Smart AgrIOT : A Machine learning and IOT based complete farming solution

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Abstract—Agriculture plays the major role in economics and survival of rural people in India. Due to unavailability of crop related data, unexpected weather actions, wrong cropping methods productivity of agricultural field is very low. Farmers could take the necessary actions for marketing and storage if they could predict the crop before it was produced. The implementation of such a system with a user-friendly web-based graphical user interface and the machine learning algorithm will be put into practise. Over watering decreases the fertility of the soil, so it is very important to use water in appropriate quantity. Irrigation is the solution in regions of drought areas. Our smart irrigation system waters plant in precise quantity, avoiding wastage. Our hardware is also monitoring soil health status using nitrogen, phosphorus, and potassium (NPK) sensor. We also have a data of ideal nutrient data of soil required for crops and hence by comparing those values system displays necessary actions to be taken. Due to unpredictable climate conditions, a large quantity of crops get affected every year. So, by understanding their region or locality and real time weather prediction data, farmers can save their crops. Some animals ,birds can also cause damage to crops , hence securing farms from them is also an important task which is done by IR system in our prototype. To protect plants from diseases we are using plant disease detection with providing remedies. This is done by neural network model. Thus by finding a solution to all these problems , farmers can get maximum benefit in terms of effort as well as cost. On top of this our chat bot provides an interactive platform to farmers where they can get answers to their general queries regarding farming and government schemes. So using our overall system efficiency of agriculture system can be increased with minimum cost and efforts.

I. INTRODUCTION

Most of farmers and the general population in rural India depend on agriculture as their primary source of income. The foundation of the Indian economy is agriculture. However, fundamental changes in Indian agriculture are creating a farm related problems. Agriculture's relative contribution to the GDP has been progressively dropping over time. It is concerning that India is becoming a net food importer rather than still being a food-self-sufficient country. These trends collectively show that India's agriculture industry is currently in turmoil. It is suggested that the impact of the agriculture crisis in India will be quite broad and will have an impact on all other sectors of the economy as well.Making agriculture a successful business and enticing farmers to continue crop producing activities are the only ways to end the crisis. Farmers would benefit greatly from the implementation of our technology, which includes an intuitive web-based visual user interface, Internet of Things and a machine learning algorithm, and it has the potential to bring about a enhancement in India's agricultural sector[1].

With the help of this feature, farmers can choose the optimum crop for the current climatic circumstances before cultivating on agricultural field. It maximises output while requiring the least amount of work and maintains the health of the soil too. Farmers can also experiment with relatively new crops that are favorable to the environment and can be very profitable. Every year due to diseases in crops, huge loss occurs[2]. To deal with this problem early warning and remedies are made be available and our "plant doctor" feature tries to deal with this problem. There are no suitable technolo- gies or solutions to deal with the scenario we are in, despite the analysis of all these concerns and problems[3]. Smart irrigation system can help to reduce water concern upto some extent. There are many strategies available in India to promote agricultural economic development. Data mining can be used to forecast crop yield growth. Using QGIS, a geospatial application that tracks rainfall, temperature, humidity, location, and other crop characteristics, we want to monitor agricultural production. We can also obtain geographic information, which will assist farmers in determining what crops can be produced where. The three UN Sustainable Goals of eradicating hunger, combating global warming, and advancing industry, innovation, and infrastructure are all covered by our system.