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Farming Assistant Using Web Service

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Abstract:

This innovative service will allow a good opportunity for farmers, dealers and customers to have good rapo with each other under the authority of government. It will increase the communication gap between a customer and a farmer which will definitely benefit both using AI Chatbots. To reduce the efforts of farmers, by providing them online verification of the documents, as visiting government office frequently becomes hectic for everyone. This can be achieved by using Machine Learning OpenCV Library as it is a great tool for image processing and performing computer vision tasks. When dealers publish an advertisement or offer, the respective farmer will get notified via email or text message. This SMS system is achieved by using SMS API to connect SMS sending software to our website. After installing the SMS software, we have to check whether we can send SMS messages from the gateway manually. After the gateway is functioning, we can add this SMS system into our website by using Plivo python SDK. Farmers can apply their grievances online. Farmers get recommendations on which fertilizer to use based on the crop and soil fertility. This recommendation will be implemented by using SVM model from machine learning.

Keywords:

Machine Learning, Artificial Intelligence, OpenCV, Support Vector Machine, Plivo Python SDK, Python, MySQL

I. INTRODUCTION

The project that guarantees greater profitability than the outdated manual system is the agricultural web service. This will be accomplished through direct communication between the provider and the farmer as well as other aspects of the project. This solution enhances business contact between farmers as well as between farmers and suppliers. By eliminating intermediaries, it also increases transparency among suppliers and farmers.

This system has a variety of benefits, including digital KYC, which enables farmers to upload their documents without travelling to a center and wasting a lot of time, AI chatbots used to answer questions, SMS notifications for advertisements, and fertilizer recommendation systems to assist farmers based on soil needs.

Farmers in a region typically know little to nothing about farming and are just familiar with the crops they have been growing for a long time. The Farming Assistant website aspires to be a one-stop resource that will unite farmers across the nation to share expertise and support one another, as well as give news on agriculture to keep farmers informed of changes in their industry.

II. LITERATURE SURVEY

Agricultural Web Services has been the subject of extensive research. Despite the fact that there are many websites on this subject, none of them fulfils the promise of being a one-stop shop. Following are the main conclusions that were reached after conducting a literature review:

1. The use of digital KYC lowers the risk of KYC because it saves time by requiring only the scanning and uploading of data to complete the KYC procedure. Its disadvantage is that it needs a big dataset and plenty of memory. [4]
KYC (Know Your Customer) here acts as a critical gatekeeper process to safeguard against frauds made using fake id's and protect further malfunctioning. Though Customers can fill forms manually on sheets of paper but this can lead to a lot of discrepancy because of human errors, illegible handwriting, and malfunctioning writing material. This could lead to a lot of wastage of paper and time .It involves collecting basic identity & address information about the customer. One has to submit some documents to authenticate identity and address of the customer. The list of documents required is mentioned below:-

- Proof of Address
- Proof of Identity
- 7/12 extract (ROR)

KYC process even can be done in offline mode , it can take maximum 7 to 8 days for the KYC to be approved which will include loss of patience , and lots of efforts. Another way of getting approval on our KYC is Online Aadhaar Based Biometric but this also cannot be considered as a good choice considering today's scenario. So comparatively Digital KYC can hardly take your time maintaining ones health security.

2. People will be able to buy fresh food to eat with the use of this application, and they will be able to explore areas of their nearby communities to pick up their purchases and create relationships with farmers while making money by saving money and giving it straight to the farmer.[1]

3. It enables farmers to ask questions about agriculture and receive answers in both text and speech but not in their own tongue.[2] Eliza is considered as the first chatbot which works on the pattern matching system. It is developed by Joseph Weizenbaum in 1964 . ALICE is rule-based chatbot based on the Artificial Intelligence Markup Language (AIML). It has more than 40,000 categories, where each category has combination of pattern and its response. AIML based chatbots are easy to implement, they are lightweight and efficient to work. The author in his paper introduces an artificial brain where the web-based bot generates customized user responses, aligned to the desired character. Questions asked to the bot, which is not understood is further processed using a third-party expert system (an online intelligent research assistant), and the response is archived

4. With the downside of requiring a GPS system, SMS systems provide users with a quick, dependable, and easy option to request assistance in an emergency.[5] SMS makes it simple for customers and farmers to communicate with one another. This will make it easier for the suppliers to publish advertisements about the need for grains or products. Additionally, the SMS API works with a wide range of programming environments and development languages. It is quick and easy to integrate the SMS API into the programming environment, and it offers all the choices accessible for controlling SMS sending and receiving.

