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A Review on Crop Recommendation System Using Iot And AI

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ABSTRACT

Agriculture is a totally vital contributor to the Indian economy. The mainstream Indian population depends either explicitly or implicitly on agriculture for their livelihood. A vast majority of the Indian farmers believe in depending on their intuition to decide which crop to sow in a particular season. Farmers face many problems due to soil degradation, increase in temperature, changes in climate, global warming, etc cause crop failure and due to which food production decreases to overcome this issues to some extent we have found a CROP RECOMMENDATION SYSTEM which uses IoT to detect Nitrogen(N), Phosphorus(P) and Potassium(K) from soil, moisture sensor to measure soil moisture and temperature sensor to measure temperature from that particular environment and using AI and ML training algorithm using previous year datasets we find the crop which can be effectively produced for that particular environment .

KEYWORDS: AI and ML, IoT, datasets, training algorithm.

I. INTRODUCTION

Internet of Things (IoT) are physical objects like sensors, software and other technologies connected together through the internet or other means of communication and Artificial Intelligence (AI) through various algorithms can analyze data and predict the outcomes. When both IoT and AI are combined the real time data can be analyzed and output can be predicted. The Internet of Things facilitates device connection and produces a large amount of data about the desired process. Artificial Intelligence analyzes data collected by IoT enabled devices and extract patterns and process behaviors then make a decision based on those patterns. These technologies, along together, can solve real-world problems and create new products. For example, using only IoT, we have connected cars. Using AI along with IoT, we have self-driving cars. This can be now use in agriculture too. In smart farming, the use of IoT and AI technologies has the potential to result in a positive transformation of traditional agriculture, including: -

- Improved use of data collected from agriculture sensors.
- Managing and governing the internal procedures within the smart agriculture environment including the management of the harvesting and storage of several crops.
- Waste reduction and cost- saving.
- Increasing production efficiency using automating traditional processes; and
- Improving the quality and volume of products.

Artificial intelligence technology is rapidly rectifying the problems while recommending specific action that is required to overcome the problem. AI is efficient in monitoring the information to get solutions quickly. Artificial intelligence technology is being used in agriculture to improve results with a minimal environmental cost. By implementing AI can recognize a disease with 98% accuracy. Thus, AI helps farmers monitor the fruit and vegetable by adjusting the light to accelerate production.

Farms make hundreds of thousands of data points on the ground each day. With the implementation of AI,

Farmers can now analyze weather conditions, temperature, water usage and soil conditions collected from farms to inform decisions. AI technologies are helping find feasible crop choices or which hybrid seeds will increase profit and decrease waste.

II. LITERATURE SURVEY

Reshma, et al [1], have proposed a crop recommendation which uses IoT system containing sensors like pH sensors, Humidity and temperature sensors, Soil moisture sensors, soil nutrient sensors (NPK) and microcontroller / microprocessor equipped with Wi-Fi and Cloud storage the real time data collected is stored in cloud and the recommendation system applies Support Vector Machine (SVM) algorithm and Decision Tree algorithm on the data and gives the suitable crop

A.M.Rajeswari, et al [2], have used fuzzy logic and

have applied CN2, LME2, AQ and in discernibility algorithms on the data set which contains data of 23 crop varieties and 22 attributes like Ph, Mn, Fe, N, P, K, etc.

S.Pudumalar, et al [3], have developed a crop recommendation system using ensemble model with majority voting technique using K – Nearest Neighbor, Naïve Bayes, CHAID, Random tree. The attributes used are Depth, Texture, Ph, Soil Color, Permeability, Drainage, Water holding and Erosion of various crop varieties.

Aoqi Liu, et al [4], have discovered a crop recommendation system using clustering centered optimized algorithm by synthetic modeling oversampling technique which overcomes the real-world data imbalance and have also used Random Forest Support Vector Machine (RFSVM) algorithm.

Nidhi H Kulkarni, et al [5], present a recommendation where they use a ensemble model for data processing and using Random Forest, Naïve Bayes and Linear SVM algorithm using majority voting technique best accurate algorithm is used. The dataset used contains the physical and chemical properties of soil and climatic condition such as average rainfall and surface temperature.

Mummaleti Keerthana, et al [6], have done research on crop recommendation system which uses ensemble of AdaBoost regression and decision tree regression this system gives recommendations based on weather condition that particular area.

Apoorva Chaudhari, et al [7], have used data mining techniques based on climatic factors such as rainfall, temperature and location are used and classification techniques such as

Decision tree classifier, K-Nearest Neighbour Classifier, Random Forest Tree Classifier, etc are used and web scrapping technology is also used to get crops for best price.

Ansif Arooj, et al [8], have used data mining classification algorithm such as Decision Tree, BF (Best First) tree, OneR and Naïve Bayes on the dataset which contain attributes of soil properties of various crop types the attributes are Ph level, organic and inorganic matter, texture and temperature, etc and hence a crop recommendation system is built.

Priyadharshini A, et al [9], have built a system for crop recommendation, profit analysis, crop sustainability predictor the system uses neural networks and linear regression which is applied on dataset which contains soil characteristics, environmental characteristics and cost of different varieties of crops.

Rashmi Priya, et al [10], have presented a crop recommendation system using naïve bayes supervised learning algorithm which is applied on the data obtained from satellite images, sensor recorded data, irrigation report, crop data, weather data, after data pre-processing and after extracting features such as soil moisture, rainfall, temperature, atmosphere pressure, etc.
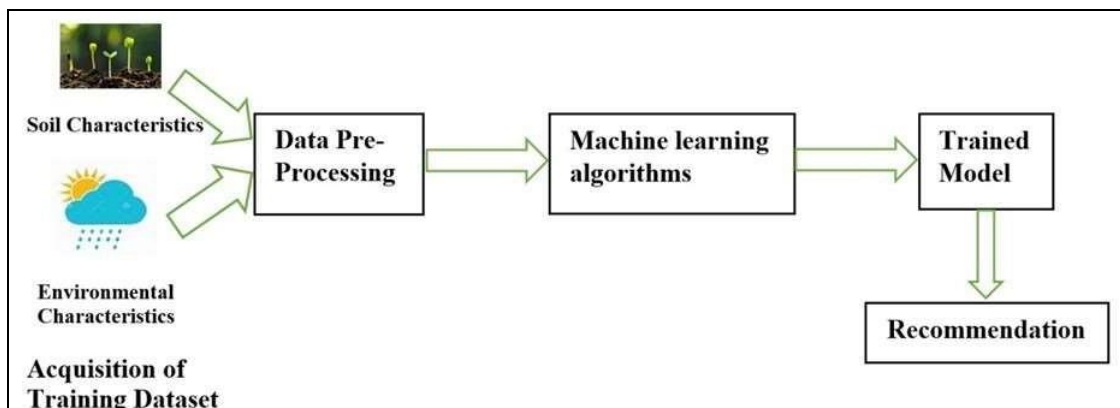

Fig. A Systematic approach of Machine Learning

CONCLUSION AND FUTURE SCOPE

It is concluded that the crop recommendation systems is a efficient and helpful system for farmers and it gives a huge amount of profit for farmers and other industries depending on farming. To get best prediction from this crop recommendation system it requires a large amount of data for training and testing purpose the model which is lacking data won't give accurate prediction hence a large amount of good quality data is required which can be achieved through IoT and other technologies. Crop recommendation system can be merged with other recommendation system such as crop price predictor, crop sustainability, weather prediction, etc. into one application which would be very useful.

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