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Regional transport services through smart governance using bigdata

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ABSTRACT

Smart Governance is the process of utilizing modern technology to create a transparent and sustainable environment for citizens and the government. Intelligence through smart governance is utilized to upgrade decision making through a better collaboration including government and citizens by utilizing heterogeneous techniques and technology through smart governance. Transportation is being the vital concern for enormous countries like India, Bangladesh, Nepal etc.; where the vehicles are increasing in big numbers which include variety of vehicles like two-wheelers, cars and heavy vehicles where all the vehicles have to get registered at Regional Transport Office (RTO) which are situated all over the country in various states. The motive of this paper is to store an enormous range of vehicle data and extract the information in a smart and efficient manner by utilizing big data technology.

Keywords— *Smart Governance, Regional Transport Office (RTO), Bigdata, MapReduce, ECC*

1. INTRODUCTION

The latest technology of communication and information through technology to make the working function of the government in a transparent and efficient way. E-Governance acts like a subset of Smart Governance where the whole government using communication and information technology, currently nobody can oppose the significance of smart governance which is the modern form of the political process and public administration.

The definition of smart government is often phrased in the form of key requirements that society places on its government. To an enormous extent, the occurrence of smart government can be justified unambiguously by adopting a definition of smart governance that includes all electronically executed transaction between government agencies and citizens. The people get access to information and participation in public administration and making decisions. Smart Governance can support more responsive and effective service. Smart Governance is a process and structure needed to deliver electronically based amenities between the government and the citizens. A smart governance service also creates social benefits for the citizens of a country.

2. PROBLEM STATEMENT

2.1 Existing system

A systematic scrutiny of the literature and meta-analysis method is employed with various levels of scales and indicators. Literature Survey reviews that smart governance has been explained through the development of a number of models but systematic researches made on the applicability and suitability of big data idea for regional transport services is yet lacking. Big data having the huge potential in solving socio-political complex issues of several government agencies by minimizing risks, upcoming threats, provocations and magnifying productivity, planning and transparency. The theory on the vulnerability of information science and listed out all the failures having possible disproportionate impact consequences due to the small damage with regard to the functionality of the whole system which can tend to disproportion economic and social damages. Limitations of the existing system are less performance, disproportioned economic and social damages, more risk and threats.

2.2 Proposed system

The objective of this paper addresses smart innovation characteristics of open, integrated, intelligent and innovation layers composing a planning framework of regional transport. Smart cities are urban areas that exploit operational data, such as that arising from traffic congestion, power consumption statistics and public safety events, to optimize the operation of a city. It also provides fast-public service delivery, to the citizens for the economic development of a country. The smart city concept must involve both citizens and governing agencies to gain wider acceptability and transparency. It requires a centralized

metropolitan governing structure. Technology should be used only as a tool to monitor regional transport services. Advantages of the proposed system are efficient performance, error-free, cost-effective services.

3. SYSTEM DESIGN

The idea of implementing big data for smart agencies can increase the efficiency of agencies functioning in an efficient manner, it also enhances the services for the public in a swift manner, and transparency is promoted which helps in reducing the complexity. This paper further proves that implementing big data for smart agencies reduces the error, proper services and cost-effective services is distributed to the citizens which helps in attaining supportable economic development of a country. The research reports that each public agency should be covered under smart agency which should be encapsulated under the technology of big data to attain convenient access, clear and explicable and smooth functioning of the public agencies. The methodology steps include the following:

