

PROTOTYPE GEOMETRIC SOLUTION FOR LAND RESOURCE MAPPING AND INFORMATION MANAGEMENT SYSTEM AS A TOOL FOR EFFICIENT PROPERTY SEARCH AND GOOD UTILIZATION OF RESOURCES

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Abstract: Problems concerning the optimal use of land resources and improved land management are important all over the world. Since automation has greatly increased the ability to handle masses of data the challenge is to develop a good and comprehensive computer-based Land Information System (LIS). Information related specified land units is the cornerstone of Land Information System, since data concerning ownership and other property rights, boundaries, areas, land uses, market and assessed values, building, habitations, etc. are all interrelated. Land Information System is devoted to the problem of developing efficient information systems based on such land units and have proven knowledge of establishing Land Information System mainly based on experiences gained from integrating existing Cadastres, Land Register and Valuation Systems. This research paper aims to introduce a prototype Geometric Solution for Land Resource mapping and information management system as a tool for efficient property search and good utilization of resources.

Keywords: Land, Information, System, Property, Database, Estate

INTRODUCTION

Land use as well as land valuation is one among the oldest questions in economic theory, (Shavell, 2004). Land is an essential input (factor of production) for agriculture, and Agriculture is by far the most important economic activity in preindustrial societies. With the advent of industrialization, important new uses for land emerge as sites for factories, warehouses, offices, and urban agglomerations. The value of real property taking the form of man-made structures and machinery increases relative to the value of land alone. The concept of real property eventually comes to encompass effectively all forms of tangible fixed capital. With the rise of extractive industries, real property comes to encompass natural capital. With the rise of tourism and leisure, real property comes to include scenic and other amenity values.

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Starting in the 1960s, as part of the emerging field of law and economics, economists and legal scholars began to study the property rights enjoyed by tenants under the various estates, and the economic benefits and costs of the various estates, (Epstein 2007). This resulted in a much improved understanding of the property rights enjoyed by tenants under the various estates. These include the right to:

Decide how a piece of real property is used;

Exclude others from enjoying the property;

Transfer (alienate) some or all of these rights to others on mutually agreeable terms;

Nature and consequences of transaction costs when changing and transferring estates.

STATEMENT OF THE PROBLEM

Keeping record of lands and their owners has been a great task to government and the governed. To access land information proves was difficult that most times people are defrauded due to lack of land information. Illegal sales of lands without the consent of the owner are very common. Certificate of occupancy is usually a problem. Litigation which results to death and destruction; valuation of land for the purpose of paying tax to government is not achieved. Hence the need for computerization of land information for comprehensive details and more assessable information systems.

AIM AND OBJECTIVES OF THE STUDY

The main aim of this research is to develop and implement a prototype Geometric Solution for Land Resource mapping and information System. The objectives are;

To carry preliminary investigation on land information and analyse on available land Resources which help identify Land size, Land location, Land owners, Land use information.

To develop a system capable to facilitate the preparation of certificate of occupancy and to assist the prospective buyer to ascertain the ownership and availability of the property.

Implement the system which will enable property search map and promote land information security to reduce unnecessary litigation.

PURPOSE OF THE STUDY

The purpose of this work is to make land information accessible to both government and individuals who may like to acquire landed property.

SIGNIFICANCE OF THE STUDY

The project work will help in a good number of ways to make land information available to users. The system will:

Keep a database of all the lands in the state

Enable retrieval of land information

Guide buyers on how to buy and who to meet

Educate buyers on the type of house to build in an area for proper town planning.

DEFINITION OF TERMS

Databases: A systematically arranged collection of computer data, structured so that it can be automatically retrieved or manipulated. It is also called databank.

Fee tail: Under common law, this is hereditary, non-transferable ownership of real property.

Feudal Land Ownership: a system of mutual obligations under which a royal or noble personage granted a fiefdom

Life Estate: Under common law, this is an interest in real property that ends at death.

Leasehold or rental: Under both common law and civil law, land may be leased or rented by its owner to another party; a wide range of arrangements are possible, ranging from very short terms to the 99-year leases, allowing various degrees of freedom in the use of the property.

Property: is any physical or intangible entity that is owned by a person or jointly by a group of persons.

LITERATURE REVIEW

The issue of inefficiencies posed by manual method of keeping land records has become a topical issue in the world, especially developing countries like Nigeria. (Arnot, 2006) Magaji Galadima - AGIS: The Journey so Far (2006): In his words stated categorically that the former Department of Land Administration and Resettlement was operating a manual system of land record management. These were plagued by numerous bottlenecks and cumbersome, widespread forgeries, document laundering, and racketeering of land. According to him other problems of land administration include cases of multiple allocation, unattended applications, allocations from “Parallel Ministry” mismatches in land use, and encroachments. Other worrisome problems include inefficient revenue generation and collection, as well as delays in issuing/perfecting transactions in land.

