Advanced Agricultural Controlling and Monitoring of Greenhouse Using Li-Fi Technology

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***Abstract: Li-Fi based irrigation system mainly consists of two parts they are transmitter part and receiver part. This contrast describes a complete wireless networking system and uses bi-directional communication system. The sensors in the transmitting part collect the information of soil moisture and temperature of different crops in different period and then an algorithm was developed with the threshold values of temperature and soil moisture that was programmed into a micro-controller based gateway to control water quantity. Communication is achieved by switching LED lights on and off at a speed higher than what is perceptible to the human eye. LiFi is a mobile wireless communications technology that uses light rather than radio frequencies to transmit data. LiFi is fully networked, and mobile. The experience of using LiFi is similar to WiFi but offers a range of advantages*.**

Key words - Light fidelity (Li-Fi), Visible Light Communication (VLC), Light Emitting Diodes (LED), Soil moisture sensor, Temperature Sensor.

1. INTRUDUCTION

Appropriate environmental conditions are essential for plant growth, progressed crop yields, efficient use of water for other resources. Light fidelity (Li-Fi) is a new short range optical wireless communication technology which provides the connectivity inside a nearby network, through using Light-Emitting Diodes (LED's) to transmit data which depending on light illumination properties and it will reduce the consumption of water and fertilizers. The techniques of irrigation includes micro irrigation, drip irrigation, sprinkler irrigation, subsurface irrigation etc. This modern system is one of the way of enhancing the irrigation system to optimize the using of water. The successful irrigation control depends on water control, time control and to give security for the crops. The data packet coming from wireless sensor unit is received, identified, recorded and analyzed by the ATmega328P micro-controller and perform the corresponding irrigation movement and those data are transmitted to computer using wireless communication unit, Li-Fi module for data inspection and irrigation scheduling to be programmed through an web page.

1.1 SMART TOLL COLLECTION USING LIFI TECHNOLOGY:

There are large numbers of toll gates in the National Highways across the country. Most of the people find it very difficult to wait in a long queue because of manually operating toll gate system. This causes waste of time and fuel. This project provides a great solution to all these problems. Most recently, Li-Fi is a new emerging technology in the trend. Here, the concept of Li-Fi is used to eliminate this queue. In this project, the data transmission and reception is done by pic microcontroller. The data which is received by the Li-fi receiver is sent to the monitor for checking account balance. The account detail is showed in the LCD display. Here the Dc motor is used to drive the barrier. As we use the concept of Li-Fi, high speed data transfer is achieved. So that the technology used in this project eliminates the queue in the toll gates and helps the people to reach their destination on time

1.2 Visibile Light Communication Technology For Data Transmission UsingLi-Fi

Handling data transmission for radio signals became one of the most important concerns, giving birth to Light as a significant alternative. Visible Light Communication (VLC) arose as an effective option for data communication. Light Fidelity (Li- Fi) is one of VLC technologies and represents a new technique operating with light signals in order to transmit data a source to a destination. It guarantees several benefits and can overcome different limitations of

Wi-Fi technologies including security issues, media obstacles, and radio interference. Li-Fi technologies are adopted for experimental usage and does not extensively arise in industry. The adoption of Li-Fi technology in industry, it is necessary to measure the performance of data transmission several data types requiring to be supported. The purpose of this paper is to investigate the performance of data communication using VLC. This research is based on an implementation for different types of data transmission through Li-Fi. The methodology that has been adopted for this study consists on a simulation topology by NS-3 which has been built to study the performance TCP and UDP protocols in Li-Fi environment for VLC communication. Various types of data have been transmitted through an appropriate designed model. The simulation results show the differences between the two common algorithms. The implementation explained the needs for Li-Fi data transmission. Indeed, this work show a successful audio, text, and images transfer through VLC technology.