- **Data Preparation:** In this process the data is accumulated, combined, structured and organizing the data so it is easy to analyses as a part of data visualization, it covers all the step necessary to acquire, prepare and manage the data assets of the organization. In the proposed system an enormous amount of data has been generated automatically using random functions.
- **Upload to Hadoop (HDFS):** Connection is made to the Hadoop cluster whose files or directories is to be copied to or from your local filesystem. You must run this command before using fs put or fs get to identify the name node of the HDFS. You can copy (upload) a file from the local file system into a specific HDFS using the fs put command. You can choose to upload your data in HDFS or an object store. For sensitive data, it is advised to use a secure location that is previously created in HDFS.
- **MapReduce Function:** The Map Reduce algorithm accommodate two dominant tasks, namely Map and Reduce. The map holds a set of data and transforms it into another set of data, where independent elements are separated into tuples (key/value pairs). Secondly, reduce task, which extracts the output from the map task and considers it as input and also collaborates the data tuples into a small group of tuples. As from the series of the name MapReduce it is understood that the reduce task starts execution after the execution of the map job. The prime supremacy of Map Reduce is that it is uncomplicated to scale data processing over multiple computing nodes. Under the Map Reduce model, the data processing primitives are called mappers and reducers. Deteriorating a data processing application into mappers and reducers is sometimes insignificant. But, once an application is written in the Map-Reduce form, ascending the application to run over hundreds, thousands, or even a large number of machines in a cluster is purely a change in configuration. This simple procedure is what has attracted many programmers to use the Map Reduce model.
- **Encryption and Decryption:** In order to protect the data deposit on a system many internet protocols define mechanisms for encrypting the data. It is a bidirectional function were the same algorithm can be used for encrypting plaintext as well as decrypt the ciphertext. Hash functions are used in aspects of security where they take an electronic file, message or block of data and generate a short digital message as the hash value. The cyphers in hashing are optimized for hashing as use large keys and blocks.

3.1 High-level design

The system architecture of the proposed idea has various phases and elements where the administrator enter the details with respect to the registration of the vehicles and the data of the vehicles can also be generated automatically in a random manner an enormous amount of the data sets generated in this particular phase and also the data is visualized and analyzed. The analyzed data gets uploaded into the Hadoop infrastructure. Hence all the information regarding the vehicle registration will be stored in Hadoop. When a user has to fetch particular information regarding any vehicle based on the querying using a unique factor with respect to the vehicle. The required value is fetched by applying the suitable algorithm and the value that is fetched undergoes encryption and decryption before displaying the accurate information.

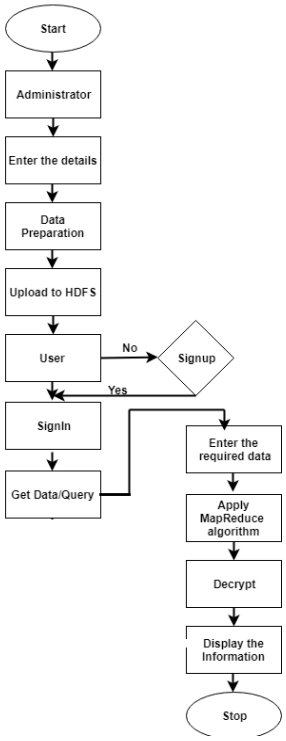

Fig. 1: Data flow diagram

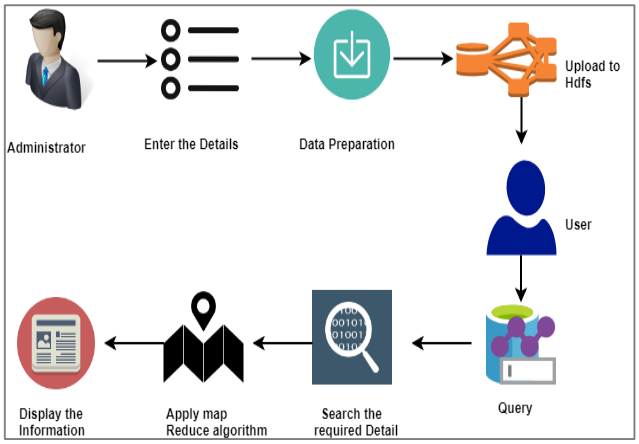

Fig. 2: System architecture

As per the existing system, there exist certain backdrops, the vulnerability theory of Information system has recognized that minor damage can have uneven consequences with respect to the functioning of the entire architecture which can further result in economic and social damages which further results in various risks and threats.

