International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 06 Issue: 07 | July - 2022 Impact Factor: 7.185 ISSN: 2582-3930

CROP RECOMMENDATION USING MACHINE LEARNING

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Abstract - The amount of moisture in the soil, the temperature, and the pH level all have an impact on Agricultural output. The manual technique of evaluating soil nutrients is less exact in the current environment due to the time gap between when a soil sample is collected in the field and when it is analysed in a laboratory. It is critical to establish a smarter agriculture practice leveraging the Internet of Things and Machine Learning to overcome this challenge. The user may monitor the soil fertility at any time using their mobile application. It's possible that a farmer will wish to cultivate a certain crop due to financial considerations.

Key Words: Machine Learning, Sensors, Cloud storage.

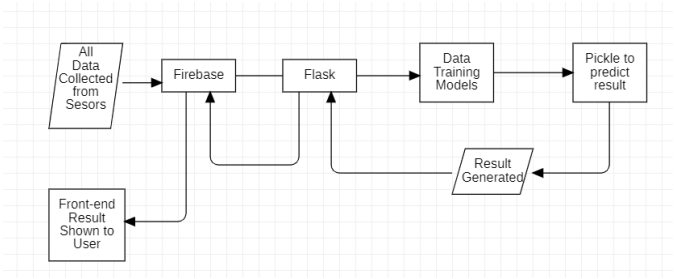
1. INTRODUCTION

I have devised an application-based device and also formulated a software-based com- mutational software which facilitates the allocation of different crops, while showing the possibility of similar crops to grow in similar nutrients and soil contents. By properly placing the sensors and collecting data based on those sensors, we can have near accurate presumptions of the variety of the crop to be grown. Similarly, if a respective crop is to be grown on the land with proper soil, then the loads of nutrients and water that should be added can also be retrieved using the database for the previous crop cultivation. Mainly, with use of ESP8266 which comes with a Wi-Fi module can be easily be used to communicate with cloud storage such as firebase, google cloud, AWS, etc. It allows wireless data storing, thus reducing the redundant physical as well as external components such as wires, cable power supply, Etc., which would further welcome more open-source implementation with easier and understandable interaction for a non-expert entity.

