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APPLICATIONS OF INTERNET OF THINGS (IOT): A COMPREHENSIVE REVIEW

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Abstract

In order to serve a meaningful purpose, the Internet of Things (IoT) is characterized as a paradigm in which objects equipped with sensors, actuators and processors interact with each other. In this paper, in this new emerging field, we research state-of-the-art methods, protocols, and applications. This study paper proposes a new taxonomy for IoT technologies, highlights some of the most important technologies, and describes some applications that have the potential to make a significant difference in human life, especially for the elderly and the otherwise capable. This paper is much more extensive in its coverage compared to similar survey papers in the field and exhaustively covers most major technologies, ranging from sensors to applications.

Keywords: *Climate Control, Internet of Things (IoT), Home Automation, Transport System, Network layer*

I. INTRODUCTION

The Internet has become universal today, has reached almost every corner of the globe, and is unimaginably impacting human life [1]. The journey is far from finished, however. We are now entering an age of much more ubiquitous networking where the web will be connected to a very large range of appliances. We are entering an "Internet of Things" age (abbreviated as IoT). In

several different ways, this concept has been defined by numerous authors. Let us look at two of the meanings that are most common [2].

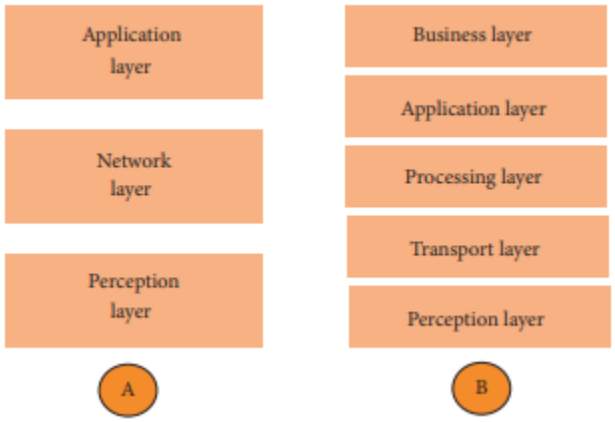

Fig. 1 Illustrates the Architecture of Internet of Things (IoT) (A: 3 layers) (B: 5 layers)

$$E(x) = \frac{1}{N}\sum_{i=1}^{N} x_i$$

$$D(x) = \frac{1}{N}\sum_{i=1}^{N}(x_i - E(x))^2$$

$$cov\,(x,y) = \frac{1}{N}\sum_{i=1}^{N}(x_i - E(x))\;(y_i - E(y))$$

$$r_{xy} = \frac{cov\,(x,y)}{\sqrt{D(x)}\sqrt{D(y)}}$$

$$\sqrt{D(x)}\; \neq 0, \sqrt{D(y)} \neq 0$$

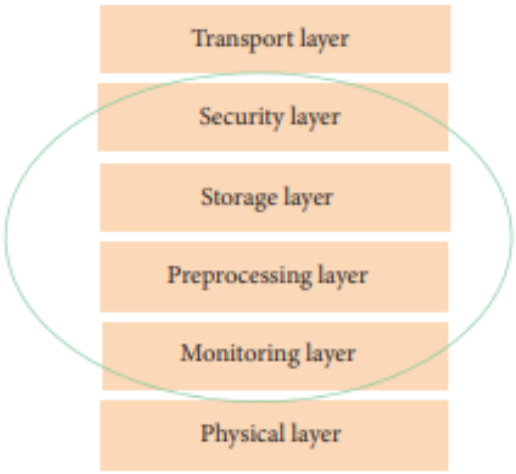

Fig. 2 Illustrates the fog construction of smart Internet of Things (IoT) gateway

II. LITERATURE REVIEW

A survey on the security of IoT frameworks was done by Ammar et al. In several domains, ranging from small wearable devices to large industrial networks, the Internet of Things (IoT) has a huge influence on our everyday lives. Consequently, using various IoT frameworks, a broad range of IoT applications have been developed and deployed [3]. A framework for IoT is a collection of guiding guidelines, protocols and specifications that simplify the implementation of IoT applications. The performance of these applications depends mainly on the environment features of the IoT framework, with a focus on the security mechanisms used in it, where security and privacy concerns are central. A total of 8 frameworks are considered in this paper, which surveys the security of the key IoT frameworks [4]. We explain the proposed architecture, the basics of third-party smart app development, the compatible hardware, and the security features for each system. The comparison of security architectures reveals that the same principles were used for communications security, while the provision of other security properties was pursued by different methodologies [5].

III. DISCUSSION

In health care, fitness, education, culture, social life, energy efficiency, climate control, home automation, and transport systems, the Internet of Things finds diverse applications. We may find that IoT technologies have been dramatically able to minimize human efforts and enhance the quality of life in all these application fields. There are a diverse number of areas in which smart

applications have been developed. The IoT is now used worldwide for many applications, such as home automation, smart cities, irrigation, agriculture, health care and many more.

$$r_{x,y} = \frac{C(x,y)}{\sqrt{D(x)}.\sqrt{D(y)}}$$

Where $C(x,y), D(x)$ and $D(y)$ may be evaluated by utilizing the following equations[6].

$$C(x,y) = \frac{\sum_{i=1}^{K}(x_i - E(x))(y_i - E(y))}{K}$$

$$D(x) = \frac{1}{K}\sum_{i=1}^{K}(x_i - E(x))^2$$

$$D(y) = \frac{1}{K}\sum_{i=1}^{K}(y_i - E(y))^2$$

IV. CONCLUSION

The principle of smart grids provides information at each phase to make electricity generation, transmission and distribution smart and also enables the two-way flow of power (back from the consumer to the supplier). This will save a lot of energy and help customers understand power flow and dynamic pricing better. Power generation is distributed within a smart grid. To track everything, there are sensors deployed in the device. It is basically a distributed micro grid network. We presented a study of the latest technologies used in the IoT domain as of 2016 in this survey paper. This area is presently in a very nascent phase. There are indicators of maturity in the technologies in the main infrastructure layers. In the fields of IoT software and communication technology, however, a lot more needs to happen. Over the next decade, these areas will undoubtedly mature and affect human life in inconceivable ways.

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