GIS Applications for Aboriginal Land Management

In this section, important thesis concepts, such as Geographical Information System (GIS) and Aboriginal rights are introduced. The implications of Aboriginal rights in resource development are discussed. The use of GIS in the decision-making process in land management is examined by reviewing some successful applications.

Geographical Information Systems (GIS) The term Geographical Information Systems (GIS) is used generally for any computer system that has the capability to manipulate and display spatial data. A GIS includes not only hardware and software components, but also specialized devices used to input spatial data and create map products, together with communication systems (Bernhardsen, 1999).

The concept of GIS, as “an integrated system of storing, managing, displaying, and analysing geospatial data.” (Burrough & McDonnell, 1998) has been adopted for the purpose of this research. As a spatial database, an important functionality of GIS is to integrate and analyze spatial and textual data. As a spatial information manipulation tool, GIS allows for the integration of many ‘layers’, thus, input data may be gathered from a variety of sources: maps, aerial photos, satellite images, etc. As an analytical tool, GIS can be used to perform spatial queries, develop dynamic models, analyze trends over time, simulate scenarios, and develop predictive models.

The development of internet technology has allowed some GIS data and functions to be accessed remotely by end users. By using web GIS, data and operations can reside anywhere, hosted by institutions, organizations and companies around the world. This means that users need not purchase a GIS

software license to run a simple operation (e.g. geo-coding, proximity) on their own computer. End users can use data and operations on the web to perform real-time data processing remotely. The analysis is completed on the remote computer where the main GIS functionality is located and the result is sent back to the client through the internet.

Aboriginal Rights

Aboriginal rights are Sui generic rights that originate in traditional rights exercised by Aboriginal peoples in Canada prior to European contact (Canada, 1996). Aboriginal rights may be described as a broad spectrum of rights, the cornerstone being the relationship of Aboriginal rights to land. At one end of the spectrum of Aboriginal rights are practices, customs and traditions unrelated to land claims, for example, the right to speak an Aboriginal language. In the middle of the spectrum are treaties and Aboriginal “site-specific” rights dependent on use of the land, such as fishing, hunting and trapping (whether it be for ceremonial, commercial or sustenance purposes). At the other end of the spectrum is Aboriginal title (Campbell and Sindlinger, 2001).

Aboriginal peoples holding Aboriginal title have an indefeasible interest in land. Aboriginal title is a sui generic right in land, between fee simple right and a usufructuary right (Issac, 2004). Aboriginal title arises from pre-sovereignty occupation of lands and not from Crown grant (Calder, 1973). Therefore it is incompatible with the Torrens system of priority, which is based on date of registration of rights to land and not based on when such rights are acquired.

Aboriginal title is a collective right, inalienable except to the Crown (Issac, 2004). Aboriginal title is held communally, and not by any one member of an Aboriginal community. Although Aboriginal title has its legal source in pre-sovereignty occupation of the land, there is an inherent limit on the possible uses that can be made of the land. For example, Aboriginal people may not use lands to which Aboriginal title is asserted, for activities that impact negatively on such land. If a group claims a special bond with the land because of its ceremonial or cultural significance, it may not use the land in such a way as to destroy that ceremonial or cultural relationship (Campbell and Sindlinger, 2001). In addition, Aboriginal title may be infringed on by either provincial or federal governments if the infringement satisfies a compelling legislative objective, for example the protection of the environment or endangered species. If there is to be an infringement on Aboriginal title the government must recognize its fiduciary relationship with Aboriginal people, and ensure that there is as little infringement as possible, that fair compensation is made available, and that the Aboriginal group has been consulted.

Land Property

Property is any physical or intangible entity that is owned by a person or jointly by a group of persons (Bethel, 2003). Depending on the nature of the property, an owner of property has the right to consume, sell, rent, mortgage, transfer, exchange or destroy their property, and/or to exclude others from doing these things. Important widely recognized types of property include real property (land), personal property (physical possessions belonging to a person), private property (property owned by legal persons or business entities), public property (state owned or publicly owned and available possessions) and intellectual property (exclusive rights over artistic creations, inventions, etc.), although the latter is not always as widely recognized or enforced. A title, or a right of ownership, establishes the relation between the property and other persons, assuring the owner the right to dispose of the property as they see fit. Some philosophers assert that property rights arise from social convention. Others find origins for them in morality or natural law.

