

Internet of Things in Various Scenarios: A Survey

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Abstract: Nowadays the world is undergoing a dramatic transformation from isolated systems to ubiquitous Internet-enabled things referred to as the Internet of Things (IoT) this new reality will enrich everyday life and changes everything including ourselves which enhance the productivity, saves the energy and so on. The primary purpose of this paper is to discuss about how the Internet of Things are used in various possible scenarios and how it helps us to improve efficiency, accuracy and economic benefit.

Keywords: Wireless Sensor Applications, IOT in Agriculture, Sensors, Wireless Sensor Network (WSN), IOT and cloud.

I. INTRODUCTION

The Internet of Things (IOT) sometimes referred to as the Internet of Objects, will change everything including ourselves. This may seem like a bold statement, but consider the impact the Internet already has had on education, communication, business, science, government, and humanity. Clearly, the Internet is one of the most important and powerful creations in all of human history. Now consider that IOT represents the next evolution of the Internet, taking a huge leap in its ability to gather, analyze, and distribute data that we can turn into information, knowledge, and, ultimately, wisdom. In this context, IOT becomes immensely important. IOT is designed by several technologies and communication solutions. The Internet of Things (IOT) is generally thought of as connecting things to the Internet and using that connection to provide some kind of useful remote monitoring or control of those Things.

II. WIRELESS SENSOR IN AGRICULTURE

Wireless sensor and miniaturized devices is used in control of greenhouse parameter in precision agriculture. It helps in

growth of agriculture and it benefits the farmers in many ways. Due to uneven natural calamities, wrong prediction of weather, improper irrigation method, there is no proper ideal irrigation process available for all weather conditions, soil structure and variety of crops cultures [1]. It is observed that farmers have to bear huge financial loss because of wrong prediction of weather and incorrect irrigation method to crops. Programmable System on Chip Technology (PSOC) a semiconductor device is used as a part of Wireless Sensor Networks (WSN) to monitor and control various parameters in agriculture. PSOC is the first touch starter kit to be designed with low-power RF, and low cost USB for easier sense and control of data collection. High Bandwidth/throughput spectrum is needed for proper greenhouse implementation. It is seen that without this kind of chip (semiconductor device) it is impossible to sense environmental parameters like temperature, CO₂ & humidity in this technology [2]. Three sensors are used namely a, b, c which is used for inside (a), outside (b) parameters and soil sensor (c). These sensors are been connected to server or sink node without wire. This network is called wireless network (WSN). A ZIGBEE sensor network and a RAS

(REMOTE APPLICATION SERVER) are used to maintain network performance at high level, gather data and to host manage the network [3]. STD IEEE 145.1.5 is used as a special transducer WSN for sensing, computing and communication. Three sensors are used here. All sensors are reconfigurable as per the stages of crop growth, soil condition, climate season etc. This helps farmers in growing high quality crop. All these sensors will detect each changes happening inside and outside. WSN with additional hardware and software is better solution for greenhouse control [4][5]. This has wide range in developing countries, where agriculture is source for living. Irrigation, fertility of soil etc., are implemented and tested in agriculture for their basic lifestyle earns.

III. WIRELESS SENSOR IN HUMANS NEEDS

Human health care can be improved by the use of advanced technology of IOT with the use of many sensors. Alzheimer's, cancer, lung disease, appendix all critical major problems are cured by using wireless sensors [6]. RF ID tags and NFC technology are used to track and examine patient health and behavior with use of sensors. By this, Doctors can monitor the health of their patients on their smartphones after the patients gets discharged. There is an application known as "CAREGIVER" which gives the information about indisposed person discretely without hurting their feelings. Babies' behavior can be controlled and monitored by enclosing sensor in their toys [7]. Tracking heartbeat rate, person body temperature, blood pressure, hemoglobin content level etc. can also be monitored and controlled. To support the humans in their health and in happy living wearable heart monitors are also possible with IOT.

IV. WIRELESS SENSOR IN SURVEILLANCE

In military WSN is used to get information by tracking the enemy in the battlefield surveillance target classification [8][9]. Here the input data comes from seismic and acoustic waves. Multiple sensors are used for better results in terms of accuracy and energy saving. Many challenges can affect the target tracking quality in wireless sensor networks:

- ◆ Node missing
- ◆ Target missing and recovery
- ◆ Data aggregation
- ◆ Connectivity and coverage
- ◆ Tracking latency
- ◆ Energy consumption

Sensor node can be either binary or ordinary. Binary sensors are used to detect the presence or absence of the target by generating one-bit information (0 or 1) [10]. They are low-

cost and consume less energy. By using binary outputs, the size of data sent to the base station is reduced.

