Smart Assistance System to Improve Agriculture Productivity

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ABSTRACT: extracting data from different web pages online is a significant task. Here is a system that can extract information related to different agricultural products from websites of agricultural wholesales and deliver them to farmers. This system is for the government agencies, which provides the farmers easy access to information on weather, market price of the crops, and more. All these data can be communicated with the farmers via text message (SMS).
Because of the ever-changing world which is progressing towards automation, everyone deserves to reap its benefits, even the farmers. As farmers aren't able gather information about weather and crop prices because of a lack of access to smartphones, it is important to develop a system that levels up the playing field.
This system is suitable for all the farmers who have only basic mobile sets and they wish to improve their productivity and profits.

KEYWORDS*:* HTML, MongoDB, Flask, Web Data Extraction, SMS Service

I. INTRODUCTION

The world is evolving at a fast pace and everyone is reaping the benefits. Then why should the farmers lag behind? Even though the farmers are evolving and implementing new and more efficient methods for farming, sometimes they lag behind because they don't have enough information. They don't have proper information about the weather which can sometimes harm the crops. For example – if they don't know it is going to rain and they sow a crop that needs very less water, then the crop might get spoiled and the lot will go to waste. Similarly, they also face a serious problem of getting paid very less for the yield because they aren't quite aware of the everyday crop prices.

Our primary goal` is to help the farmers in both these areas and help them live a more productive and profitable life. This system will give the farmers the ability to uphold their value and come up with prices that are favorable to them for the amount of work they have done.

Our system will allow the farmers to work in tandem with the gram panchayat of their village or the admin or anyone who has admin permission to the system and get daily updates of the crop prices and weather.

Everything is digitalized these days and every task is readily performed on your smartphones. However, farmers get so less margin on their crops that they are barely able to afford food let alone a fancy smartphone.

This system is aimed at improving the condition of such farmers as it will give them the same amount of information that you can get on some of the apps and websites. The advantage of this system is that it will work even for basic mobile sets so even if you have a keypad phone or any old phone which isn't a smartphone, you will still get the information. Another benefit of using this system is that the farmers won't be needed to have access to internet for receiving the messages.

The methodology is designed in a way that the administrator can keep tabs on all the farmers who have entered their names in the system to receive daily updates. The admin will also have the personal details of the farmers including their districts, mobile numbers, and the crops they chosen for getting the price. The front end will be an HTML website where the farmer gives the information. That information gets stored in the database. At the back end, the weather data and crop prices of individual districts are retrieved from the World Wide Web and sent to the farmers on the basis of the crops and districts they had given. The information is sent in the form of an SMS so that every farmer is able to access it irrespective of the type of mobile phone they have. However, they do need to have an active SIM otherwise they won't be able to receive the message updates.

II. EXISTING SYSTEM

A. Mobile Apps

There are existing mobile apps that provide crop prices while there are apps that provide weather details. In such apps, the user is required to download them from either Play Store or App Store (on the basis of the OS in their smartphone) and install it on their smartphones. Then, the user needs to make an ID and login their credentials before selecting the crops whose prices they want to see.

The disadvantage with such a system is that not every farmer is able to afford a smartphone. Additionally, a lot of farmers don't know the basics of smartphones like downloading apps, how to make an ID, how to access different apps. In short, some technical knowledge is needed to use this system and the farmers might not have that much knowledge. Also, these apps consume a lot of memory and come with a lot of bugs as not a lot of people use it so the bugs aren't fixed as often.

B. Websites

Another existing system where the farmers can receive information like crop prices and weather data is via websites. There are a few government websites where you can visit using the internet and check the prices of crops and the weather in your district.

Here, you don't need to create an ID as you can just visit the page and view all the information. However, this system also has its flaws.

Not many farmers are able to afford desktops or laptops, which is a basic requirement for viewing such websites. Also, not all such websites are supported on mobile phones so that alternative is also not viable. Even if these websites were available on smartphones, chances are that most of the farmers will not be able to afford smartphones and a regular internet connection so again such information won't be accessible to them.

III. PROPOSED SYSTEM

We have proposed a system where the farmers can receive both the weather data and crop prices directly on their mobile devices in the form of an SMS.

In our proposed system, the farmer provides their personal details including name, district, mobile number, and the crop prices that they want. The system is designed in a way it crawls the World Wide Web and gathers the weather details and current crop prices of that day and stores it temporarily before it is sent to the farmers. There are a lot of components involved in this system –

A. Hardware Components

The module would require the use of a laptop/PC from the admin end and basic mobile phones from the user end. The admin will use a laptop/PC to enter all the details of the farmers and the users will be receiving the messages on their mobile phones.

1. Laptop/PC

While most laptops and PCs will be able to run this system easily but there are some minimum requirements needed to carry out this project. Those are:

- Windows XP, 7, 8, or 10 (if Windows user)
- MacOS 10.8.3 or above (if Mac user)
- Minimum 1 GB of RAM
- 10 GB free Hard Disk storage space

Fig 1. PC/Laptop

2. Mobile Phones

Mobile phones are necessary for the user end as the farmers will be receiving the crop prices and weather data on their mobile phones. This system works on every mobile device including the basic mobile phones given there is an active SIM card working on that device.