5. A huge amount of data is needed for the fertilization recommendation system, but it increases productivity, profitability, and nutrient usage efficiency when seeds are present.[3] Limin Chuana and Ping Hea proposed a fertilizer recommendation system for wheat in China.Department of agriculture, government of West Bengal has developed soil test based fertilizer recommendation system (STFRS) for farmers in West Bengal . Mansi Shinde have proposed a crop recommendation and fertilizer purchase system which uses a-priori algorithm for recommendation. Based on previous history of fertilizers purchase recommendations are provided.

III. PROJECT METHODOLOGY

Requirements :

Software Requirements:

Operating System : Windows 7 or higher
Database : SQL Server
IDE : Python IDE
Languages : HTML, CSS, Python

Hardware Requirements:

Processor : i3 or higher
HardDisk : 5GB
Memory : 1GB RAM

Project Plan :

Our project's major goal is to assist the farmer in working towards increased profitability by establishing direct contact between the farmer and the client. First, a simple and useful GUI is provided to accomplish this. A chatbot is then introduced to help the user. The user's chosen language can be used to access this chatbot. Lastly, the digital KYC, which is completed after the registration process itself, establishes confidence before the give and take between the farmer and the client.

Finally, our primary goal is to assist farmers in conducting direct-to-consumer (D2C) transactions by assisting them in selling their goods to customers without going via a store. Using the portal, the farmer can directly list his goods for sale, and customers can browse these postings. So, the customer can get in touch with the farmer and ask for the items based on his or her needs. A strong relationship between the farmer and the customers will also be facilitated by our project.

Also, we are providing farmers with a tool that will assist them increase their yield and, consequently, their profit: fertiliser recommendations. The findings of the soil fertility test will be fed into this module, which will then offer a suggestion.

Steps taken by the SVM algorithm:

Step 1 : The SVM algorithm predicts the classes in step one. One of the classes has the identification number 1, while the other has the number -1.

Step 2 : The business problem is transformed into a mathematical equation with unknown variables, as is done by all machine learning algorithms. The task is then transformed into an optimization problem in order to find these unknowns. such as optimization issues In the case of the SVM classifier, a loss function known as the hinge loss function is utilised and adjusted to find the maximum margin. When searching for and tuning unknowns, one should always strive to maximise or minimise anything.

Step 3: For clarity, this loss function can also be referred to as a cost function, with a cost of 0 for predictions of no classes that are inaccurate. Error/loss is then assessed if this is not the case. The issue with the current situation is that there is a conflict between maximising margin and the loss that results from doing so to an extreme degree. The addition of a regularisation parameter theoretically grounds these ideas.

Step 4: Like with the majority of optimization problems, weights are optimised by computing gradients using partial derivatives, an intermediate calculus topic.

Step 5: The gradients are updated only when there is no classification error using the regularisation parameter, and when misclassification occurs using the loss function.

Step 6: When there is no classification error, the gradients are just updated using the regularisation parameter; however, when misclassification occurs, the loss function is also applied.

Important SVM Concepts :

Stability Vectors :

The data points on which bases margins are calculated and maximised are known as support vectors.

Strong Margin -

Hard Margin is a decision boundary that ensures that all of the data points are accurately categorised. While this prevents any errors from being made by the SVM classifier, it can also cause the margins to contract, defeating the very goal of utilising an SVM algorithm.

Weak Margin -

The loss function in the SVM classification algorithm is also given a regularisation parameter. The user can increase margins at the expense of misclassification by using this combination of the loss function and regularisation parameter. The requirement to control this classification, however, gives rise to another hyper-parameter that requires tuning.