4. REQUIREMENTS

4.1 Hardware requirements

The power the CPU is a fundamental system requirement for any software. Most software executing on x86 architecture define processing power as the model and the clock speed of the CPU.

Various features of a CPU that influence its speed power like bus speed, cache and MIPS are often ignored. The processor used is Intel core i5, speed is 1.1 GHz, and RAM is 8GB.

4.2 Software requirements

Software requirements give a brief description of the software amenities that are required for the successful execution of the software with minimal errors. Some of the software requirements that are very much required for the smooth functioning of the software includes the amenities such as operating system, tool kits, graphical user interfaces, technology software interfaces, web technologies, integrated development environment, web servers, databases, various versions of the programming language. The operating system is windows 10 under Java and J2EE technology. The integrated development environment is My Eclipse.

5. IMPLEMENTATION

5.1 Algorithm

5.1.1 MapReduce: To take the best of parallel processing advantage in Hadoop, the structure of query should be in MapReduce form. The MapReduce is an archetype which contains dual phase which is the mapper phase and reducer phase. In the mapper phase, the input of this phase is a key-value pair. The output obtained in this phase is used as an input to the reducer phase.

The Reducer phase execution takes place only after once mapper execution gets finished, the input form of the reducer is also in the key value format, the output obtained from reducer is considered as the final output. The number of maps that are required is decided by the size of the data that is to be processed. For example when the 64MB block size containing 1000MB of data than 16 mappers will be required. The sorting and shuffling occur after when the mapper phase gets executed and before the reducer phase gets executed. When mapper completes its execution, the results get stored by key, if there are more than one reducers then they will be written on to the disk. The input from each mapper< K2, v2> all values for each unique key k2 is collected. Hence shuffle phase output is in the form of < k2, list (v2))> is considered as reducer phase input. The MapReduce includes the following steps:

- The map takes data in the form of pairs and gives a list of <key, value> pairs. In this case, the keys will not be unique. By considering the output of Map, sort and shuffle are applied by the Hadoop architecture.
- This sort and shuffle acts on these list of <key, value> pairs and sends out unique keys and values list associated with this unique key <key, list(values)>.
- The next reducer phase gets the output of sort and shuffles function. The reducer will perform a defined function on a list of values for unique keys and Final output will<key, value> will be stored/displayed.

5.1.2 Elliptic Curve Cryptography: The idea of Elliptic Curve Cryptography (ECC) is a faster and secure method of encryption as compared to the current standards. The following encryption steps of ECC steps are followed:

- A public, private key pair is generated for both the sender and the receiver.
- A shared key is generated from the key pair.
- Then the shared secret key generates an encryption key by using the encryption key and encryption algorithm, which encrypts the data.

The following decryption steps of ECC are followed:

- The public key is shared by the sender with the receiver, generate public, private key pair for the receiver and shared secret key is regenerated using the receiver's private key and sender's public key.
- Shared secret key generates an encryption key.
- The given data is decrypted by using the encryption key and encryption algorithm.

6. RESULT

The proposed system would make use of MapReduce function to filter and extract the required data from the huge amount of data which is present in Hadoop infrastructure and ECC algorithm keeps the data secure while transferring of the data where the data is encrypted and decrypted.

7. CONCLUSION

In this paper, a conceptual model is proposed which explain how data will be collected from various sources and followed a series of the procedure by maintaining a certain indicator that explains the measurement of the standard of a particular system. It also explains the outcome after following a series of procedures. This study reveals that big data has actually big potential for smart agency in the public sector even though it is still in its initial stage. It also explores what the public sectors agencies are not fully ready to adopt this technology as the result of scarcity of the data, uncertainty, and lack of efficiency of the administrators and policymakers. Hence the application of ECC algorithm for security purpose to secure the information. It suggests that every government agency should adopt the big data technology for reducing corruption, threat and challenges and increasing efficiency, accountability and transparency.

A common form implementing of smart governance services which can be made use by the citizens of India were a single portal which contains user interface and made available in almost all the languages used for Smart Governance in RTO, which further saves time and cost in case of implementation across the country.

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