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A Survey on Farm Productivity Prediction Using IoT

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Abstract--- *The data collected from Google data sets of about 3977 is reduced and various algorithms are used such Decision tree classifier and random forest classifier is used. This dataset is divided into training and test data of 80 and 20 percent respectively. The soil type is found as one of the alkali, sandy, chalky, clay unpredictable changes in factors like rainfall and soil water content causes hard time for farmers. It can be improved with proper approach and analysis for the type of soil, warmth, max temp, min temp, humidity crop type And rainfall patterns. Crop and Weather prediction can be found by deriving useful inputs from these agricultural data available. Survey is conducted on the various algorithms used for climate, yield and productivity. The other challenge that our farmers face is land losing their productivity. Which crop should be planted based on the climate prediction and considering the strength of the soil keeping in mind the external factors like water availability and risk of crop to be destroyed due to pests. The efficiency of 99 percent is achieved by using random forest as machine learning tool. This is maximized performance.*

Keywords--- *Farming, Internet of Things, Weather, Sensor and Productivity.*

I. INTRODUCTION

17 farmers commit suicide each day in our country. It is high time that guidance and support should be provided to farmers to help them increase productivity, show light on what would be best for them, and guide them with the help of latest technology available. Lack of information and guidance is the key reason behind the current pathetic situation of most of the farmers in our country. Besides ever- increasing cost of raw materials required for farming. Considering the purchasing power of our farmers the solution should be cheap in cost but at the same time should be efficient and highly accurate. The farmer should have multiple options on what is best for them. This would surely let them flourish and bring life back on track with substantial development and would surely lead to overall development of nation. The figure 1. General forecasting block diagram shows the work flow of the data interpretation process the process begins with data collection 3977 datasets.

Implementing various operations on that data.

1. Data pre-processing
2. Dimensional reduction
3. Suitable clustering algorithms
4. Verification of data
5. Forecasting

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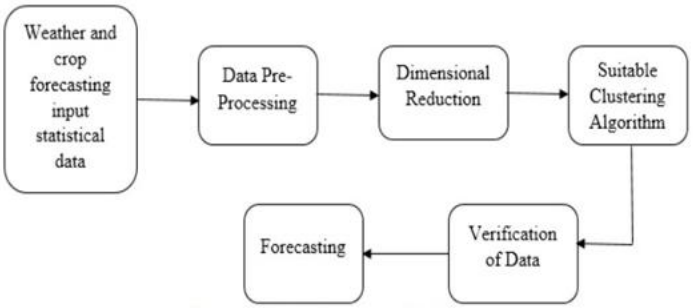

Figure 1: General Forecasting Block Diagram

II. RELATED WORKS

Finding Crop details and their requirement

Sugarcane crop can be cultivated in any season and twice a year. From single plantation it require 6 months to be cultivated in any soil type. Rice crops grow in clay soil as it retains water. It is grown in summer season. Cereal crop includes lentils and green gram which requires very less amount of water and hence is grown even in Rajasthan. Only one time irrigation is required for such crop. Bajra can be planted twice a year.

A. Wireless Sensor Based on Remote Monitoring System for Agriculture

In this WSN, WEME are used. WEME utilizes sun based power and has standard multi-pins information interface, which can be associated with different sensors as indicated by real requests. What's more, the cell phone is additionally used to understand a few capacities, for example, parameters the executives, remote data request, and natural edge setting. So as to take care of the issues of continuous strategies in customary natural observing framework and the high consumption of complex current offices, a minimal effort constant remote ecological checking framework dependent on GSM short message was structured This investigation can offer a general answer for little scale crops on ongoing observing and early cautioning.

B. Automated Agricultural Process Using PLC and ZigBee

The CDL stratification analysis was effectively directed for Oklahom. The stratification exactness's of the conventional (visual elucidation) and new robotized CDL stratifications techniques are analysed on 2010

June Area Survey information. Inside NASS, region outline development is a long procedure directed one state at any given moment. State's land is isolated into PSUs, which are characterized by strata. This stratification procedure are directed utilizing ArcGIS programming, aeronautical photography, satellite symbolism, and auxiliary agrarian data. PSUs are portrayed by changeless limits for example, streets, railways, and streams and are around 3–4 sq. mi for new edges. PSUs are haphazardly chosen by strata and just chose PSUs are separated utilizing the recently depicted lasting limits into testing units or portions in request to control ranch control dissemination and water system framework, this paper proposes a specialized approach of the remote sensor organize for gathering condition information and sending control order to turn on/off water system framework and control distribution and percent development utilizing visual understanding of satellite information. This proposed new CDL-based procedure improved proficiency, objectivity, and precision when contrasted with the conventional stratification

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technique. This paper proposed another robotized CDL-based technique for determining percent development and along these lines stratifying U.S. land spread. The objective of this exploration was to decide the utility of the robotized CDL-based strategy for use in the stratification of U.S. land spread and possibly in ASF development. The CDL-based stratification of NASS ASF PSUs was effectively lead for Oklahoma, Ohio, Virginia, as an examination. The stratification correctness of the customary and new CDL stratification strategies were looked at dependent on in situ approval information gathered by enumerators amid the 2010 JAS.

