A cloud-based user recommender and e-governing system for public welfare

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Abstract. Several problems exist in traditional analysis and design for e-government. The modern Era requires finding few solutions to dynamically facilitate the activities involved in administrative sectors of democratic regions. Individuals of a state or a central can be given an opportunity to actively participate in making decisions by placing their individual views on the democratic process for the better welfare. This paper is presented with the aim of developing a interactive system that adapts to dynamically updating the current policy recommendations, role of every crow sourcing committees, existing policy operational areas, beneficiaries, up-coming proposal plans of state and central regions for the welfare of rural and urban sectors. The framework facilities demand analysis, bringing many benefits to e-government planning, such as grasping emphasis immediately, affording to maximal benefit of democratic policies and plans. The Interactive system benefits mutually the individual as a Citizen and the administrator as the local parties of government body with efficient utilization, hence aiming at better development and implementation of goal plans that put forwards the Nation to step in to next degree of development by accomplishing the sustainable growth.

Keywords: Cloud, Data Policy, E-governing System, Internet of things

1. Introduction

In this Framework, A Cloud based User recommender system is developed as an application that highly facilitate any kind of citizen to get benefited with a detailed insight into the current beneficiary policies and future projects of the state government such that public get benefited directly, thus improves the lives of the users. Related models included several services as web-based services, one of which includes collaborative filtering technique with genetic algorithm exposing to solve issues related to e-commerce as recommending system but limiting to users, such that cost expensive and limits accuracy of recommendations \cite{1}.

Therefore there is highly need for developing an efficient framework that supports every kind of lives to have easy access on application thereby increasing utilization of public policies introduced by the parties at present. Also the proposed paper deals with analyzing limitations of related works \cite{2}, \cite{3} and \cite{4}. In \cite{2} author provides a framework with few cases comparing past and future considerations on
how the strategies with crowd sourcing can be solved using collaborative modules that operate on smart phone and in [3,8] is a recommender systems that works on context analysis using Latent Dirichlet allocation dealing with customer feedback for internet applications (e-learning, e-shopping), the insights involves evaluating the unstructured data and the system employs deep neural network to extract features of recommendations.

In the proposed framework pre-processing of the policies, and proposed plans of government sector, approved schemes, up-coming proposal, are the data set for the system to present as the recommendation for the user, and the framework also facilitate the user to submit the reviews, queries to the corresponding ward counselor, member parties, thus the two way communication is made easier through the android application and efficiently handling the information communication technology for the welfare of the public.

A suggestive recommender system developed in [4] is purely a commercial system deployed on GitHub, hosting that has transparency with online collaborative coding and sharing and user repositories might be accessible with third party, author proposed the suggesting system for GitHub, enabling customized views placed to GitHub users, in which the target directories their views are stored as the shared location to the users.

The proposed system is built on the public cloud that stores the knowledge base to dynamically update the policies, descriptions and the profile of the benefited locations that are applicable to the local parties, in a highly secured environment; Data security is highly preserved by restricting un-authorized access to cloud.

A key management technique is implemented for secure authentication at administrators login for efficient file management [7], a key is generated for the end to end transaction logins, only the authorized user can update the new policy or modify the data sets that are uploaded in the cloud environment, fig 1 shows access control mechanism, ensuring data privacy through key management. Since the key for file upload or access is generated and issued only for the secured logins, present system efficiently preserves the data security and privacy.

The other related work [5] Crowd sourcing for Democracy: A New Era in Policy-Making, describes basic policies, procedures for framing the role of crowd sourcing in a democratic process, also the author Tanja Aitamurto, depicts the policy recommendations and Open innovation challenges that may arise in policy making and placing the recommendations. The focus here is to involve globally the state and central governments utilizing crowd sourcing by involving people in political processes virtually. Public as a Citizen can raise their innovative thoughts, insights for the development of social welfare.

In this proposed paper an efficient framework is designed to place user queries, suggestions as recommendations, Users as a Citizens can make live chat with the political parties by placing the views on policy making, for improving the lives, thus enhancing democratic process widely in between the people as an individual and publically.

The proposed system helps the people to have the transparent view on the beneficiary policy decisions taken by the state government and facilitates the individuals to engage themselves in discussing the views on proposed policy makings, the ensuring the government to serve better.

The cloud storage plays an important role in this project by assuring a secured login credentials through key management technique. The public cloud stores the details of the policy descriptions, on-going projects, up-coming project plans, users, local-parties at regional level at current positions, users profiles thus a need for large storage space is satisfied by the cloud storage.

2. Related Works

The idea on the proposed framework is developed on the analysis of the related works that has both advantages and few constraints observed in each work in integrating the collaborative and interactive system.

A recommender system deployed in [4] is a suggestive approaches personalized to work on a common platform, the system benefits one approach in placing the views but does not encourage interactive process to yield and existing active plans, policies.

The system responds the participants with choices that can be suitable or might not irrespective to their interest. Here the author introduces analysis by providing REST-based APIs for its data retrieval and reviewing several directory entries in a GitHub with a hybrid filtering mechanism, Although the
system leads to provide a static approach with recommenders input limiting to the services rather than being the interactive model.

