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A Brief Study on IoT Applications

N. Sathiyanathan, Selvakumar. S, P. Selvaprasanth

Assistant Professor, Department of ECE, Sethu Institute of Technology, Virudhunagar, Tamil Nadu, India

ABSTRACT

The Internet of Things (IoT) is viewed as an ecosystem that includes smart objects with sensors, networks, and processing technologies that integrate and work together to provide an environment that provides smart services to end users. IoT brings many benefits to human life through an environment where smart services are provided to use any activity anytime and anywhere. All of these facilities and services are communicated through various applications running in the IoT environment. The most important utility achieved by IoT applications is monitoring and, consequently, rapid decision-making for e-cliient management. In this paper, we will explore the diversity IoT application domain to understand the various approaches of IoT applications that have recently been proposed based on the systematic literature review (SLR) method. The purpose of this paper is to analyze and statistically categorize and analyze current research approaches on IoT application approaches published between 2011 and 2018. According to the content of the current study selected, this study will use SLR processes that include general aspects of healthcare, environmental monitoring, smart cities, commercial and industrial testing, and IoT applications. IoT applications are compared to each other according to several technical characteristics, such as quality of service (QoS), proposed case studies, and evaluation environments. It describes the results and shortcomings of each study, addresses those weaknesses, and provides tips for highlighting future research and open issues in IoT applications.

KEYWORDS: *Smart city applications, Cyber Security, Health care applications.*

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1. INRODUCTION

In recent years, the Internet of Things (IoT) has penetrated much of human life everywhere, including cities, homes, universities, industrial factories, organizations, agricultural environments, hospitals and medical centers [1-4]. Numerous features, such as data generation / consumption and online services, improve everyday life and activities around the world via IoT contexts [5]. Facilities and smart services run through a variety of applications running in the IoT environment [6]. As user demands increase, innovative applications for monitoring, managing, and automating human activities are provided [7,8]. IoT applications also apply cloud services computing to achieve appropriate composite services through the composition of existing atomic services for service-based applications in IoT contexts [9,10]. IoT scenarios are applied to applications with smart devices and users apply them to daily activities in different places Tabata. IoT applications also have the advantage of choosing the best opportunity for users, regardless of whether they decide, manage, or monitor environmental cloud resources [11].

Although the motivations for application domains are different, all of them have common goals in common. It is about improving the quality of human life by provisioning smart services [12,13]. The primary concern of IoT applications is meeting quality of service (QoS) metrics. User requirements must be supported by IoT application smart services that cover QoS metrics such as security, cost, service time, energy consumption, reliability, and availability. There are technical research and review papers that do not focus on IoT applications. [14,15] systematically. The main purpose of this research is to explore various IoT applications to understand the variety of recently announced IoT application approaches. Key approaches for IoT applications focused on selected research consist of healthcare, environmental monitoring, smart cities, commercial, industrial, and general approaches. An overview of the Systematic Literature Review (SLR) method and IoT applications. The main commitments of this study are:

Table1 Related studies in IoT applications.

Reference	Main topic	Publication year	Covered years
Li et al. [15]	IoT technology	2015	–
Han et al. [16]	IoT smart objects	2015	–
Ray [17]	IoT architectures	2016	–
Bello and Zeadally [12]	IoT services	2017	2004–2017
Talavera et al. [5]	IoT in environmental and agro-industrial fields	2017	2006–2016

2. Study on related work

This section provides a temporary description of relevant work studies for IoT applications.

Bello and Zeadally [18,19,20] discussed existing networking standards for the IoT environment and showed how to meet the QoS needs of objects to enable a smarter IoT ecosystem. In addition, an analysis is presented on the risks of lack of cross-domain integration in various applications and IoT environments to meet interoperability and QoS requirements such as availability, reliability, scalability, security, etc. to provide IoT services it was done. The strength of this research is that it presents a classification of the recent various standards at the network and application layers in various fields, including architecture, transportation, smart cities, business, and grid systems. The main drawback of this study is that it does not present statistical information on the discussed standards applied to different regulatory domains, as well as statistical charts for risk analysis of the lack of interoperability between IoT objects and transport protocols Judgment is not to provide.