2. LITERATURE REVIEW

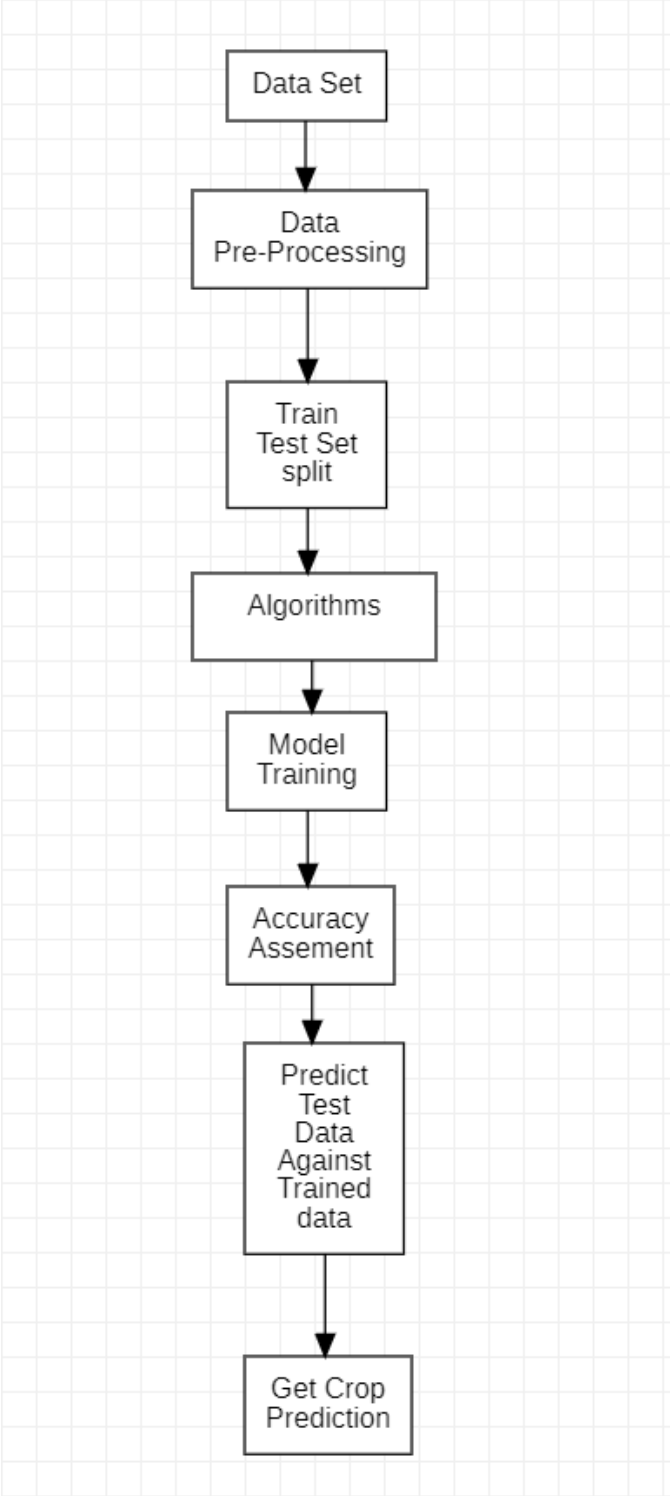
The manual technique of evaluating soil nutrients is less accurate in the current environment due to the time gap between when a soil sample is acquired in the field and when it is analyzed in a laboratory. Farmers from remote areas must also go to laboratories, which are often located in cities. To address this issue, our model proposes a platform that would enable the development of a smarter agriculture practice based on the Internet of Things and Machine Learning. The purpose of this suggested model is to monitor several metrics related to the crops under observation via wireless connectivity on a cloud storage. Air humidity, ambient temperature, and soil moisture, pH level is just a few of the factors that will yield precise results, helping farmers to increase their output. Knowledge about implementation and real time usage of various machine learning algorithms to facilitate the dataset formed by recording the data. Also, the idea of using different machine learning algorithms for the same dataset also gives us an idea to choose the appropriate method for a unique data point {[}1{]}. The absence of hardware questions the credibility and functioning of the dataset and the subsequent rendering capability of the machine learning models which have little to no surety with any factual value to check the following model.

3. METHODOLOGY



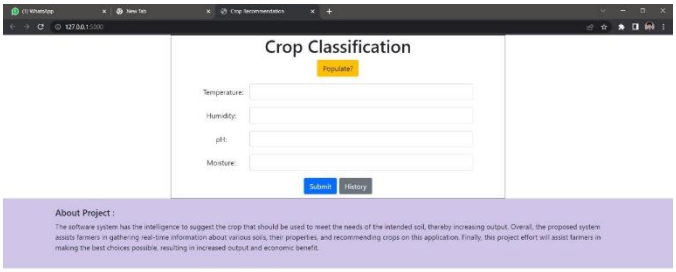
Architecture

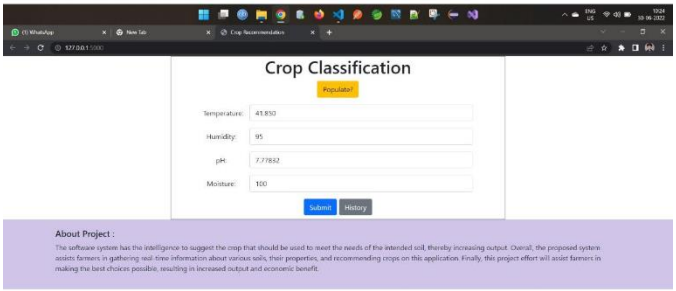
Micro-Controller will be fed data from the different sensors which are connected to the microcontroller. Different sensors like motion sensor DHT11 sensor and PH sensor together facilitates the real time data of the sensors by creating a serial input path. Data from various sensors can be saved and recorded in a tabular form. This serial data is real-time and can be changed according to the present condition of the oil field. This data can be saved in a local host storage or can be given to a cloud storage to further safeguard and store the data easily without any hindrance whatsoever. This particular cloud storage can be easily deployed without any Particular software or hardware in between as ESP8266 Comes with an inbuilt Wi-Fi module thus completely removing the need of an external supply or any machinery of that sort between the sensors with micro-controllers and its equivalent storage entity. The data from the sensors, when fetched into the micro-controller, is guided and enabled by Arduino IDE. Instructions and commands for micro-controllers are given by the user in C language. Data from the sensors can be seen in this IDE result. The Arduino IDE in ESP8266 is faster with a better responsive interface than its previous counterparts. The collection of data coming from the sensors and thus from the micro controller Is code in a cloud- based Storage for firebase through Wi-Fi module and thus easily enabling the sensing, proper reading and storage of the soil data in real time. The data in firebase can be seen by the user in real time with changes in a very accurate way. This data can be accessed or given to other clouds or any other form of software with little to no time delay. To give data from the software air to the fire base there needs to be a key. This key is known to be a JSON key.

