PROPOSED SOLUTION:

SMART FARMER – IOT ENABLED SMART FARMING APPLICATION

DOMAIN:

INTERNET OF THINGS

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Project Design Phase-I
Proposed Solution Template

Date	19 September 2022
Team ID	PNT2022TMID44795
Project Name	Project - xxx
Maximum Marks	2 Marks

Proposed Solution Template:

Project team shall fill the following information in proposed solution template.

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	
2.	Idea / Solution description	
3.	Novelty / Uniqueness	
4.	Social Impact / Customer Satisfaction	
5.	Business Model (Revenue Model)	
6.	Scalability of the Solution	

Project Design Phase-I
Proposed Solution Template

Date	24 September 2022
Team ID	PNT2022TMID44795
Project Name	Smart Farmer – IOT Enabled Smart Farming Application
Maximum Marks	2 Marks

Problem Statement:

This is the project from the motivation of the farmers working in the farm lands are solely dependent on the rains and bore wells for irrigation of their land. In recent times, the farmers have been using irrigation technique through the manual control in which the farmers irrigate the land at regular intervals by turning the water-pump ON/OFF when required. Moreover, for the power indication they are glowing a single bulb between any one of phase and neutral, meanwhile when there is any phase deduction occurs in other phases, the farmer cannot know their supply is low. If they Switch ON any of the motor, there will be the sudden defuse in motor circuit. They may have to travel so far for SWITCHING ON/OFF the motor. They may be suffering from hot Sun, rain and night time too. After reaching their farm, they found that there is no power, so they quietly disappointed to it!! Is there any solution for it??? Let's check our solution.

Idea / Solution description:

This project presents proposed model for Smart Agriculture to develop real time monitoring system for soil properties like Temperature, Humidity and moisture, crop yield identification using SMS based Alerts. It will also be possible to control various operations of the field remotely from anywhere, anytime by mobile as well as web application. The IOT based agricultural monitoring system has been used to maximize the yield of crop by monitoring the environmental parameters and thus providing the required information to farmer remotely. This system can be implemented in any type of agricultural field with varying soils. The use of IOT over the other technology one aides for deploying it in any type of environment for monitoring, making it flexible and robust. The proposed system is developed for the goodwill of farmers. The system greatly reduces the human interaction, labour cost and wastage of water. Threshold values for climatic conditions like humidity, temperature, moisture can be fixed based on the environmental conditions of that particular region.This system generates irrigation schedule based on the sensed real time data from field and data from the weather repository. Using the water level sensor the water level in the tank can be calculated and based on the data from humidity and moisture sensor the land can be irrigated

automatically and can detect the overflow in the water tank. Thus, smart irrigation system helps to improve the crop yield and thereby meet the demand. This project remotely measure and monitor water moisture levels in the soil to ensure that crops are getting optimal water resources and automatically trigger sprinkler systems to address low moisture levels in the soil to prevent crop damage or loss. This idea will improve the crop yield and manage them.

NOVELTY/ORIGINALITY OF THE STUDY:

Water being a precious resource must be utilized efficiently. Agriculture is one of those areas which consumes lot of water. Irrigation to the farm is a time consuming process and must be done on timely basis. As aimed, through this work an auto irrigation system measuring the moisture content, and the water level. Later harvesting the excess water from the cultivation field and recycled back to the tank.

SOCIAL IMPACT:

Third Green Revolution

Smart farming and IoT-driven agriculture are paving the way for what can be called a Third Green Revolution.Following the plant breeding and genetics revolutions, the Third Green Revolution is taking over agriculture. That revolution draws upon the combined application of data-driven analytics technologies, such as precision farming equipment, IoT, big data analytics, Unmanned Aerial Vehicles (UAVs or drones), robotics, etc.

In the future, this smart farming revolution depicts, pesticide and fertilizer use will drop while overall efficiency will rise. IoT technologies will enable better food traceability, which in turn will lead to increased food safety. It will also be beneficial for the environment, through, for example, more efficient use of water, or optimization of treatments and inputs.

Therefore, smart farming has a real potential to deliver a more productive and sustainable form of agricultural production, based on a more precise and resource-efficient approach. New farms will finally realize the eternal dream of mankind

BUSINESS MODEL/REVENUE MODEL:

Sensors,control systems, robots, autonomous vehicles ,motion detectors, button cameras, and wearable devices are all important components in this approach to farm management. This information can be used to track the overall state of the company, as well as employee performance and equipment efficiency. The ability to predict production output provides for improved product distribution planning.

I)**Agriculture Drones** are being utilised in agriculture to improve a variety of agricultural processes, including crop health assessment, irrigation, crop monitoring, crop spraying, planting, and soil and field analysis.

II) **Greenhouses with Intelligence** – A smart greenhouse built with IoT monitors and manages the climate intelligently, removing the need for manual intervention.

III)**Smart farming with predictive analytics**, Crop prediction is important because it aids the farmer in making future decisions about crop production, storage, marketing tactics, and risk management.

IV)**Artificial networks** are used to predict crop output rates using data received from farm sensors.

V)**A snowballing world population** means the agricultural industry will need to produce approximately 70 percent more food in 2050 than it did in 2006, according to the UN Food and

VI)**Agriculture Organization**. - To maximize crop yields and use of resources, farmers are utilizing smart agriculture technology to track progress, predict outcomes and drive decision-making.

VII)**Precision agriculture(Precision farming):** Weather forecasting accuracy and other dynamic data inputs can affects crop productivity to a great extent. The higher the level of accuracy, the lower the chances of crops being damaged; thus, more accurate weather forecasts can lead to higher profitability and productivity levels

SCALABILITY:

Scalability is another requirement that should be considered in a smart farming platform. Scalability refers to the ability to increase available resources and system capability without the need to go through a major system redesign or implementation. We can increase the capacity for data processing by increasing the cloud resources in the second layer and computation resources in the third layer. The challenges related to scalability in smart farming fall into two categories:
i)Capacity

ii)Performance

Scaling capacity refers to the ability to add new nodes or resources to the system. Scaling performance is the ability to improve performance or to keep the performance identical while expanding capacity. The fundamental bottleneck that may affect system performance may be caused by different deployment configurations of various components. Other challenges of scalability are identity management and access control, security, privacy , governance, and fault tolerance . Since farming data generation is rapidly increasing every day, such data are too large to be stored on a single node. A fundamental solution to address this need is distributing data collection mechanisms across multiple nodes. For instance, Zhou et al employed Hadoop to process and store 1.44 million data records for daily temperature monitoring. Since most smart farming data are small files that lead to many small files, Hadoop cannot be effective without a

distributed system equipped with a high-performance computing system. To address this problem, the Hadoop Distributed File System (HDFS) has been designed to process large (and small size) datasets. Using cloud computing technology in a smart farming platform is another solution that can address scalability challenges related to capacity due to flexible and robust data collection, management, and processing capabilities [83]. Cloud computing provides a high level of flexibility by providing remote services for monitoring and managing farm data. Moreover, these services can provide on-demand storage and computation resources with no need for on-farm hardware installation. The data stored in the cloud systems are usually distributed in the data storage platforms supported by backup mechanisms. The data-driven services are finally offered by web services accessible through diverse tools, including laptops, tablets, and smartphones in the last stage of smart farming tasks. Smart Farm Net is an example of a scalable platform that utilizes cloud computing technology to provide a scalable solution for smart farming.