Design Embedded System for Monitoring Level of water

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Abstract- **IoT deals with intricate systems that integrate multiple disperse components towards their synergetic use. In this paper a system of interconnected smart modules is developed as a way to enable centralized data acquisition as well as provide a interlinked network for transmission of data in absence of any existing infrastructure. Emphasis is given on how sensing and communication technologies of IoT can effectively be used in smart city monitoring as well as in case of disaster management. The hardware of the module used for this purpose is studied andelaborated in a detailed manner.**

***Index Terms*— IoT, Smart City Monitoring, Data Acquisition,Disaster Management.**

I. INTRODUCTION

According to Federal Emergency Management Agency (FEMA), an emergency is any occasion or instance such as a hurricane, tornado, storm, flood, tidal wave, tsunami, earthquake, volcanic eruption, landslide, mudslide, snowstorm, fire, explosion, nuclear accident, or any other natural or manmade catastrophe that warrants action to save lives and to protect property, public health, and safety. In order to properly manage the catastrophic events, information needs to be collaborated, for example by sharing resources and/ordata and coordinating actions, decisions, and activities. Furthermore, during an emergency, such resources and data have to be merged in order to accomplish complex tasks, such as evacuate a geographical area and perform operations by means of actuators [1]. The lack of integrated platforms and infrastructures which assist in data acquisition results in a bad management of the emergency. The main concept of IoT is machine to machine communication. Internet-based sensor networks have recently been gaining attention. Sensors are connected to the Internet and the information from the sensors is gathered at a server through the Internet. Security and manageability of sensor information transmission and deployability of sensors connecting to the Internet wirelessly are the major issues though low cost and high scalability are expected [2]. Currently IoT systems are used to remotely record and keep track of family and friends, send notifications about climate change, inform users of traffic information concerning minor, local roadways, notify of arrival and departure times of railways, etc [3]. This research work aims at developing a system which facilitates aids in the collection of data with the help of interconnected modules consisting of multiple sensors useful for smart city monitoring as well as disaster management.

1.1 Literature survey

[1] Federal Emergency Management Agency FEMA, US Department of Homeland Security, USA, 2001.

In the early morning hours of December 26, 1802, fire ripped through the city of Portsmouth, New Hampshire, destroying large areas of this important seaport. The fire was a devastating event and threatened commerce throughout the northeast section of the newly founded Nation. Nineteen days later, Congress suspended bond payments for several months for the merchants affected by the fire, thus implementing the first act of Federal disaster relief in American history.

[2] J. Gubbi and R. Buyya, "Internet of things (iot): A vision, architectural elements, and future directions," Future Generation Computer Systems 29, pp. 1645–1660, 2013.

Ubiquitous sensing enabled by Wireless Sensor Network (WSN) technologies cuts across many areas of modern day living. This offers the ability to measure, infer and understand environmental indicators, from delicate ecologies and natural resources to urban environments. The proliferation of these devices in a communicating–actuating network creates the Internet of Things (IoT), wherein sensors and actuators blend seamlessly with the environment around us, and the information is shared across platforms in order to develop a common operating picture (COP). Fueled by the recent adaptation of a variety of enabling wireless technologies such as RFID tags and embedded sensor and actuator nodes, the IoT has stepped out of its infancy and is the next revolutionary technology in transforming the Internet into a fully integrated Future Internet. As we move from www (static pages web) to web2 (social networking web) to web3 (ubiquitous computing web), the need for data-on-demand using sophisticated intuitive queries increases significantly. This paper presents a Cloud centric vision for worldwide implementation of Internet of Things. The key enabling technologies and application domains that are likely to drive IoT research in the near future are discussed. A Cloud implementation using Aneka, which is based on interaction of private and

public Clouds is presented. We conclude our IoT vision by expanding on the need for convergence of WSN, the Internet and distributed computing directed at technological research community.

