2nd National Conference on Engineering Applications of Emerging Technology in association with International Journal of Scientific Research in Science, Engineering and Technology | Print ISSN: 2395-1990 | Online ISSN : 2394-4099
[https://ijsrset.com | doi : https://doi.org/10.32628/IJSRSET]

Implementation of Smart Agriculture System Using Machine Learning Algorithm

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ABSTRACT

Agriculture is the framework of the society as it majorly operates to furnish food, cotton and fiber on which all the human livelihood is dependent on. Precision agriculture is performed with an objective to seek adequate analysis at the precise place in appropriate time with the motive to come up with low-input, sustainable agricultural yield and high proficiency.

The paradigm model of mechanized agriculture system using IoT, ML which will be used for Smart Farming, where the evolution price is to be entirely considered, to make sure that the food producers will be able to subsidize their capital as a end user. Therefore, farmers can then nourish the farm conditions from anywhere at any point of time. It is functional through the commands from smart devices such as cellular phone. A software application will be developed and examined for its successful connectivity to the precision agriculture system model, which gives very relevant recommendation on the whole overall above mentioned specifications. In this project, we have proposed the idea to develop a smart agriculture recommendation system for farmers that will make use of advanced technologies such as cloud computing, machine learning, etc. The project focusses on making use of emerging technology i.e. machine learning for smart agriculture recommendation system using automation. In case of any discrepancy sending an SMS alert as well as apprising on the application built for the same to the farmer's cell phones using Wi-Fi/3G/4G. The system has a duplex (both the ways) communication link based on a cellular Internet interconnectivity that allows for data scrutiny. This automated agriculture system will help our farmers in all aspects (which will act as a farmer's very good companion who can give convenient and real time recommendation to him).

Keywords—data analysis, recommendation, notifying, qualitative crops, smart farming, machine learning algorithms

I. INTRODUCTION

In India, agriculture is the primary occupation. According to agriculture and allied industries report IBEF (India Brand Equity Foundation) and also various census which was going away, 58% of the people living in rural areas in India are dependent on agriculture. The overall global community is predicted to touch 9.67 billion by 2050 – this give rise to a giant threat for the agriculture industry.

According to the World Bank Group it accounts for third of global GDP; by 2050 it is thought that prolificacy of the agriculture will need to rise by 70% just to contend with demand. In their efforts to meet the rising demand food grower (farmers) should now turn into digital revolution to increase their yield and farming proficiency. To assure these rising needs, agriculture should meet up to the new technologies. As a contribution towards increasing farming efficiency ML based agriculture system is designed that will support monitoring the crop and it will help the farmers give best possible recommendations by analyzing all parameters like humidity, soil moisture, quantity and quality of fertilizers to be added, rain, etc. The recommendations are given by web application for successful connectivity with farmers and suggest them about all necessary above mentioned parameters for farming in appropriate manner.

II. PROPOSED SYSTEM

The below diagram is based on dataset manipulation and web interfacing, firstly considering the dataset, it undergoes training, cleaning, validation and testing, which is further used for prediction and recommendation. Database is purely storing unit for data acquired by sensors. Web interface has two user input parameters and an output window.

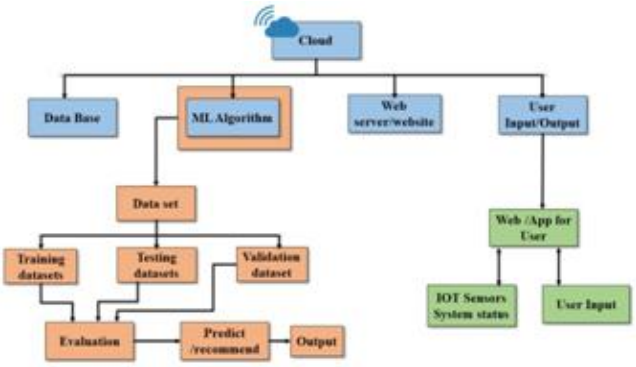

Fig 1: Flow Diagram

III. SYSTEM DESIGN

The below flowchart focuses on the content and the web interfacing process taking place behind the web server and also between user and the admin.

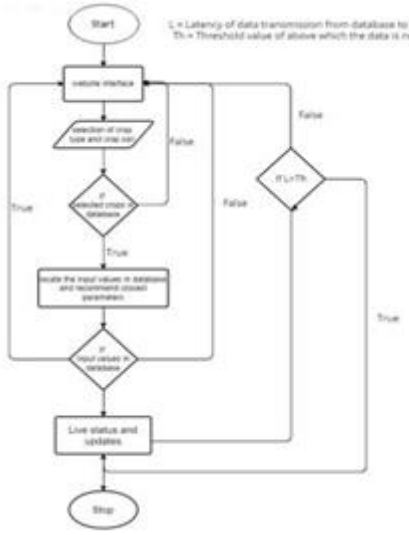

Fig 2. Flow chart

IV. IMPLEMENTATION

1. A web interface is hosted with Two user selectable parameters namely Selection of Crop and Type of Crop.
2. If the selected inputs are present in database apply the algorithm and select appropriate parameters else display a message saying "Unavailable" on the web interface.

3. Also check for the parameters presence in Dataset and Database.
4. If the appropriate parameters have been selected then display it on the web interface else display message saying "unavailable" on the web interface.
5. To check for the live updates of all the parameters, If the latency of data transmission from database to website interface is less than that of the threshold time, display it on the web interface else retransmit the updated value of all parameters.