Various scholarly disciplines (such as law, economics, anthropology or sociology) may treat the concept more systematically, but definitions vary within and between fields. Scholars in the social sciences frequently conceive of property as a bundle of rights. They stress that property is not a relationship between people and things, but a relationship between people *with regard to* things.

Property is usually thought of as being defined and protected by the local sovereignty. Ownership, however, does not necessarily equate with sovereignty. If ownership gave supreme authority, it would be sovereignty, not ownership. These are two different concepts.

Public property is any property that is controlled by a state or by a whole community (Ankerl, (2000). *Private property* is any property that is not public property. Private property may be under the control of a single person or by a group of persons jointly.

Modern property rights are based on conceptions of ownership and possession as belonging to legal persons, even if the legal person is not a natural person. In most countries, corporations, for example, have legal rights similar to those of citizens. Therefore, the corporation is a juristic person or artificial legal entity, under a concept that some refer to as "corporate personhood".

Property rights are protected in the current laws of most states, usually in their constitution or in a bill of rights. Protection is also prescribed in the United Nations' Universal Declaration of Human Rights, Article 17, and in the European Convention on Human Rights (ECHR), Protocol 1.

Traditional Principles of Property Rights include:

Control of the use of the property

The right to any benefit from the property (examples: mining rights and rent)

A right to transfer or sell the property

A right to exclude others from the property.

Traditional Property Rights do not include:

Uses that unreasonably interfere with the property rights of another private party (the right of quiet enjoyment)

Uses that unreasonably interfere with public property rights, including uses that interfere with public health, safety, peace or convenience.

Not every person or entity with an interest in a given piece of property may be able to exercise all possible property rights. For example, as a lessee of a particular piece of property, you may not sell the property, because a tenant is only in possession and does not have title to transfer. Similarly, while you are a lessee, the owner cannot use their right to exclude or to keep you from the property, or, if they do, you may be entitled to stop paying rent or sue for access. Furthermore, property may be held in a number of forms, such as through joint ownership, community property, sole ownership or lease. These different types of ownership may complicate an owner's ability to exercise property rights unilaterally. For example, if two people own a single piece of land as joint tenants then, depending on the law in the jurisdiction, each may have limited recourse for the actions of the other. For example, one of the owners might sell their interest in the property to a stranger whom the other owner does not particularly like.

Legal systems have evolved to cover transactions and disputes that arise over the possession, use, transfer, and disposal of property, most particularly involving contracts. Positive law defines such rights, and the judiciary is used to adjudicate and to enforce property rights.

According to Adam Smith, the expectation of profit from "improving one's stock of capital" rests on private property rights. It is an assumption central to capitalism that property rights encourage their holders to develop the property, generate wealth, and efficiently allocate resources based on the operation of markets. From this has evolved the modern conception of property as a right enforced by positive law, in the expectation that this will produce more wealth and better standards of living.

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In his text *The Common Law*, Oliver Wendell Holmes describes property as having two fundamental aspects. The first is possession, which can be defined as control over a resource based on the practical inability of another to contradict the ends of the possessor. The second is title, which is the expectation that others will recognize rights to control resource, even when it is not in possession. He elaborates the differences between these two concepts, and proposes a history of how they came to be attached to persons, as opposed to families or entities such as the church.

CLASSICAL LIBERALS, OBJECTIVISTS, AND RELETED TRADITIONS

Most thinkers from these traditions subscribe to the labour theory of property. They hold that you own your own life, and it follows that you must own the products of that life, and that those products can be traded in free exchange with others.

"Every man has a property in his own person. This nobody has a right to, but himself." (John Locke, *Second Treatise on Civil Government*)

"The reason why men enter into society is the preservation of their property." (John Locke, *Second Treatise on Civil Government*)

"Life, liberty, and property do not exist because men have made laws. On the contrary, it was the fact that life, liberty, and property existed beforehand that caused men to make laws in the first place." (Frédéric Bastiat, *The Law*)

Socialism's fundamental principles are centered on a critique of this concept, stating, among other things, that the cost of defending property is higher than the returns from private property ownership, and that, even when property rights encourage their holders to develop their property or generate wealth, they do so only for their own benefit, which may not coincide with benefit to other people or to society at large.

LAND TENURE

Land tenure: is the name given, particularly in common law systems, to the legal regime in which land is owned by an individual, who is said to "hold" the land (the French verb "tenir" means "to hold"; "tenant" is the present participle of "tenir") (Williamson, I.1997). The sovereign monarch, known as The Crown, held land in its own right. All private owners are either its tenants or sub-tenants. The term "tenure" is used to signify the relationship between tenant and lord, not the relationship between tenant and land.

Over history, many different forms of land ownership, i.e., ways of owning land, have been established.

A landholder or landowner is a holder of the estate in land with considerable rights of ownership or, simply put, an owner of land.