C. Big data in precision Agriculture

This proceeds as how to find extra bits of knowledge from accuracy agribusiness information through huge information. We present a situation for the segregation of Information and Communication Technology (ICT) benefits in farming huge information condition to gather gigantic information. Enormous information investigation in horticulture including advance climate choices, improved yield profitability and evade superfluous cost identified with collecting, utilization of pesticide and composts. Distinctive wellsprings of huge information in exactness horticulture utilizing ICT parts and kinds of organized and unstructured information. Likewise talked about huge information in exactness horticulture, an ICT situation for agrarian enormous information, stage, its future applications and difficulties in accuracy farming. At long last, we have talked regarding outcomes and dispersed calculation for information preparing and gauging utilization of climate. Huge information in farming allude for the enormous measure of information, created in rural usability and prediction. The handling and the board of colossal information is a testing errand over customary techniques and stages. The handling of tremendous amount of information needs another equipment and programming stage with apparatuses and systems. Primarily exactness horticulture crop pivots, climate parameters, ecological conditions, soil types, soil supplements, Geographic Information System (GIS) information, Global Positioning System. massive information investigation in farming are developing advancements into a promising field for giving understanding from exceptionally expansive informational collections, improving efficiency, and lessening speculation costs. Huge information examination and ICT can possibly utilize novel advances and stage to create, gather, process, picture expansive information for future forecasts, and decide in the exactness horticulture. Remote detecting gadgets assumes a fundamental job in information accumulation and constant choice help. The outcomes leads to huge information handle by Map decrease of this investigation shows a significant potential of information combination in field of harvest and water the executives for applications. example exactness garden cultivation.

D. The Internet of Things in Agriculture for Sustainable Rural Development

Connecting information for radiation, temperature, stickiness and moisture of soil is collected using sensors where liquid is discharged as well as what amount is required. Since the rustic regions are invested with sustainable power source and there is almost no entrance to the power framework, these sustainable power source advancements, for example, sun oriented and wind can encourage vitality into water siphons, which thus siphon water from underground into tanks. This water is utilized to flood crops. This has recognized potential utilizations of IoT in agribusiness for supportable provincial improvement. It has demonstrated the business benefits that can be gotten from IoT by different areas of horticulture. These areas incorporate water the board, climate gauging, natural life the executives. Money, ranger service, plant and creature malady the executives, transport and capacity of rural

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produce, expansion administrations, and so forth. The investigation is intended to impact approach on the appropriation of IoT in country improvement and horticulture. The examination can likewise be used by engineers of new IoT advancements to fabricate country specific advances dependent on the recognized. The country society will advancement when the advances have been created to help neediness easing and inspiring the models of the general population.

III. IMPLEMENTATION

Here the crops listed will be classified individually and the soil type in which they were grown will be recorded besides the period in which they were planted. The months are to be denoted by 01 to 12. The climatic condition i.e the mean of the climate during the period in which plantation was done. Soil php is an important aspect, which affects the crop, and farmers usually ignore this factor. The soil php readings will also be considered for a particular crop. Finally the productivity that was obtained will be recorded as a. in percentage b. drought c. flood d. pest attack The various analysis will be carried out on this vast amount of Data and various conclusion are to be drawn regarding the scope of the crop on a particular land in a region according to the readings obtained from Arduino device. Various machine learning techniques are used but the optimal output is achieved when random forest is used. It gives efficiency of 99 percent which is greater than SVM, Neural Network. Alternative crop plantation considering the current soil and climate will be suggested to farmers maximizing the productivity and minimizing the cost is the main aim of this analysis. The probability of pest attacks and the particular crops vulnerability will also be analysed and suggested using tools.

First step consisted of hypothesis generation which was not done in previous models. It is done in a manner by obtaining information related to dataset and the domain knowledge we can have some expected output. In order to boost efficiency we added further the training data and finally a dataset of 3977 values. Then we treated the missing values as it affects the output drastically. So we trimmed out the complete row whose some values were missing. The random forest algorithm works well with normally distributed data. Therefore, we removed skewness of variable(s).Then we derived new variables from existing variables. This is feature creation and it is used to find out hidden relationship of data set. Then we found out the feature selection i.e the parameters which have the most impact on a predictive basis on the ground of the domain knowledge. Rainfall and temperature were the one with more weightage. Parameters influence the outcome of machine learning algorithms. Methods like bagging and boosting are to be applied for further development of the present model and to increase the accuracy. Finally the efficiency is high for the random forest as it implies from multiple trees during the runtime so as to give more precise output

IV. CONCLUSION

The implementation of machine learning and various algorithms are the key highlight of this proposed system. As we know larger the sample size more is the prediction, this is the reason data of around 3977 data sets are collected through official sources like Google Dataset (beta). As there are different conditions in different region, hence a physical hardware is also present so that the reading obtained is pinpointed, so that the prediction done is accurate. Almost all aspects are considered from weather condition to soil condition and moisture so that the chances of

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failure is very less as more data will be analysed with time. The probability of prediction would tend to be more efficient various other features could be added like this providing farmers open marked and coordinating this trade.

V. RESULT AND DISCUSSION

Ninety-nine percent efficiency is achieved using random forest algorithm for the specified data set of 3977 values. The wheat crop i.e millet yield is found and result can be calculated for inputs consisting of moisture, minimum temperature, maximum temperature, mean temperature. Further work will consist of implementing it for other crops.

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