Software block diagram is includes a SQLalchemy database, Flask framework which includes jupyter software and ML algorithm, web app website, user recommendation output, below diagram show all these parameters are interdependent and synchronised.

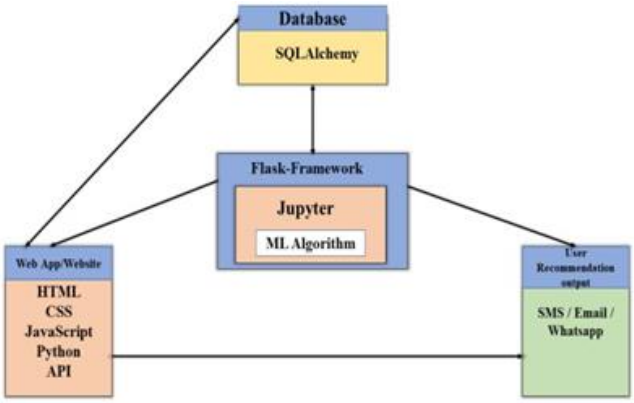

Fig.3. Software block diagram

V. RESULT

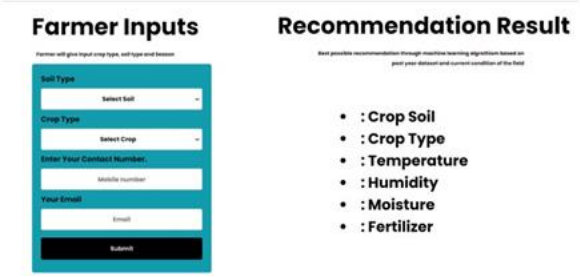

Fig.4.1. Input window

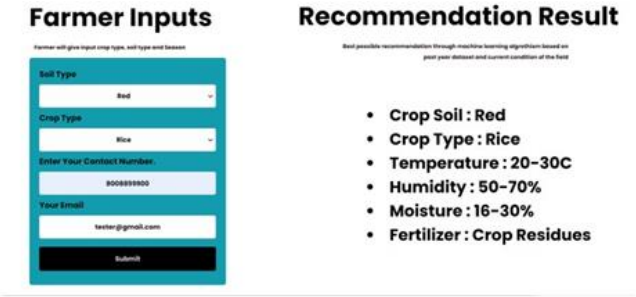

Fig.4.2. Output window

VI. CONCLUSION

To increase farming efficiency, enhance efficiency of the crop and wholesome profit of the farmer, Machine Learning based agricultural system is designed that will support monitoring the crop and it will help the farmers give best possible recommendations by analyzing all parameters like humidity, soil moisture, quantity and quality of fertilizers to be added, rain, etc. Farmers will be updated in real time about the conditions of the farm at any remote locations. Using the technologies like Machine Learning and Networking the whole process is managed and also the output yield is comparatively more, for the predicted outcome the accuracy and the result is much more reliable, the farmers will be able to handle major tasks remotely using the networking technologies like 4G, WIFI etc. The recommendations are given by web application for successful connectivity with farmers and suggest them about all necessary above mentioned parameters for farming in appropriate manner.

VII. FUTURE SCOPE

As the overall block diagram is concerned with the complete synchronization of software and hardware implementation, the hardware mechanism is not included in the following paper,

hence to improve the accuracy of result coordination of sensors with cloud and ML technology is crucial, the IOT based smart system can be considered as a future scope to the existing crop recommendation system.

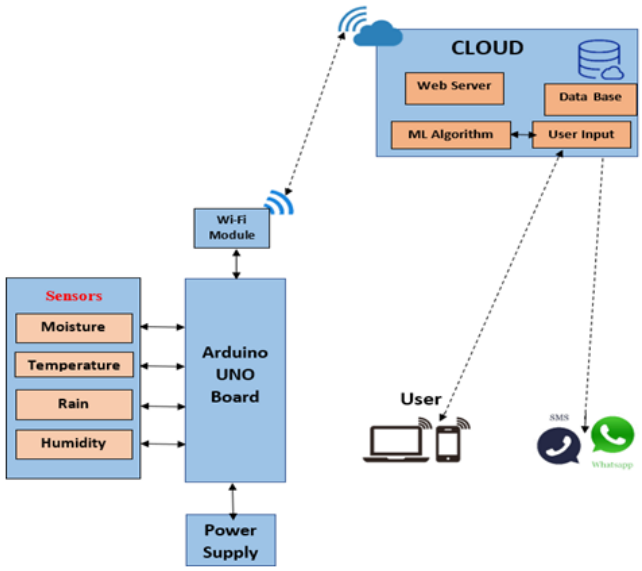

Fig 5. Overall block diagram

VIII. ACKNOWLEDGMENT

The satisfaction that goes with the successful fulfilment of any task would be partial without the intimation of the people who made it happen, with continuous enlightenment and heartening crown the endeavour with success. I would like to convey my thanks to the Principal Dr. N. Rana Pratap Reddy for their encouragement that inspired me for the affluent completion of project work.

It gives me immense happiness to thank Dr. H S Manjunath, Professor and Head of Department for his persistent support and encouragement. Also, I would like to express my sincere thanks to our project guide Assistant Prof. Sushma K Sattigeri, Department of Electronics and Communication Engineering for her constant support and guidance throughout the project work and paper presentation.

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