCLUSION

In summary, real-time field inspection reporting revolutionizes the way land inspections are conducted by leveraging technology to ensure that data is collected, processed, and shared instantly. This leads to improved accuracy, efficiency, and stakeholder engagement in the land registration process.

In conclusion, adopting real-time field inspection reporting through a mobile app represents a transformative approach to land title registration in Ghana. By harnessing technology for immediate data capture and processing, the Lands Commission can significantly improve its operational efficiency and transparency, ultimately benefiting all stakeholders involved in land administration. This paper highlights the necessity of such innovations in addressing the challenges faced by traditional land registration systems and sets a foundation for future advancements in this critical sector.

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APPENDICES

Appendix A: An output of the Smart Report

INSPECTION REPORT

Job Number:	LRDGAR84122023
Applicant:	MOHAMMED FAIZ SURAKA
Locality:	ABOKOBI
Property Address:	GH-094648
Title Information:	LEGAL DOCUMENT
Neighbors:	MR FRANK OTOO (UNDEVELOPED) MARK OSEI (UNDEVELOPED)
Neighbors Address:	P.O.BOX 465
Form of Possession:	UNCOMPLETED BUILDING ON THE LAND
Remarks:	Three sides of the parcel have been walled. There is an uncompleted building on the parcel. Also, the following building materials were found on the parcel i.e. 1000 cement blocks, half trip of sand and half trip of gravels. The applicant claimed that, the 3 sides of the parcel was walled by the him. Also, he claimed that, the uncompleted building was built by him. However, he claimed that, the above-mentioned building materials belongs to him.
Purpose:	To locate laud for Isaac Quaye Odartey & others
Field Description:	I went to the site with one of the applicants. The coordinates on the cadastral plan helped confirmed the size and acres of the land. The area is developing but the roads are untarred. Some of the neighbors who share a common boundary with the applicant have not developed their land. The parcel was accessible.

UNCOMPLETED BUILDING

Date of Inspection:	02-11-2024 16:27:57
Officer:	ALLAN GREEN MARKSON

BIOGRAPHICAL NOTES

–Surv. Kwabena Boafo MATTHEW (MGhIS) obtained a membership diploma of the Ghana Institution of Surveyors in 2007. He is currently a lecturer at the Ghana School of Surveying & Mapping (GSSM) school in Principles of GIS, Principles of Computer Programming, and Database Applications. He is the head of the Land Information Unit of the Ghana Lands Commission, in charge of Enterprise system and geospatial development and implementation.

--Ms Michelle Amissah is a meticulous and insightful urban planning professional. She holds a degree in BSc Human Settlement Planning, strengths in Geographic Information Systems (GIS), and a passion for research. She excels in spatial analysis and data visualization. She is currently undertaking a national service at the Lands Commission, Lands Information Unit.