The comparative study in [6] provides the guidance on how a recommender services to deals with performance measures and metrics for the collaborative filtering systems, also the study gives the insights to common measures with item based recommendations and based on the active user’s view, these study restricts with utilization of data mining technique in exploring the analysis, that limits to the expansion of interactive data analysis for the future predictions, better mode of analysis may yield exact forecasting of user recommendations view to get clear understanding on the decisions, interest level [9].

Anyhow, this system aims to suggest and analyze the referred works to provide an efficient framework to ease the work of government parties involved in re-solving the queries, demands in a democratic environment.

The proposed framework targets at following features to integrate in the cloud based platform:

- Aiming 100% benefited for active schemes-policies
- Collaborating the activity of Policy making – Policy recommendations
- Insisting the role of Policy maker and local parties
- Exploring the new policy decisions
- Engaging in making policy – recommendations

3. System architecture

The Cloud-based User Recommender and E-governing System for Public Welfare is an efficient framework, figure 1 is developed based on the future technology that works on the public Cloud typically use a “pay as you go” for actively engaging the work of e-governance.

The system can be deployed with two login credentials supporting the administrative and individual logins, whereas the administrative logins can be supplied to local parties, government bodies, and regional parties of the government sectors restricting with key management mechanism for efficient data privacy protection achievable.

Figure 1. System Architecture Cloud-based E-governing System

Related works of the existing system provides the detail with respect to constraints based on limitations for accessing, based on the behavioral aspects, predicting future activities, frustrations as a
long road toward the modernization of its activities using the Information and Communication Technologies. It also gives the detail about the various area administrative events.

Flat service with basic assistance measures rising need for more data stretching out to different data channels for offering better types of assistance to actively engage in making policy decisions and proposals. This emerges the need of introducing the interactive system on a open source environment with the future technology to launch the application directly to each sectors of the rural and urban areas.

The proper utilization and the better knowledge on the framework can ensure yielding surprising effect with benefiting plans; schemes at the maximal utilization of all the proposed plans, scheme for the welfare of the public sectors, as well as the individual’s participation percentage will also give more satisfaction at the social level.

The impact on bringing this system in to practice must bring the awareness with the state level initially at each administrative area which will have better understanding of integrating and collaborating the operational and functional areas.

4. Data privacy mechanisms

![Data Policy Privacy Preservation Mechanism](image)

Data Privacy is ensured with behavior of a system shown in fig 2. Showing a Mechanism which facilitates the file upload and download through privacy algorithm for the secured login. In cloud environment, user’s profiles can upload and download files into the cloud. While registering the user has to enter the default attributes like name, voter ID number, password, email id, phone number, city, state and country. Then the user can select any of default attributes which would be asked while downloading or renewing the policy. Then the user has to enter some user defined attributes of their own choice. These attributes also have to be given while downloading files and renewing policy. The next operation is to upload files to cloud. For that we have to choose the file to be uploaded.

The secret key is to be generated for authentication purpose. Policy file is generated and encrypted simultaneously. The keys are split by Shamir’s key sharing technique. For downloading the file, the user has to send request to the KM and also should provide the user and default attributes. After checking for the valid user, the KM will send the key for decrypting the file to the user. The user can
also revoke and renew the existing policy. Revocation is the process of removing the existing files. For revoking policy, the user has to send request to cloud, and the cloud will revoke the selected files. For renewal of files, the user has to provide the old attributes as well the new attributes to the storage area.

User Data is the crucial asset for any sector that require high security and privacy, thus controlling unauthorized access to cloud data, access control mechanism is aimed with the intention of facilitating secure retrieval and storage technique. The proposed system constructed on a cloud-enabled mobile application get privileged with advantage of existing resources.

Portable application in cloud stage could be viewed as a unique IoT application in CoT. With the wide work of IoT application, the physical gadgets permit clients to share the versatile administrations helpfully [8]. Alongside the broad use and quick improvement of web data innovation, a pressing need is produced from end clients to create or arrange online versatile applications quickly particularly in cloud climate. Here the people and authoritative clients are proposed to actualize their redid applications by reusing existing IT assets including framework segments, administrations and information bases on a cloud stage.

5. Methodology

Methods used for implementation are,

5.1. executeQuery():
Method used to access values backend and perform operations in frontend.

5.2. executeUpdate()
Method used to access values frontend and perform operations in backend.

5.3. readObject()
Method used to read the object files.

5.4. writeObject()
Method used to write the object files.

5.5. accept()
Method used to accept the client request.

5.6. public static Connection getConnection()
This method is used to provide database connection by creating class name, driver manager and jdbc connection.

5.7. During establishment of a JDBC connection Procedure to follow is as below :
   a) Register the database driver by using
      Class.forName(" driver class for that specific database")
   b) Open a database connection using
      Connectionconn= DriverManager.getConnection(url,username,password)
   c) Create a query using
      Statement stmt = Connection.Statement("select * from TABLE NAME\n")
   d) Run the query
      stmt.executeUpdate()

5.8. getAddr():
It is the method used to return the IP address of that specified site.
Input: File name that includes the IP address of the site.
Output: IP address of that site taken from the file.