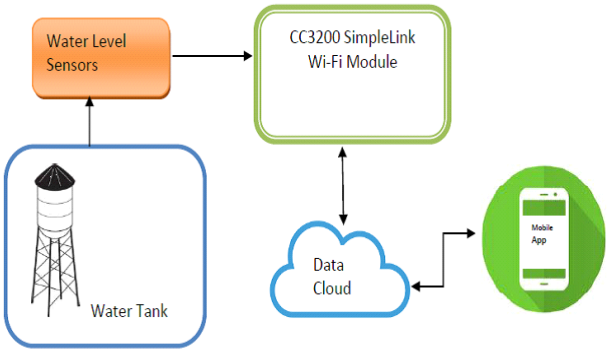
[3] A. Monzon, "Smart cities concept and challenges bases for the assessment of smart city projects," IEEE Smart Cities and Green ICT Systems (SMARTGREENS), pp. 1–11, May 2015.

ASCIMER (Assessing Smart Cities in the Mediterranean Region) is a project developed by the Universidad Politecnica of Madrid (UPM) for the EIBURS call on "Smart City Development: Applying European and International Experience to the Mediterranean Region". Nowadays, many initiatives aimed at analysing the conception process, deployment methods or outcomes of the - referred as - Smart City projects are being developed in multiple fields. Since its conception, the Smart City notion has evolved from the execution of specific projects to the implementation of global strategies to tackle wider city challenges. ASCIMER's project takes as a departure point that any kind of Smart City assessment should give response to the real challenges that cities of the 21st century are facing. It provides a comprehensive overview of the available possibilities and relates them to the specific city challenges. A selection of Smart City initiatives will be presented in order to establish relations between the identified city challenges and real Smart Projects designed to solve them. As a result of the project, a Projects Guide has been developed as a tool for the implementation of Smart City projects that efficiently respond to complex and diverse urban challenges without compromising their sustainable development and while improving the quality of life of their citizens.

[4] A. Yusoff, I. S. Mustafa, S. Yussof, and N. M. Din, "Green cloud platform for flood early detection warning system in smart city," Information Technology: Towards New Smart World (NSITNSW), IEEE, pp. 1–6, Feb. 2015.

The use of cloud computing is gaining its preferences by researchers and inventors worldwide including for the development in the Information and Communications Technology (ICT) infrastructures. This is especially in the move of defining a smart city development. Contrarily, there's always uncontrollable forces and natural disaster that would challenge man's creation in technological advancements. This article discusses one of the common disasters that occurred in both urban or rural housing areas and neighborhood i.e. the flood. This article is proposing that the flood management and early warning detection can be resolved with cloud computing facility. Through the progressive appearance of cloud computing, it is also expected that this facility is complemented with the Green Cloud technology to promote the green environment towards a better living in the smart cities.

II. PROPOSED WORK



Sensor wires in the overhead tank will detect the level of water.Single stranded wire is used as sensor. Sensing will be done by operating thetransistor in switch mode. When a particular water level will be sensed and the corresponding level will be send to the ARM cortex M-4 microcontroller in the CC3200 Launchpad, it will upload the corresponding level of water on the cloud. This data on the cloud will be fetched by the android application and will be displayed to the end user. In this android application recent and previous water levels will be displayed a long with date and time. When the water level goes below low level, motor will automatically turn on and when water level goes above high level, motor will turn off automatically.

Smart City refers to a future city that makes use of upcoming and latest technology [4]. The sensors and actuators available in the market today allow users to remotely record and keep track of family and friends, send notifications about climate change, inform users of traffic information concerning minor, local roadways, notify of arrival and departure times of railways [5], etc. Thus, localized or private information of such day to day activities must be securely saved say on a server for keeping track of safety and well-being of humans. A Disaster is a natural or man-made hazard that causes serious severance in the functioning of a community or a society. Disaster brings with it great damage, loss, destruction and devastation to not only human life and property but also to infrastructure, transport networks and economy. It is very essential to allocate the data and resources in a proper manner such that maximum number of the masses outlast the ill-effects of the disaster. Though it is not completely possible to avoid the occurrence of a disaster, but the impact can certainly be minimized by creating proper methods of awareness of likely disaster and its effects by developing a system that channels this information to the concerned authorities [6]. IoT can play a significant role in this channelling and

transmission of data through efficient use of existing technology [7].

III. CONCLUSION

IoT is setting off an upsurge of information industry. IoT is still in its initial stage. The hardware of a low cost module used in IoT enabled systems has been designed and the concept for the use of this module for Smart City Monitoring and Disaster Management has been proposed. Initial testing has shown positive results. Future work includes improving resilience of the network, dynamic adaptation of modules to changing conditions and development of a dedicated protocol for disaster management.

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