RELATED LITERATURE

Adeoye (2006) During FIG Regional Conference, Accra, Ghana; posits that Manual record-keeping has been in use by Land related Departments of the Ministry of the Federal Capital Territory (MFCT) and the Federal Capital Development Authority (FCDA) since the inception of the Federal Capital Territory almost 30 years ago. The city and its surrounding have been expanding rapidly beyond projections. With this rapid expansion, manual record-keeping became inefficient, time-consuming and prone to abuses. Several unsuccessful attempts were made in the past to solve the problems. The attempt failed because of the gross under estimation of the gravity of the problems and the ill-defined scope of the project. The primary reason that has hindered the computerization of the Cadastral and Land Registry records in the past is lack of a strong political will on the part of the authority hence the need to eliminate paper based system.(Arnot, 2006).

A land administration system provides a mechanism that supports the management of real property. The processes of land administration include the regulating of land and property development, the use and conservation of the land, the gathering of revenues from the land through sales, leasing, and taxation; and the resolving of conflicts concerning the ownership and use of the land (Dale and McLaughlin 1988).

Arter, F.W. (2006) in "A Review of the Torrens System and Some Aspects of Title Survey." Australian Surveyor Arter begins by explaining the significance of a title and continues by relating the experience of implementation of title registration in Australia and the problems encountered. The author explores the concept of "limited title," where by the government accepts claims to land pending further evidence, but allows transactions only with title. Arter concludes with his views on the technical needs of boundary survey.

Austin, Jan (2004) in "Developing Cadastral Systems." includes among them better tax assessment, increased efficiency of land markets, increased ease of assembling land for development programs, more incentive to improve housing, and better access to credit. Austin suggests that designing land information systems requires identifying specific needs of an area, real goals that avoid costly implementation mistakes, and simple procedures understandable by those required to register land. She further states that compulsory registration is necessary, as is recognition of existing tenures and customary transfer rights, and suggests the utilization of pilot projects. To avoid common pitfalls encountered

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in the implementation process, Austin recommends that costs of surveying be tied to land value (that is, not exceed a certain small percentage), while appropriate relative accuracy be emphasized by tying parcels to their immediate surroundings rather than to remote points.

Baron, Don(2001). Land Reform in sub-Saharan Africa sees consolidation and registration as a solution to uncertainty and fragmentation in current landholding systems. Citing excessive transaction costs due to group rights and judicial reliance on biased oral evidence as impediments to investment, Baron writes that registration will furnish "secure and enforceable rights to all who own interests in land, and ensure that all conveyances of land can be accomplished quickly, efficiently, and at low cost." It does so by encouraging successful farmers to expand their operations by acquiring additional land. However, the author concedes the need to guard against the creation of a land monopoly in the hands of a few.

Barr. MacDonald (2002) in "Comparison Among Land Records of the European Colonies and Other, Improved Systems Used in Developing Countries". Among the functions of land records Barr lists the determination of current rights, improving tax collection, regulation of land development and use, management of public services, and protection of customary rights. He also describes the contributions of Spanish-, English-, and French-speaking colonizers to developing country land systems, including a useful, succinct summary table of the level of registration/titling each group brought to its colonies. This is accompanied by a brief summary of developing countries which purport to use some form of titling or registration.

Binns, Bernard O. (2007) Cadastral Surveys and Records of Rights in Land. The first sections describe the history of mapping and cadastral systems, and the use of air photos. Binns states that a register of rights need not be based on individual ownership, and that such a variation could therefore reduce opposition to registration. In his discussion on adjudication, he suggests that initial efforts be aimed at registering occupation under a "presumptive title" for either individuals or groups. This would then be replaced by a more definitive title at a later time. Advantages of registration are seen to be its description of the exact disposition of land, protection for all classes of landholders, and facilitation of land transactions. Binns also stresses the necessity of preparation and maintenance of the record of rights.

Larsson, Gerhard 2000) in "Land Registration as Part of a Land- Reform Program.". The advantages include increased security, reduced litigation, cheaper transaction costs, increased credit access, expanded taxation, and better

regulation and planning of land use. According to Larsson, registration does not change ownership, but only registers it (this can include group ownership). He further states that registration could accelerate trends toward individual ownership, while suppressing rights that are weak, without legal support, or unpleasant to the majority. Conceding that adjudication is heavily influenced by politics, the author nevertheless supports implementation of compulsory and systematic registration on the grounds that in the long-run the cost per unit is low and that simple method of aerial surveying may be employed to overcome the obstacle of initial survey costs.