5.9. request.getParameter(variableName)
It determines that the value of the attribute "txtUserName" of the html form field is assigning to the String type variable "variableName".

5.10. request.getRequestDispatcher()
The RequestDispatcher method is used to forward or include response of a resource in a servlet.

5.11. Clear():
Method Clear the text area of the register form.

5.12. policyKey(String username)
This method is used to get the policy key.
Input: User name should be given as input.
Output: It will return the key information.

5.13. createKey(String user)
This method is used to generate the secret key for authentication.

Input: The user name is given as input
Output: The secret key will be stored in the variable result2.

5.14. updatepolicy(String name, String filename)
This method is used to renew the existing policy.
Input: The user name and the file name should be given as input.
Output: The existing policy will be removed and new policy is updated.

5.15. encrypt(String mess,String passWord1)
This method encrypt the given message to a different form.
Input: The message to be encrypted and the password is given as input.
Output: Encrypted text is displayed.

5.16. decrypt(String cipher,String passWord1)
This method decrypt the encrypted cipher to the original form.
Input: The cipher to be decrypted and the password is given as input.
Output: Decryption is performed and original message is displayed.

KEY_GENERATION_MECHANISM (KM):
While require to upload the new policy, project plans to the cloud, the admin raise a request to the KM to generate a public/private key pair. The said is done by sending a policy file to the KM.

The KM produces the key pair, associates that with the policy file, and sends the public part of the key to the client. After completing the registration process, authentication process will be performed between user and key manager using Diffie-Hellman key exchange Algorithm.

This algorithm is used to exchange the key secretly. It is secure because of the complexity to compute discrete algorithms.

STEPS:
1. Choose a prime number 'q'
2. Assume 'a' such that 'a' is a primitive root of 'q' and a < q
3. Select such that Xa <q
4. Calculate Ya
   \[ Y_a = a^{X_a} \mod q \]
5. Select such that Xb <q
6. Calculate Yb
   \[ Y_b = a^{X_b} \mod q \]

Key for User A, \( k = (Y_b)^{X_a} \mod q \)
Key for User B, \( k = (Y_a)^{X_b} \mod q \)

Presently the client A and B gets their individual mystery keys. After that client will scramble their document utilizing mystery key which is given by cloud, in view of client credits and afterward it will transferred into cloud. All the while the strategy record will likewise be created and it contains username, filename and access authorization, naturally client access consent will be permitted.

Rivest-Shamir-Adleman (RSA) calculation is utilized to produce keys for the key administrator. The public aspect of the key is encoded and doled out to the key directors. Digital Encryption Standard (DES) is a productive calculation which is utilized to encode the client documents which is to be transferred into the cloud and furthermore to scramble the approach record. Presently client separates mystery key into n shares (S1, S2… Sn) by utilizing Shamir’s key sharing procedure and client scrambles their I-th key offer with public key of I-th key director.

USER NAVIGATIONS GUIDANCE:
In proposed system, there are two roles one is the Citizen/people/public as user and the other is government bodies, administrative parties as admin. At the admin stage the existing active policies, project plans that are currently approved and progressing under the area are notified. Any update of the existing plans and the new plans that is going to be initiated is also intimated to the user. The users also as the equal rights to participate actively by placing recommendations and suggestions. Each user need to log in using their valid identity.
6. Structure of the framework design and working

The below are the user window, demonstrates the system of e-governance for Active Projects Under taken, modification in policies, Managing Projects-Policies and Alert the User by notifications.

Figure 3. Login Page

Figure 4. User registration window
Figure 5. Active Projects Undertaken

Figure 6. Existing Active Plans-Policies
Figure 7. User Recommendations updated list

Figure 8. Admin login-to up-date new policies-projects
7. Open challenges

The framework can be enhanced to provide and alert with change in upgrade of policy decisions and expire of schemes listed. Further the tracking of beneficiary active policies and suggestions with high priority can be enabled by integrating convolution network models with natural language processing that supports better performance of taking quick decisions on emergency periods.

Interactive system may support facial recognition for eliminating duplication of logins as individuals and also restricting single login for an individual user, hence can facilitate facial recognition with valid voter identity provided for effective utilization of privacy preservation mechanisms.
8. Conclusion

This works inspire future crowd sourcing functionalities in government, accomplished within an efficient framework to implement a crowd sourcing based on democratic policies. The users and the admin play vital role where the proposed plans and policies to be executed in future are updated dynamically in the framework, such that aiming at maximal utilization of democracy welfare reached the public. When the framework is studied and analyzed with its complete knowledge and when deployed in a smarter way, this system will definitely bring a massive change in between the public and the administrative to get higher order of work efficiency and yielding better management of work-flow in government sectors. And the user gets the notification of the every new and update plan and suggestions can also be given by the users. It provides an overview of crowd sourcing. These best practices also impart an emerging need for further research and case studies related to crowd sourcing in a democratic Nation.

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