Internet of Things

# INTRODUCTION

In the present world where every person is always in transit, they need to have access to all of their devices all the time. The solution comes with the devices having an internet connection so that it can be accessed from everywhere around the globe. This is what resulted in we call “internet of things”. In the year 1999, the term “internet of things” was coined by Kevin Austin, the executive director of the Auto-ID[1]. From then IOT is in its ever-growing stage.

In general, IOT consist of anything and everything that uses some embedded technology to communicate with each other. IOT is an ecosystem of interrelated processing devices, mechanical and digital machines, physical objects, animals or people that have particular unique identifiers (UIDs) associated with it and is able to transfer information over the network without requiring person-to-person or person-to-devices communication[2].

IOT has impacted every sphere of day to day life. According to the Gartner 2011 Hype Cycle of Emerging Technologies, IOT is current at ‘Technology Trigger’ phase. [3] It is predicted that by the year 2020 there will be more than 26 billion IoT devices. As said the rule of IOT is that, "Anything that can be connected, will be connected."[4].

Agriculture plays a major role in a country like India. One of the modern sectors of agriculture is a greenhouse, where crops are grown in an artificial environment. Monitoring and control of the greenhouse environment are of utmost importance. Here comes the role of IOT which can monitor and control a greenhouse environment in real time[5]. It can also minimize crop disaster and increase production.[6], [7]

In this paper, we are going to present a model for implementation of a smart greenhouse ecosystem with the help of IoT devices that can monitor and control every aspect of a greenhouse, such as temperature (DHT11 sensor), humidity, soil moisture, ambient light (LDR sensor), etc. The main aim is to reduce the cost as per power and resources and get a better yield but using those resources optimally. The greenhouse will also module itself for the type of crop it will be going to for using the specific requirement of the crop.

The rest of the paper constitutes of the IOT components used in Section 2, the proposed work in section 3, and the detailed approach in section 4, finally concluding this paper in section 5 with the discussion.

# IOT Components

1. Smart devices and sensors: These constitute the Things in the IoT ecosystem. These things can be anything starting from a cell phone to sensors like temperature, humidity etc. which are interconnected with each other. [8]

Here we have used sensors like the CO2 sensor, LDR sensor, DHT11 temperature, and humidity sensor, a soil moisture sensor, and the ph sensor. Reading from these sensors will be the deciding factor to use the other components like the motor pump, water pump, exhaust fan, cooling fan, and artificial light.

1. Gateway: It is the layer between the cloud and the sensors module which also ensures security. Its main aim is to smoothen the bi-directional data flow between the sensors, protocols, and networks.

We use Arduino Uno connected with ESP8266 as the gateway platform from where the data from the sensor is directed to the cloud.

1. Analytics: It converts the analog data obtained from the sensor and other devices and converts it to digital form which can be easily understood by the machine.

Here Arduino Uno takes analog data from the sensor as input and transforms it to a digital output the can be easily interpreted.[9]

1. Cloud: The large bulk of data created is managed and handled by the cloud. It is an optimized network of servers for high-performance data processing.

We have used HPE UIOT Platform for the purpose of data management and processing.[10]

1. User Interface: It is the topmost layer of an IOT Ecosystem visible and used by the user. It can be anything from an Android Application to a Web-Based Platform.

# References

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