Machyo, R. Chango. (2010) *Land Ownership and Economic Progress*. Machyo is opposed to individual ownership and titling, which he sees as a method for the continuation of metropolitan control over now-independent colonies. The author begins with a description of European concepts of land holding which is followed by a discussion of African land tenure systems. The arguments for title registration are given, but the author emphasizes the problems of such a system. He says that fragmented land holdings are often based on micro-environmental differences, while also stating that individualized land ownership will tend to increase fragmentation, not reduce it. In addition, Machyo believes that individual title will increase unemployment, the possible result of peasants being dispossessed from their lands for indebtedness (debts they are able to contract as a result of using their registered land as col-lateral). Individual ownership is rejected by the author as a system that would destroy community integrity and introduce class distinctions. Machyo suggests other options (small peasant farms, capitalist farms, state farms, and collective farms), as well as the criteria for choosing: economic efficiency, employment, social value, overall economic development, and living standards. He supports a combination of tenures which utilizes both communal and individual land ownership and farming.

However, this research work proposed the use of Structured System Development Methodology in implementing “A Prototype Geometric Solution for Land Resource Mapping and Information System” .

SYSTEM ANALYSIS AND METHODOLOGY

In this research paper, the Structured System Development Methodology is adopted. Is a widely-used computer application development method, where its use is often specified as a requirement for government computing projects. It is increasingly being adopted by the public sector. Decision-making depends on timely information on the present land-use situation, on possible ways of improving this situation and on the consequences of implementing each alternative solution. The gathering and storing of data requires much time in planning, but is not an end in itself. It is important to reserve time to interpret and apply these data to the task in hand. To manage information effectively, it is essential to know the place of each operation in the information system as a whole. Otherwise, it is easy to concentrate on one part of the system, or one specialist task, without recognizing the implications it has for the whole operation. For example, if a lot of information is required, then a big investment in data collection, storage and reporting is necessary.

Analysis of the Existing System

At present, land information is documented manually. Files are created for different plots of land. These files are kept in a file cabinet. In the file, all the details of the property owner, land size and location is documented. Any form of transfer or sales is equally recorded on the file manually.

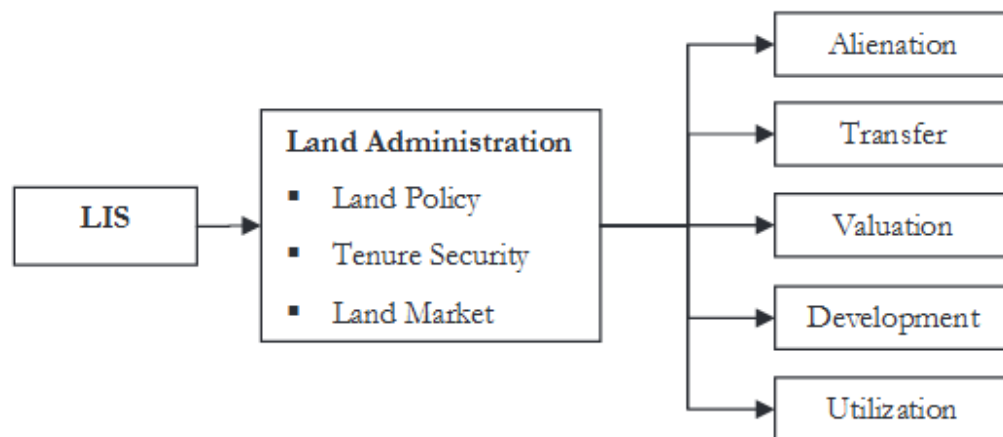


Fig 3.0 Structure of the existing System

Problems of the Existing System

Due to the manual means being used in keeping land information, a lot of problems are encountered which includes:

Inability to create a property search map to be able to locate available land Resources like Land size, Land location, Land owners and Land use information.

Delay in processing files

Loss of vital documents as the filing system is manual

Damage of documents due to fire incident.

Illegal removal of files by fraudulent staff leading to insecurity.

Advantages of the Existing System

Incorporate functionalities for valuation assessments, physical planning and district land management decision.

Prevents encroachment on wetlands, forests, road reserves and other public land reserves.

Reduces the time required to check, update and transfer land

Increases the security of land tenure

Contributes to reduction in corruption associated with checking, updating or transfer of titles.

Deliver services closer to the public

Research Methodology

For this research work, the Structured System and Design Methodology is being adopted.

Structured System and Design Methodology

(SSDM) is a set of standards for systems analysis and application design. It uses a formal methodical approach to the analysis and design information systems. It is also a standard for developing database projects.

