Web based Application as a Communication Platform for Farmers

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Abstract: Despite of the government efforts, farmers around the world are facing a lot of challenges in agriculture such as lack of money for investment in seeds, required machinery for farming, insufficient water availability and many more, even in this modern era. The government has been trying hard to empower and support them in facing these challenges by introducing number of schemes in favor of farmers. But majority of the farmers in most of the countries are not used to technology in communication. As a result, the details regarding schemes are not known to majority of farmers and thus amounting to small number of farmers benefitting from those schemes. Thus, there is a necessity to develop an interoperable, dynamic and easy-to-use communication platform that helps to bridge the communication gap between farmers and the government. The proposed system acts as an interface between end users and the government and picks the list of end users who will be benefited from the schemes and sends a voice message to them in their regional language explaining the complete details about the schemes to which they are eligible and the procedure to avail those benefits. The platform is built using web technologies, webservice, communication gateway, proper set of resources and end users. It is interoperable as the end users need not require even a smart phone. This system creates healthy awareness among farmers. It can also be used for various other awareness programs more effectively. Using this system is more feasible and effective and there is a need of using it in the present world.

Keywords: Web Technologies, Web Server, Communication Gateway, Set of resources and end users.

I. INTRODUCTION

Agriculture is the primary occupation in many countries like in India. Many challenges are faced by farmers around the world like lack of money for investment in seeds, less costs for the produced food, lack of proper machinery for farming, lack of implementation of technological advancements in real life, etc., Development is always going on in this field to increase the production and decrease the challenges faced by farmers. The government is also launching many new schemes to reduce the effect caused by damage and empower farmers. It is launching a new site for every scheme and in rural areas hardly 5% people actually know the procedure to apply in the new site. Assessing the actual number of beneficiaries of various schemes introduced by the government to support farmers is not a difficult task. But increasing that number is a challenging task. Even in this modern world, we are not able to see large number of beneficiaries for the schemes. There may be a lot of reasons behind this. But the main reason is the lack of proper communication to the eligible ones. And huge amounts of money provided by the government for the empowerment of farmers is being wasted as only few people are having knowledge on the loans, schemes and they are depending on middlemen to get awareness about all these. Various apps and web applications were developed which show information in their applications. But who will carry that information to the eligible end users who do not have access to those applications? Our system bridges that communication gap, which can bring huge increasing change in the total number of beneficiaries.

It is developed using web technologies like HTML, CSS, PHP, JAVASCRIPT, web server (ex., wamp), communication gateway, dynamic set of end users and resources. We take information from official announcements and the government Orders and pass that information to eligible end users in their regional language in the form of a voice message. The main advantage of this system is that the end user need not use internet, smart phone or install any software. A normal voice message is sent to eligible ones among the end users using communication gateway API like SMSSGatewayHub. That message explains the complete procedure to avail the benefits. We can obtain the data of end users from trusted resources like Local Secretariat Offices. People who can access internet can directly register for our services online too. Thus, this system covers all kinds of users. The platform also acts as a single reference to all the schemes instead of having a different website for each one. This awareness brings in a huge increase in the beneficiaries. It is feasible in all sectors which have a proper set of data of end users. There is a need for the government and all private sectors to implement this idea to increase the beneficiaries in large amount.

II. THE PROPOSED SYSTEM

2.1 Workflow of the proposed system

The proposed system works as shown in the Fig 1. Being clear, the steps involved are:
- Collection of the Government Orders and Announcements.
- Collection of end users data from trusted resources. (optionally user can directly register in the website)
- Picking eligible ones from the available list.
- Grouping users based on regional language.
- Generating voice message in regional languages using translator and text to speech converter.
- Sending voice messages to end users using a communication gateway.
- Updating web application to reach people who use internet.

Fig 1: Workflow of the proposed system

2.2 Components involved in the proposed system

2.1.1 Collection of Information

Updates, announcements and the government orders are collected by our team from various official websites and media. We researched on the main aspects that the government look for dividing the farmers in agricultural sector and prepared a list of elements that need to be examined for each farmer. They are

- Type of farmer: tenant/owner of the land
- Loan details: loanee/non-loanee
- Type of crops they cultivate: food crops (cereals, millets and pulses)/oilseeds/annual commercial crops (horticultural crops)
- Season of farming: kharif/rabi (in India)
- Size of the field: ranges like (0-100)/ (100-1000)/above 1000
- Water availability in that region: high/medium/low
- Native language

We collect all the above details of farmers in a particular region from the local secretariat offices and store it in a database for further processing. Updates are also collected based on the above list of elements.

2.1.2 Generation of text and voice message

Based on the update collected, the list of eligible farmers/end users from the available set is queried and are grouped based on their regional language. Then the actual content to be communicated is translated into the languages obtained from the query using Unicode translation. Then that Unicode text message is converted into voice message using text to speech converter.

2.1.3 Updating the web application

Even though the end user gets updated through text and voice messages, the users can directly have access to updated information provided in our website. The website is updated whenever an announcement or the government order is released by
the government on any media.

We have made it easy for the administrator of the platform to update the website directly from the website itself by providing a special login to the admin such that he can access and modify the content on the website very easily. Thus, this system is dynamic in nature.

III. IMPLEMENTATION OF THE PROPOSED SYSTEM

3.1 Software Technologies used

In our implementation of the above idea, we used the technological stack shown below.

- **Programming Languages**: HTML, CSS, JAVASCRIPT, PHP
  
  These languages are used to develop a dynamic web application. HTML, CSS and JAVASCRIPT are used to develop frontend i.e., user interface and PHP is used for server side scripting. We used PHP to link database with our web application. It is used as a server scripting language, and a powerful tool for developing dynamic and interactive Web pages. Its advantages include widely-used, free and efficient.