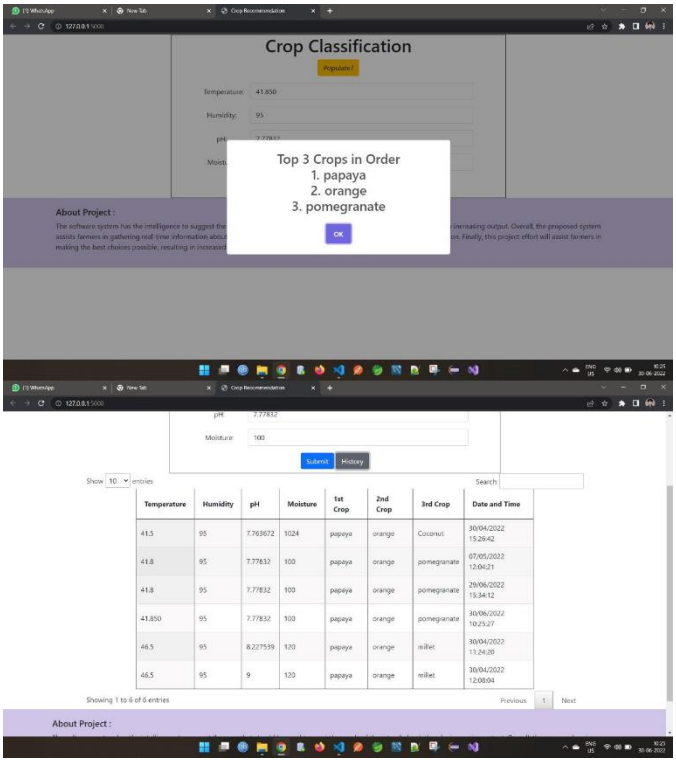


Machine Learning Data Training Flowchart.