SSDM follows the waterfall life cycle model starting from the feasibility study to the physical design stage of development. One of the main features of SSDM is the intensive user involvement in the requirements analysis stage. The users are made to sign off each stage as they are completed assuring that requirements are met. The users are provided with clear, easily understandable documentation consisting of various diagrammatic representations of the system. SSDM breaks up a development project into stages, modules, steps and tasks. The first and foremost model developed in SSDM is the data model. It is a part of requirements gathering and consists of well-defined stages, steps and products. The techniques used in SSDM are logical data modeling, data flow modeling and entity behavior modeling.

Logical Data Modeling: This involves the process of identifying, modeling and documenting data as a part of system requirements gathering. The data are classified further into entities and relationships.

Data Flow Modeling: This involves tracking the data flow in an information system. It clearly analyzes the processes, data stores, external entities and data movement.

Entity Behavior Modeling: This involves identifying and documenting the events influencing each entity and the sequence in which these events happen.

Important Characteristics of SSDM

Dividing a project into small modules with well-defined objectives

Useful during requirements specification and system design stage

Diagrammatic representation and other useful modeling techniques

Simple and easily understood by clients and developers

Performing activities in a sequence

Stages of SSDM Include:

Determining feasibility

Investigating the current environment

Determining business systems options

Defining requirements

Determining technical system options

Creating the logical design

Creating the physical design

Each of these stages applies certain techniques and a sequence of analysis. They include conventions and procedures for recording and interpreting the information with the help of diagrams and text.

Justification of the Research Methodology

The SSDM was adopted for this study because of its advantages relative to other methodologies. It:

Has high recognition of user participation. During fieldwork the different stakeholders (including land use planners, land users, regional development councilors and other natural resource managers) to identify the problems and constraints in the current system and giving ideas to what kind of system they require to solve their problems.

Takes on the Top-Down approach and is flexible in design and techniques whereby the conceptual model of the system being developed can be broken down into manageable modules.

Involves the use of tools like dataflow diagrams, and data dictionaries to document and describe the real world situation.

Have iterative steps that allow reviews and changes to be made for improvements if necessary.

Proposed Architecture

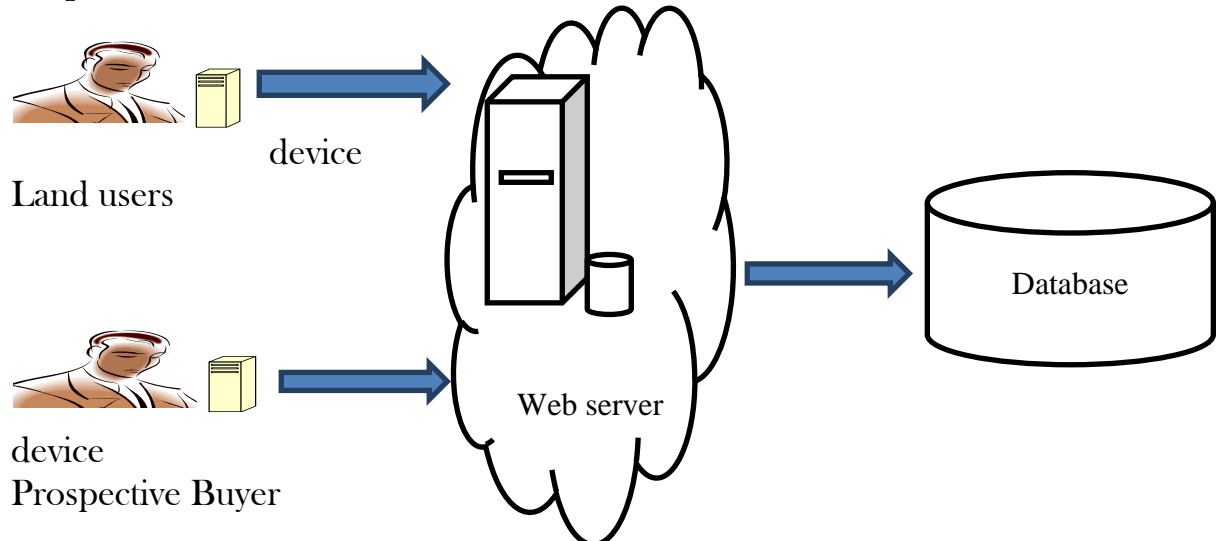


Fig 3.1 Diagram illustrating a Propose Architecture

Description of the Key Components

Input Analysis

The input to the new system is the land acquisition form. This form is used to record all the details concerning the land and its ownership. Both the name, address, and other information relating to the owner is documented here.

Process Analysis

The information gathered was processed into a more meaningful format for entry into the system.

Output Analysis

The output from the system designed is generated from the system inputs. More of the output generated is on land information.