Fig 2. Basic Mobile set

B. Software Components

This module requires the system to access the World Wide Web and gather all the needed information is temporarily stored before it is sent directly to the farmers.
There are some software needed for the back-end of this system. These include –

1. PyCharm

PyCharm is a python IDE (Integrated Development Environment) for developing various programs and applications in computer. PyCharm is developed by JetBrains which is a Czech company. JetBrains has many other software other than PyCharm, like IntelliJ IDEA which is the most intelligent IDE used for programming

applications and software's in java, ReSharper is a visual studio extension for .NET Developers and many more. PyCharm was released in July 2010 i.e. 8 years ago. It works well in any platform whether it is windows OS or MacOS. The size of the software varies from 174 megabytes to 270 megabytes.
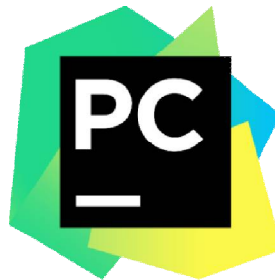

Fig 3.PyCharm

2. Sublime Text 3

We will use Sublime Text, a proprietary cross-platform source code editor that supports most programming languages, markup languages, and functions that can be added with plugins. It is community-built and is maintained under free-software licenses.

We have chosen this source code editor because it supports a lot of features including –

- "Goto Anything", navigate to files quickly
- "Command Palette" is useful in adaptive matching for quick keyboard invocation.
- Using simultaneous editing you can simultnanously make the same interactive changes to one or more selected areas.
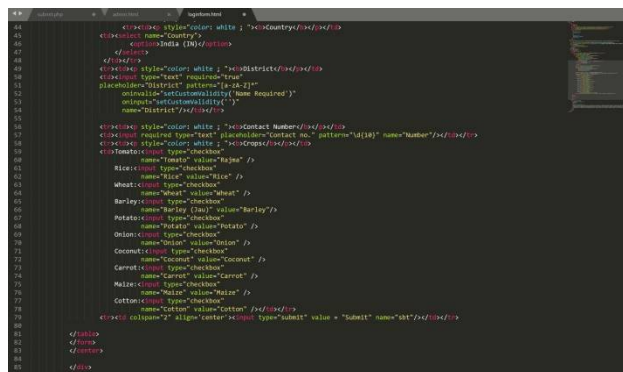- Cross-platform (Window, macOS, and Linux)

Fig 4. Sublime Text 3 Editor

3. MongoDB

MongoDB, a document database was used as it provides a lot of scalability and flexibility that is needed with querying and indexing.

- It stores data in a flexible, JSON-like document meaning the fields can vary and the data structures can be changed over time.
- It maps to the objects in your code making the data easy to work with.

IV. IMPLEMENTATION

The project was divided in different modules and in the end all the modules are combined together to form one system that successfully delivers the output.

Front-end

- For the front-end, HTML was chosen to create a website where the admin could take the personal information from the farmers and connect to them via their contact numbers.
- The connection between the front-end and back-end was made using flask.

Back-end

In the back-end, there were a number of modules including weather, crop prices, and messaging system.

- For retrieving the weather data, we had to create an ID on Open Weather Map, get the API in python, and use that API for weather data extraction. This would provide us with the live weather information around the world.
- For agriculture data, we had to create an ID on data.gov.in and retrieve the live data in the form of .csv file or JSON format. For our project, we chose JSON format. That data was stored in the MongoDB database using python.
- For sending SMS, we had to create an account on fast2sms and retrieve the API and API key. Then, this API was connected with the back-end and all the other modules were merged together to successfully send the needed data in the form of SMS to the farmers.

V. CONCLUSION

Our service provides the output in the form of an SMS. Any person who registers will be able to receive and view the messages.

We were able to effectively retrieve data from a government website, store it in MongoDB database, and send it to the farmers via SMS. The farmers are never able to make enough living for the amount of hard work and effort they put. Through our system, we hope to make the farmers more aware of not just the weather but also the amount of money they deserve to make for all the countless hours of work they are giving on the field. If they are aware of the weather, they will make smarter decisions so that the crops are not spoilt. Similarly, if they are aware of the market prices of the crops, they will not sell at very less prices to the vendors (something that happens currently), and be able to make a profit out of the crops sold.
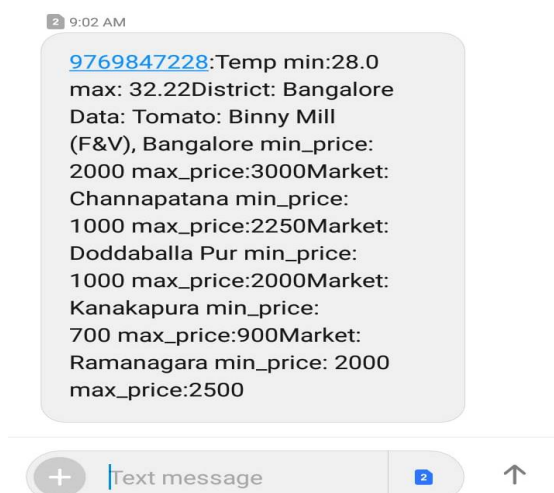
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