4. SCREENSHOTS





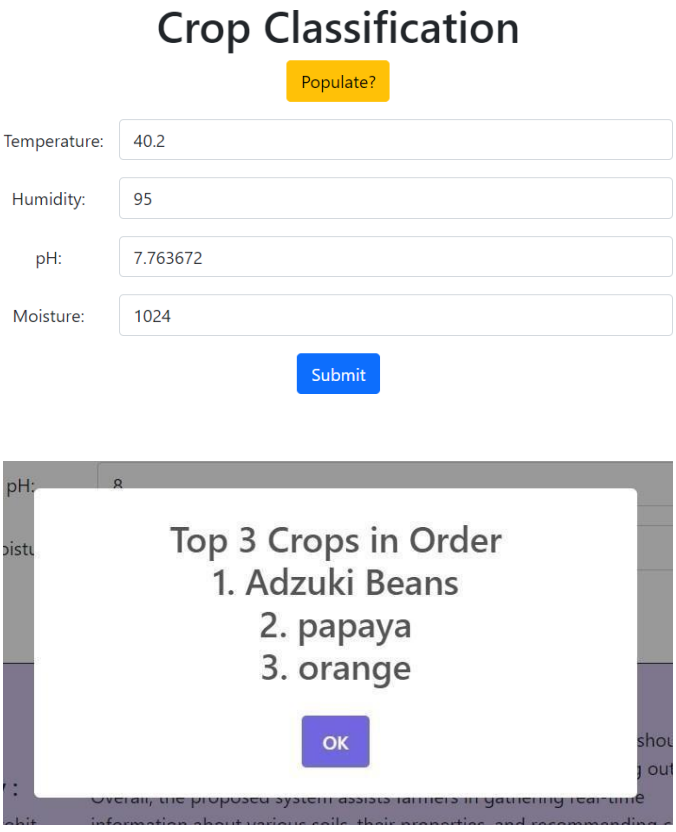


5. RESULT

Computing the data, we got from front end through various machine learning algorithms and picking the very best one with the best accuracy, that can be Implemented and used for further crop prediction we get a very near accurate result for planting a crop in a particular field. Results running through the pickles of the machine learning algorithms constitute particular parameters of certain crop can be further used for different types of land with different temperature PH and moisture levels. Also, by undertaking open-source Software and hardware equipment anybody with a better algorithm and a better and a broader data set can improve the accuracy and the volume of this project in their own respective way for their respective applications.

Based on the results of the experiment, it is possible to infer that ML approaches may be employed effectively for mustard crop production prediction. These excellent machine learning approaches will assist farmers in anticipating production in advance based on soil factors. Crop yield prediction with large soil data sets can be applied in the future in a Big Data context.

Our work would facilitate farmers to increase productivity in and prevent soil degradation in fertile land, and to limit chemical usage in crop production with an efficient use of water re- sources. Our future work is aimed at an improved data set with large number of attributes and also implements yield prediction.



6. CONCLUSION

Cloud computing marks the beginning of a new phase in the field of data and communications technology, as it comes with a development paradigm that can transform the way computing is done, but its suitability for cloud computing. Some subtraction is done in stages. Thanks to this technology, developers with new ideas for Internet services no longer have to spend a lot of money building programs. And tool sub tree skills.

7. REFERENCES

1. Vaishali Pandith, Haneef Kour, Surjeet Singh, Jatinder Manhas, Vinod Sharma, *Performance Evaluation of Machine Learning Technique for Mustard Crop Yield Prediction from Soil Analysis*, Journal of Scientific Research, Volume 64, Issue 2, 2020.
2. *Akkem Yaganteeswarudu", Multi Disease Prediction Model by using Machine Learning and Flask API", Proceedings of the Fifth International Conference on Communication and Electronics Systems (ICCES 2020) IEEE Conference Record 48766, IEEE Xplore ISBN: 978-1-7281-5371- 1.*
3. *H. Chane, S. Kothari, and D. Kadam," Multidisciplinary Model for Smart Agriculture using Internet - of - Things (IoT), Sensors, Cloud-Computing, Mobile - Computing and Big Data Analysis" Helmet Channel, Channel Technol, Appl., 2015.*
4. *M.W.P Midrange, Revan Jayasekera, "MACHINE LEARNING APPLICATIONS IN IOT BASED AGRICULTURE AND SMART FARMING: A REVIEW", International Journal of Engineering Applied Sciences and Technology, 2020}, Vol. 4, Issue 12, ISSN No. 2455-2143, Pages 24-27.*
5. *Elijah Ola Kunle, Rahman Tarek Abdul, Torikumi iGATE, Loew Chee Yen and Hindi MHD Nour 2018, "An overview of internet of things (it) and data analytics in agriculture: Benefits and challenges", IEEE Internet of Things Journal, 5 3758.*
6. *S. Ramesh, D. Vedika, "Application of machine learning in detection of blast disease in South Indian rice crops", Journal of Phytology, 2019, 11.*
7. *Yoshika Shekhar, Ekta Dagger, Sourabh Mishra, Reijo Jackson Tom and Veera Manikandan. M, Suresh Sankar Narayanan, "Intelligent IoT Base Automated Irrigation System", International Journal of Applied Engineering Research, ISSN 0973-4562 Volume 12, Number 18 (2017) pp.7306-7320.*
8. *Ullo, Silvia L., and G. R. Sinha, "Advances in Smart Environment Monitoring Systems Using IoT and Sensors",Sensors. 2020, 20, 3113.*
9. *G. S. Nagarajan, A. B. Opsimath, T. Soumya and A. Abhijit, "IoT Based Smart Agriculture Management System", 2019 4th International Conference on Computational Systems and Information Technology for Sustainable Solution (CSITSS), 2019, pp. 1- 5.*