2. LITERATION REVIEW

1. Joaquin Gutierrez, Juan Francisco Villa-Medina, Alejandra Nieto-Garibay, and Miguel Angel Porta-Gandara, “Automated irrigation device the usage of a wi-fi sensor network and GPRS Module. ”An automatic irrigation system turned into evolved to optimize water use for agricultural crops. In addition, a gateway unit handles sensor information, triggers actuators, and transmits information to an internet application. The gadget turned into powered via way of means of photovoltaic panels and had a duplex conversation hyperlink primarily based totally on a cellular-Internet interface that allowed for information inspection and irrigation scheduling to be programmed through an internet web.
2. Jacqueline, Mohammed hayder and Hashim Ahmed, “A survey on seen Light Communiction” Visible-mild communications (VLC) is a era for wi-fi communique the usage of mild that may be perceived through the bare eye. VLC makes use of frequencies apart from radio, and they may be unrestricted and licence free. Visible mild communique refers back to the communique era which makes use of the seen mild supply as a sign transmitter, the air as a transmission medium, and the perfect photodiode as a sign receiving component.
3. Periasamy and Vimal, “LED Lamp Based Visible Light Communication in Under water Vehicles” VLC can help excessive facts quotes underneath the water, wherein different wi-fi technology like RF do now no longer work .
4. Namon, Changqiang and Kim, “Smart Parking Information System Exploiting Visible Light Communication” A clever parking statistics gadget exploiting seen mild verbal exchange era to assist drivers getting the real-time parking statistics in addition to course guide. By imparting correct statistics on to be had parking spaces, drivers shop time and gasoline and boom performance of the parking process.
5. GulfishanFirdose Ahmed *et al.* (2012) have examined routing protocol for mobile ad hoc networks the Destination Sequenced Distance Vector (DSDV) and On-Demand protocol that has estimated both protocols according to the packet delivery fraction and average delay whereas differing some sources and pause time. An Improved-DSDV Protocol was proposed in this work for Ad Hoc networks. This enhanced DSDV overcomes the issues of stale routes, and thus the performance of regular DSDV has also been enhanced.
6. Srinivasa Rao*et al.* (2012) proposed an energy-efficient and reliable congestion control protocol called EERCC to multicast process in MANETs. In this work, multicast congestion control protocols AODV’s disadvantages were overcome, in which according to individual receivers, congestion control was detected, and their receiving rates were adjusted. For multicasting in MANETs, energy-efficient, and reliable congestion control protocol has been executed in three steps. In the first step, a multicast tree was routed at the source node was constructed by involving the mobile nodes with higher remaining energy towards the destination node.
7. Periasamy and Vimal, Opportunistic data forwarding was tired much consideration in the research society of multihop wireless networking, with the majority research

performed for stationary wireless networks. The reason is why opportunistic data forwarding has not been extensively exploited in MANETs can be the need for an effective lightweight proactive routing method with strong source routing ability.

8. Periasamy and Vimal, “LED Lamp Based Visible Light Communication in Under water Vehicles” VLC can help excessive facts quotes underneath the water, wherein different wi-fi technology like RF do now no longer work.
9. Namon, Changqiang and Kim, “Smart Parking Information System Exploiting Visible Light Communication” A clever parking statistics gadget exploiting seen mild verbal exchange era to assist drivers getting the real-timeparking statistics in addition to course guide. By imparting correct statistics on to be had parking spaces, drivers shop time and gasoline and boom performance of the parking process.

2.1 OBJECTIVES OF THE PROJECT:

To improve the products quality, as well as maintain a sustainable agriculture by collecting real timedata from the environment.

3. FEARTURE ENHANCEMENT

Turning light bulbs into super-speed broadband wireless Internet systems. Smartphones will soon be able to download traffic information from traffic lights. In the future, shops will transmit advertisements to our phone as we pass by and bus schedule changes will be transmitted to a screen at the stop. Smarter home appliances that talk machine-to-machine (M2M) are already being extensively researched, where LED lights on electronics function as Li-Fi access points. Li-Fi technology will in future enable faster, more reliable internet connections, even when the demand for data usage has outgrown the available supply from existing technologies such as 4G, LTE and Wi-Fi. It will not replace these technologies, but will work seamlessly alongside them.

4. CONCLUSION

This paper presents the application of Li-Fi wireless sensor network in irrigation system. It can be used in irrigation system but needs some improvements like point to multipoint communication, covering range. This irrigation method permits farming in areas with water scarcity thereby making improvements to hold water. The best strategy for deciding the water requests of harvests is based on the real time controlling of soil moisture. Visible Light Communication is a category of optical wireless communication. It is only a small portion of the electromagnetic spectrum. The data communication medium which uses visible light between 400 and 800 THz (780– 375 nm). The technology uses fluorescent lamps (ordinary lamps, not special communications devices) to transmit signals at 10 kbit/s, or LEDs for up to 500 Mbit/s. Low rate data transmissions at 1 and 2 kilometres (0.6 and 1.2 mi) were tried. RONJA achieves full Ethernet speed (10 Mbit/s) over the same distance. Visible Light requires low power for their operation and has very high switching speeds. For the communication to be full duplex it requires a downlink and an uplink.

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