- **Database**: MYSQL
  
  Database is used to store the farmers details and the schemes details. MySQL is a relational database management system (RDBMS) based on Structured Query Language (SQL). It serves a wide range of purposes, including data warehousing, e-commerce, and logging applications.

  Most commonly it is used as a web database. It can be used to store anything from a single record of information to an entire backend for an online store. In association with a scripting language such as PHP or Perl, it is possible to create websites which will interact in real-time with a MySQL database to rapidly display categorized and searchable information to a website user.

- **Webserver**: WampServer
  
  A web server is server software, or hardware dedicated to running a particular software, that can satisfy client requests on the World Wide Web. A web server can maintain one or more websites. It processes incoming network requests over HTTP and several other related protocols.

  The primary function of a web server is storing, processing and delivering web pages to clients. The communication between client and server takes place using the Hyper Text Transfer Protocol (HTTP). Generally, pages delivered are HTML documents, which may include images, style sheets (CSS), scripts and text content. WAMP is one of the best web servers available.

- **Database Language**: SQL
  
  SQL is a special-purpose programming language designed to manage data in a relational database management system (RDBMS).

- **Communication Gateway**: smsgatewayhub API
  
  Communication gateway is used for communication between the admin of the system to the end users directly just by a click.

  We used smsgateway hub API for this purpose.

3.2 Design of the implementation

The implementation of the proposed system can be done in the form of a web application. Our implementation “AGRISCHEMES” is as shown in the following figures below. Fig 2 and Fig 3 shows the home page of the application. Important features of the web application are

- State government schemes
- Central government schemes
- Admin
- Contact us
- Add me
- Login
In the “state government schemes” tab, we find the schemes and updates relating to state government. For example, the Andhra Pradesh state government schemes are as shown in the Fig 4. Similar pages are available in “central government schemes” tab also.
Clicking on one of the scheme gives complete details about the scheme like status of the scheme, amount allotted, conditions to be eligible, amount released, people benefited from that scheme, official website link, procedure to apply and many more. It is shown in the Fig 5 below.

The end user can change the language using Google translate button and can understand the content provided in their own regional language. Admin can login and update the website dynamically by clicking on the admin tab. The page looks as shown in Fig 6.
After logging in, the web page will be as shown in the Fig 8. Two options are available here: Adding to state or adding to central. Admin can directly update the website by adding the new information here itself.

The admin can click on any one of the schemes. If the admin clicks on “state government schemes”, a form will appear as shown in Fig 9 which acts as an updation form. The changes are reflected in the application.
If added successfully, we get the following screen as shown in the Fig 10. It shows the mobile numbers of all the end users (here farmers) who meet all the conditions mentioned in the updation form.

On clicking the “SEND MESSAGES” button in the page shown above in the Fig 10, an alert message will be sent to the list of mobile numbers presented in the Fig 9 above. Mobile numbers will be separated by a comma ‘,’ and grouped by regional language. The admin can add any number of mobile numbers additionally to the already available list of numbers. And any alert message can be added by the admin at the time of sending message.
A sample message sent when a sample scheme had been added to the database is as shown in the Fig 11 below. The message is sent to a farmer whose regional language is Telugu. Parallelly, a voice message which explains complete details and procedure regarding the information and application procedure.

![Sample text message](image)

Fig 11: Sample text message

The “Add me” and “Login” buttons can be used by end user to register to our services manually. Using “contact us” people can contact the admin through a google form.

### 3.3 Other features of the system

There are many other features in the implementation shown in the section 3.2. They are as follows.

- “Crops and diseases” tab shows the diseases and preventive measures to be followed for crops by dividing crops based on the soil in which they grow.
- “Fluctuations” tab gives information about the reasons behind the frequent fluctuations in the prices of vegetables like onions and tomatoes.
- Users can unsubscribe by clicking on the unsubscribe link present at the bottom of the page shown in Fig 3.

### IV. ADVANTAGES OF THE PROPOSED SYSTEM

There are many advantages of using this application. If this application or the idea of the system is used by the government authorities, it can bring enormous increase in the number of beneficiaries and create a lot of awareness among the target end users. Its advantages are listed below.

- Single reference for multiple queries as information about all the schemes are listed here.
- No software requirement at client side as end users data can be collected from local secretariats
- Non-farmers and farmers can also have access to the services by registering manually in the website if they have access to internet.
- Easy to use and interoperable
- Removes language barrier by sending both text and voice messages in regional languages
- Creates awareness among farmers (end users)
- Dynamic application
- Brings enormous increase in the number of beneficiaries

### V. RESULTS

A text message as shown in Fig 11 above and voice message will be sent to the farmer if he/she becomes eligible for a scheme to alert and update them with the latest information. For analysis, we have run this web application in a small village called “Edupugallu” near Vijayawada, India. There are nearly 240 farmers in that village. We collected that data and tested the application on that data for 3 months. We have seen an increase of 12.4% in the number of beneficiaries in just 3 months. We hope that there will be enormous increase in the beneficiaries if government implement this application in all the sectors state/national wide.

### VI. CONCLUSION AND FUTURE WORK

This application increases the number of beneficiaries of the agricultural schemes by alerting the farmers regarding the schemes in their regional understandable language. This application is incredibly useful as it can reduce the number of challenges faced
by farmers in the world. We can use the same design of the system to empower other sectors like fishing, animal husbandry, poultry, education sector and many more. It helps in increasing awareness among the people enormously. This system can be more useful if the government implements this design in all the sectors.

We will improve the application by encouraging new ideas that make the application more easiers to access. We try to expand this feature to all the remaining sectors slowly. We are also planning to further extend our project in the stream of prediction of prices of some vegetables whose prices fluctuate very often such as, onions and tomatoes.

VII. REFERENCES