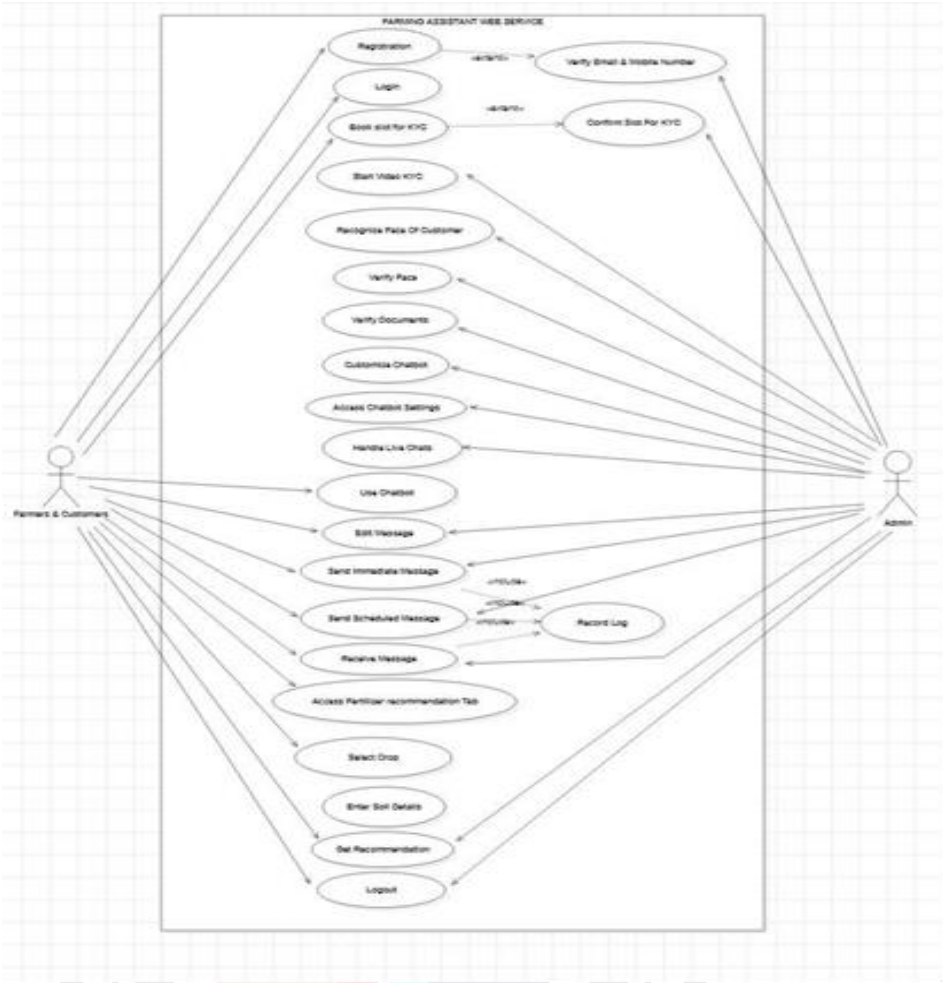


Fig.no-1 : Usecase diagram for Farming Assistant Web Service

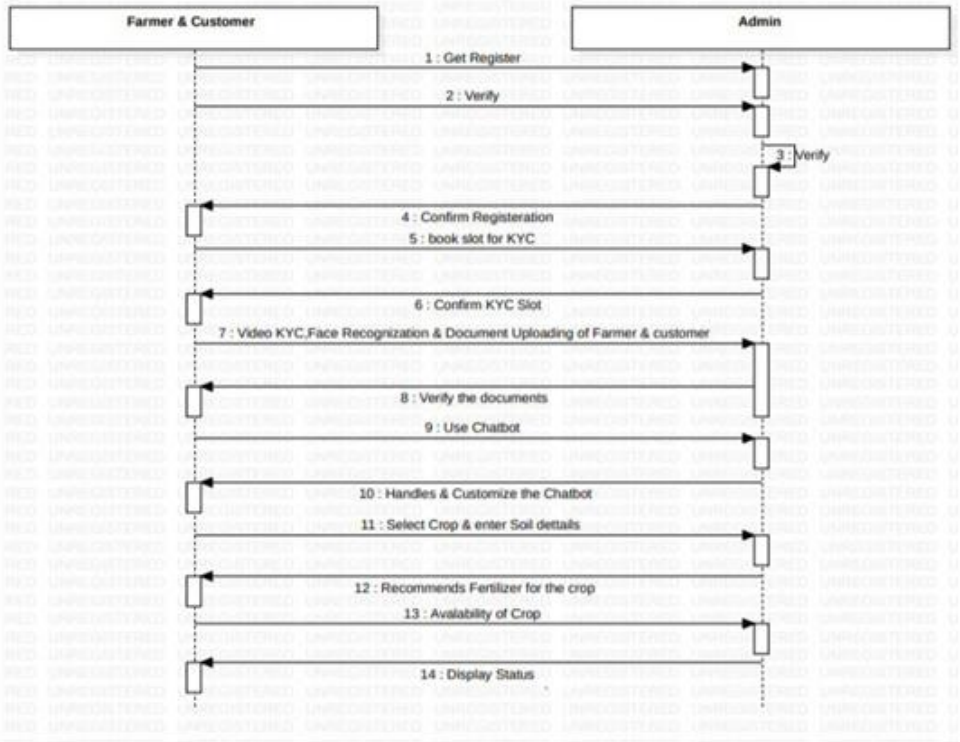


Fig.No – 2 Sequence diagram for Farming Assistant Web Service

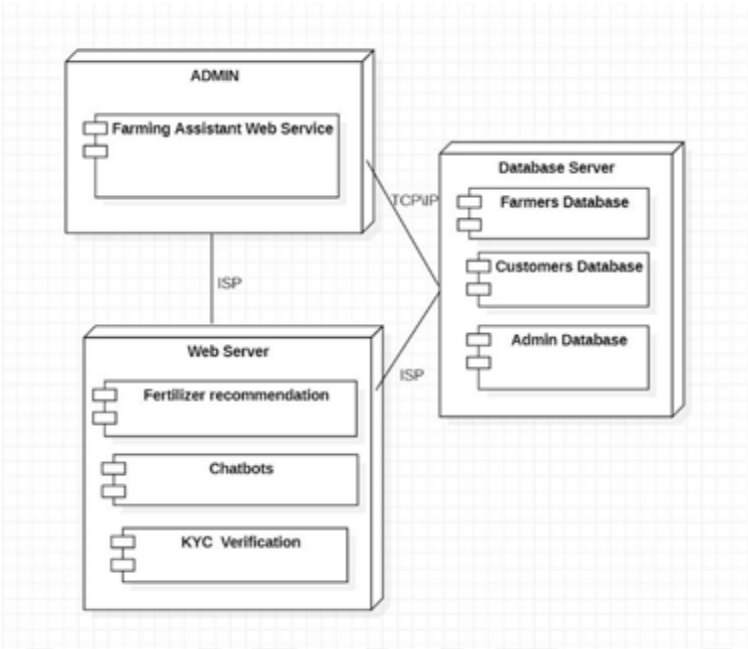
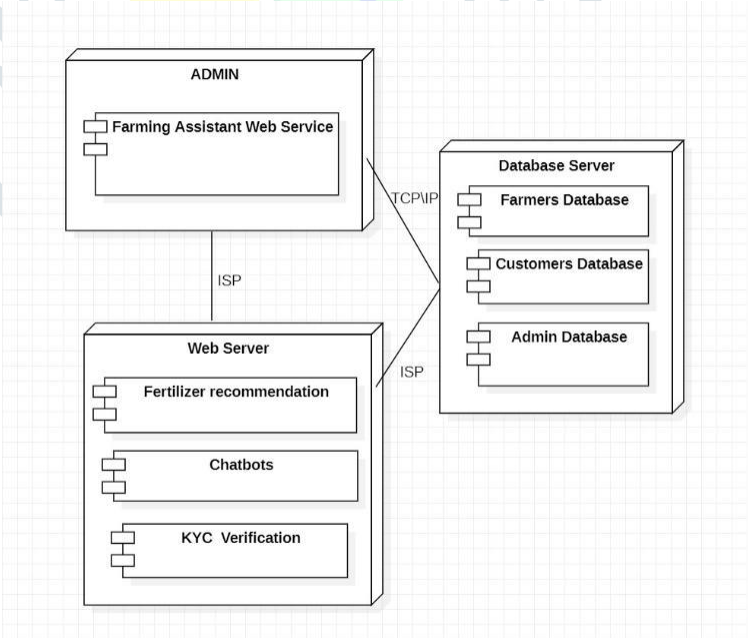


Fig.No-3 : Deployment Diagram for Farming Assistant Web Servic

IV. CONCLUSION

By lowering the amount of time and money spent on paper-based procedures and record-keeping, digital KYC will streamline the registration process.The ability to use chatbots in novel situations and explore their potential uses in agriculture is made possible by understanding of chatbots.The goal of incorporating an SMS system into our product was to make people's jobs easier on both ends, i.e., customers and farmers.By suggesting the right fertiliser, fertiliser recommendations help to boost crop productivity.



V. FUTURE SCOPE

- Design Improvement
- Mobile app for Android
- Provide commercial services

VI. REFERENCES

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