SYSTEM DESIGN AND IMPLEMENTATION

The design of the proposed system is based on the basic framework of system design and development and the Structured System Development Methodology (SSDM) (Paresi, 2000) is adapted to design the proposed system and database.

SYSTEM DESIGN

The new system designed for keeping land resources information system will among other things:

Have a workable form through which all the inputs will be made to the system.

Have a well formatted output on land information

Enable search on the land database

Create a modular programming interface for easy debugging.

Design a system that will be very fast in operation.

OUTPUT SPECIFICATION AND DESIGN

Output from the system is in form of a map and documents. Majority of the outputs carries information relating to land allocations. The outputs are presented in a text format and some of the information derived from the database.

INPUT SPECIFICATION AND DESIGN

The program designed involved some input forms in order to achieve or derived some required outputs. These forms relate to land allocation information.

FILE DESIGN

My SQL database was used in storing the information used in this project. The database was integrated into the system that the program access and update the files.

Land File

| Field Name | Type | Size |
|--------------------|-----------|------|
| Name | Text | 50 |
| Address | Text | 100 |
| Date | Date/Time | 8 |
| Block No in Layout | Numeric | 30 |
| Plot No | Numeric | 30 |
| Plot Size | Text | 10 |
| Use of Land | Text | 40 |
| Amount Paid | Single | 4 |

Fig 4.0 Table of land Details

Data Flow

The data flow of these system is sequential i.e it flows step by step it does not jump any step to execute another. A user has to register first so as to have an access to the system. After which a user can login with the access that is being provided to use the system.

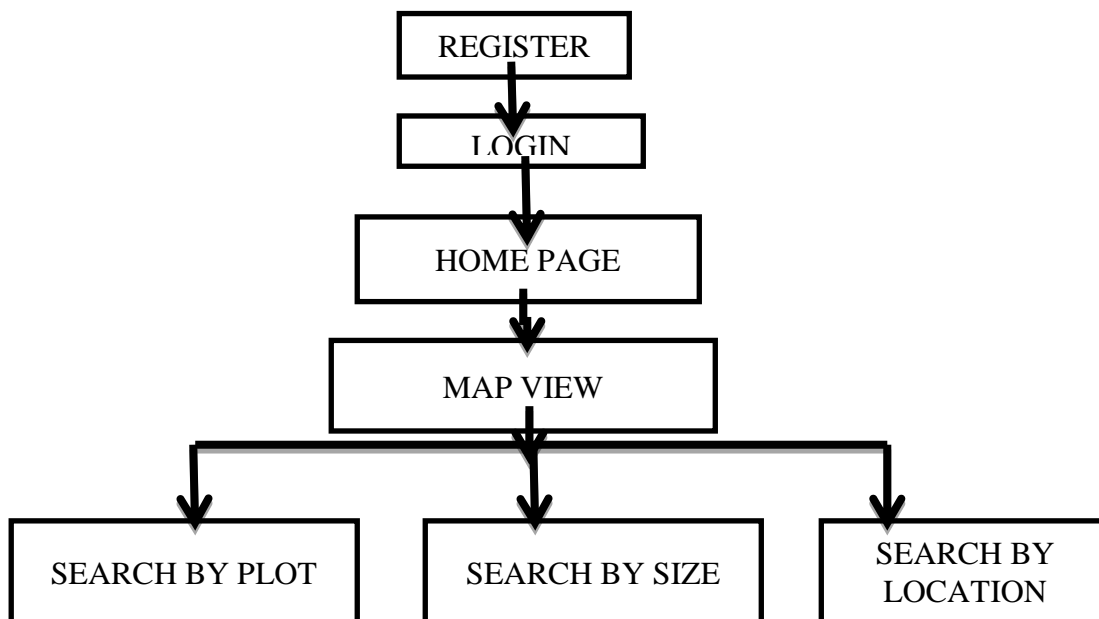


Fig 4.1 Data flow of the system

Flow Chart

The flow chart shows a diagrammatic way the data/information starts and is being process to when it gives it output and end.