V. WIRELESS SENSORS IN ENVIRONMENTAL MONITORING

IOT is a great boon in all trending technological applications, but mainly used in environmental monitoring and controlling, by using sensors. Here, sensors are able to detect and protect environment by analyzing air, water, weather, aquatic, soil conditions, in movements of wildlife and their habitats. By integrating all forms of energy consuming devices, it is applicable for effectively balance power generation and energy usage

INDOOR ENVIRONMENTAL MONITORING

SABER a research center at CITRIS installed 50 matchbox-size known as "SMARTDUST MOTES" which is device used to monitor light, temperature and air streams through which indoor pollution can be controlled [11]. Another was a WSN was deployed in an office building at Pacific Northwest National Laboratory, Richland, Washington to survey the advantages and drawbacks of wireless technology in operations of heating, ventilation and air condition (HVAC) systems [12][13]. Likewise other indoor applications include mitigation of fire, earthquakes, sensing fire and smoke deduction helps in knowing the better needs and changes that is occurring in indoor environment.

OUTDOOR ENVIRONMENTAL MONITORING

Environmental integrating all forms of energy consuming devices. The University of Hawaii and North Carolina State University has also been occupied with the study of the environment. They have focused the research in Volcano National Park, trying to discover why some species can only live in a specific region? and about red wolf [14]. The outcome of this study would be very useful in knowing to prevent endangered species from extinction. Each unit (called POD) and with a high-resolution digital camera are fixed in it [15]. The plan is to attach a node to each animal, in order to record information about its condition and behavior. Outdoor monitoring is mostly focused on agricultural, which benefit the farmers in many ways. The agriculture environment monitoring service system collects environmental and soil information through WSN. They collect image information through CCTV, and locations through GPS modules. This monitoring of outdoor will definitely increase the added value and productivity of agriculture. The other outdoor monitoring is to monitor the natural environment of a bird (storm petrel) and its behavior according to climatic changes. Here it is implemented by installing some motes inside bird's burrows, to detect the bird's presence. Finally, CORIE [16] is another

heterogeneous system that was deployed on the California River by the OGI School of Science & Engineering of the Oregon Health & Science University. Some nodes are installed and connected (hard-wired) along the estuary and a wireless on drifts on the river to describe water or atmospheric conditions. Hence it's been concluded that outdoor monitoring gives accurate data that helps in detecting and knowing happenings in outdoor environment.

VI. WIRELESS SENSORS IN TRANSPORTATION

Application on IOT assists users in many ways like knowing the range of speed limit, communication and interactions. The Dynamic interaction between these components of a transport system enables inter and intra vehicular communication, smart traffic control, smart parking, electronic toll collection systems, logistic and fleet management, vehicle control, and safety and road assistance [18]. It is been estimated that by next 20-30 years existing traffic system control would improve to extent where cars can communicate with each other without any human interaction. Hence travel could be made smoother and safer. Sensors would be fitted in cars and these cars will be placed on the roads. These would monitor traffic and send the information wirelessly to a "central traffic controlled hub". Additional benefits include parking guidance were the drivers would be told over the Wi-Fi about the vacant spaces available near to their location [19]. In addition to this, the drivers would be intimated with the shortest possible paths to reach the destination so that carbon dioxide emissions can be controlled, and also drivers will be intimated about school zone, traffic zone, danger zone, endangered species zone [20]. The traffic administration department can use this real time traffic monitoring information to detect the dangerous situations on the road and thereby react by imposing immediate actions [21]. On the whole IOT will play an important role in traffic monitoring by improving the efficiency of traffic safety and travelling costs.

VII. WIRELESS SENSORS IN ENERGY MANAGEMENT

The most important need to optimize the energy consumption as a whole on IOT devices can be done by integrating sensing and actuation systems integrating. IOT devices on switches, power outlet, bulbs, television etc., this will effectively balance the power generation and energy usage [17]. This helps in reliability for the users to remotely control devices and manage them at cloud based interface at centrally. (e.g., remotely powering on or off heating systems, controlling ovens, changing lighting conditions etc.). IOT is especially relevant to the Smart Grid, since it provides act on energy and power-related information in an automated fashion with the goal to improve the efficiency,

reliability, economics, and sustainability for the production and distribution of electricity.

VIII. CONCLUSION

WSN plays a vital role in all major applications. Its evolving nature supports sustainability, scalability and secure deployment for Internet of Things solutions. The possible use of wireless sensor motes and networks extends over a vast area of human activity. Although, most of the applications are still under research and few completed products or services have become available for public.

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