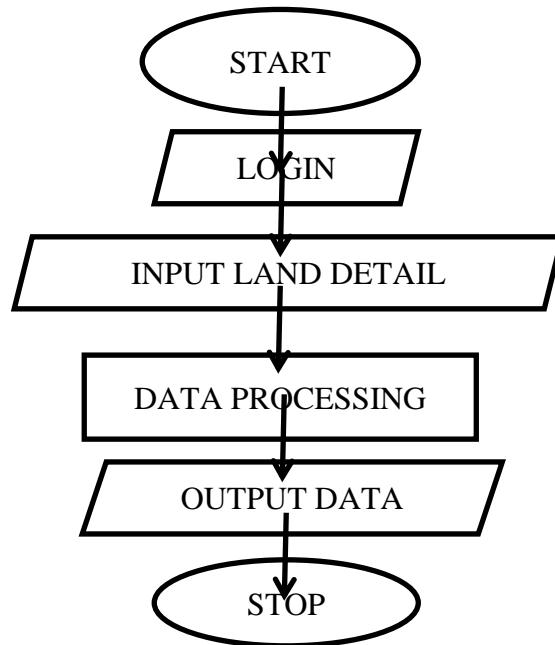


Fig 1.2 Flowchart of the existing system

SUMMARY, CONCLUSION AND RECOMMENDATION

The study has designed commute land program based on fixed property search map, land size, location and land use, built the land information platform, and realized functions including information retrieval, information matching, and mutual selection but no mutual evaluation.

Review of Achievements

This research work was borne out of the need to provide solutions to humanitarian welfare and its environment. Land information which involves a method by means by which information are store for proper reference.

So far this work has been able to virtualize some vital aspects of the manual means of land information such as keeping records of land owner, size, and location. Also the work automates important parts of the system such as information collection, retrieval and storage.

These, it has achieved by providing a simple and secure interface for information collection, introducing a search mechanism that enhances information retrieval, the use of a database management system for storage.

The system has also achieved the solutions it sets out to address by creating a simple but efficient platform that provides interaction between the land owners

and prospective buyer to work together as a single entity for effective negotiation. This study tends to show that whereas manual method have failed due to management, design, scope and costs; it is nevertheless better to educate people of its value by evaluating the performance of the designed system by deploying it in the study area in order to ascertain its effectiveness.

CONCLUSION

The research identified the necessity of use of land information system services to provide better, efficient and transparent services. Many failure examples as discussed in the statement of problem have also made the world alert about the necessity of addressing different land related issues for the successful implementation of the system. Thus, the research came up with different architectures for the land information system with due consideration of the issues identified.

Contribution of Application of work

As a means of providing an alternative and affordable way of keeping land information, the system can be made applicable in areas such as the government. For efficiency the system should be used by group of common interests and same locality e.g. this system is design to test its performance to be used by individual that require land for various uses. The system tends to contribute to the urgent need to improve and automate processes land resource, as other facets have been greatly improved.

RECOMMENDATIONS

Computerize land system as a tool for efficient property search and good utilization of resources it is no doubt a necessary requirement for any government. With the ideology behind its existence, one would agree that computer-based land system is vital if properly encouraged and advertise, starting from a small community before being expanded globally.

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Appendix B: Input Snapshot



A registration form with the following fields: Name, Email, Password, Confirm Password, Please fill in your telephone number, Gender, and Age. A 'Register' button is at the bottom. A disclaimer at the bottom reads: "We'll be sending you emails to our newsletter - you can opt out at any time." The form is overlaid on a city skyline background.

Registration Form

User Login

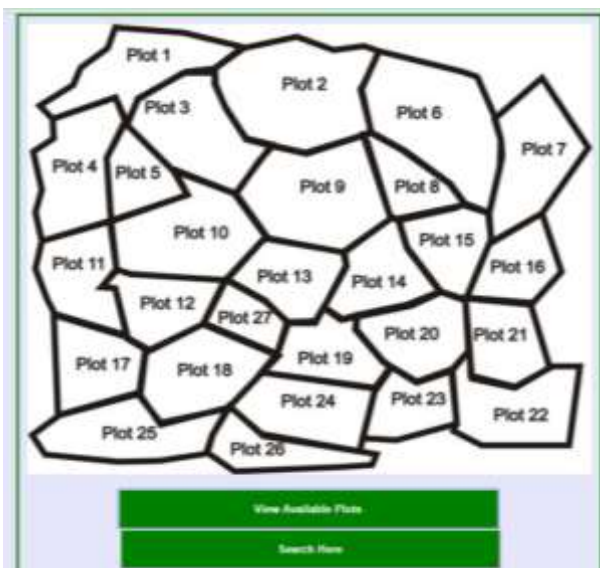
Appendix C: Output Snapshot

Available Land Preview



A user login form with the following fields: Name (filled with "timothymaxwell149@gmail.com"), Password (filled with "*****"), Remember me? (checkbox), Login button, and Register? link. The form is overlaid on a city skyline background.

Appendix D: Field Land Map



Land Map view
Performing Land Search by Size

Reference to this paper should be made as follows: ¹P. E. Udosen, ²E. E. Antia and ³I. P. Udoh (2017), Prototype Geometric Solution for Land Resource Mapping and Information Management System as a Tool for Efficient Property Search and Good Utilization of Resources. *J. of Sciences and Multidisciplinary Research*, Vol. 9, No. 1, Pp. 35 - 56