Talavera and the like. [5] Survey on IoT applications in environmental and industrial agriculture. This review paper considers four areas including forecasting, monitoring, control and logistics. This study addresses and answers two important topics. The first concerns basic technical efforts in IoT-based applications for agricultural and environmental issues, and the second concerns the infrastructure and technologies used in the solutions mentioned. It can be seen that the largest articles are focused on monitoring (62%), control (25%), logistics (7%) and prediction (6%). In addition, according to the second question mentioned in this survey, most technologies and infrastructure applied to the IoT agricultural industry and environmental applications fall into seven sets, including visualization approaches, storage approaches, and edge computing. You can see that the technology, communication technology, power supply, actuator, sensing variables are realized. Open issues addressed in this review include topics on robust standardization, improved power consumption, security, reusability of software and hardware components, and cost savings.

Proper compatibility with existing infrastructure and scalability issues. The author announced the IoT architecture for agricultural and environmental applications. The model provided is composed of four layers, including the application, service, communication, and physical layers. The benefit of this study is to present useful and comprehensive statistics on research and work on agricultural industry and environmental applications in the IoT context. The weakness of this dissertation is that the related works are not fully explained.

Han et al. [21] presented a review on service configuration issues of Internet Protocol (IP) smart IoT objects. The author provided a complete survey based on several issues, including smart IoT object systems for IoT IP, service modeling, target applications, target platforms, and service configuration approaches. The main weaknesses of this study were availability, response time as a key quality factor, cost, and scalability were not analyzed.

Lee et al. [22,23,24] provided a survey on key IoT technologies. In this review, we described the architecture layers, such as the perception, network, services, and interface layers. The benefit of this review is that it presents comprehensive open issues and challenges in IoT, but did not consider the compatibility of each approach in IoT applications.

A survey on IoT was presented by Ray [25,26,27]. This study covers topics such as service-oriented architecture (SOA), WSN, healthcare systems, and social computing. The main drawback of this study is that it does not provide analysis on evaluation parameters such as availability, energy consumption, cost, response time, and reliability as quality factors in this area.

Table 1 provides an overview of related review studies on IoT application issues related to systematic literature reviews and research studies. The table shows the core subject, year of publication, and year of coverage for each study.

According to existing review papers, existing deficiencies propose to provide a comprehensive literature review to address these weaknesses as follows:

- The current survey does not provide an analytical assessment and classification of the IoT application approach.
- Some studies have not evaluated key metrics for IoT applications.
- There is no systematic arrangement in the structure of the presented study, and it is not clear how to select the dissertation.

3. Structure of IoT applications

This section presents a technical review of IoT applications selected for existing studies according to the applied SLR process. It provides a comprehensive classification of IoT applications including healthcare, environment, smart city, commercial, industrial, and general aspects [28,29]. Each type of IoT application can potentially raise some issues that need to be focused on to find effective solutions that make IoT applications more efficient and applicable in real-world IoT environments Make sure you have a paper that tries to address some issues that support IoT applications in a particular domain. For example, smart city applications include key semantic-aware mobile cloud sensing, vehicle surveillance, location detection, context-aware or QoS-aware service configurations, scalable IoT platforms, and scalable heterogeneous data stream management. Subjects and other issues arise in various aspects of smart city IoT applications. As such, the taxonomies presented in this whitepaper are based on the various types of IoT applications for which specific connection methods were discussed and addressed in the selected research paper. For the challenges and concerns of different categories of IoT applications, we will first focus on the types of IoT applications and then explore key contexts that focus on the selected paper. Due to the general concerns of IoT applications, we have introduced a category called `` general aspects '' in the classification and categorized papers that present an approach

to address specific challenges to support all types of IoT applications To do. Of course, the general aspects of the proposed taxonomy apply to all IoT application domains, including IoT software applications and systematic software, evaluation procedures, and performance prediction [30]. In other words, illustrated studies of general aspects have presented a new conceptual approach for using any type of IoT application in development. Shows the classification of IoT applications.

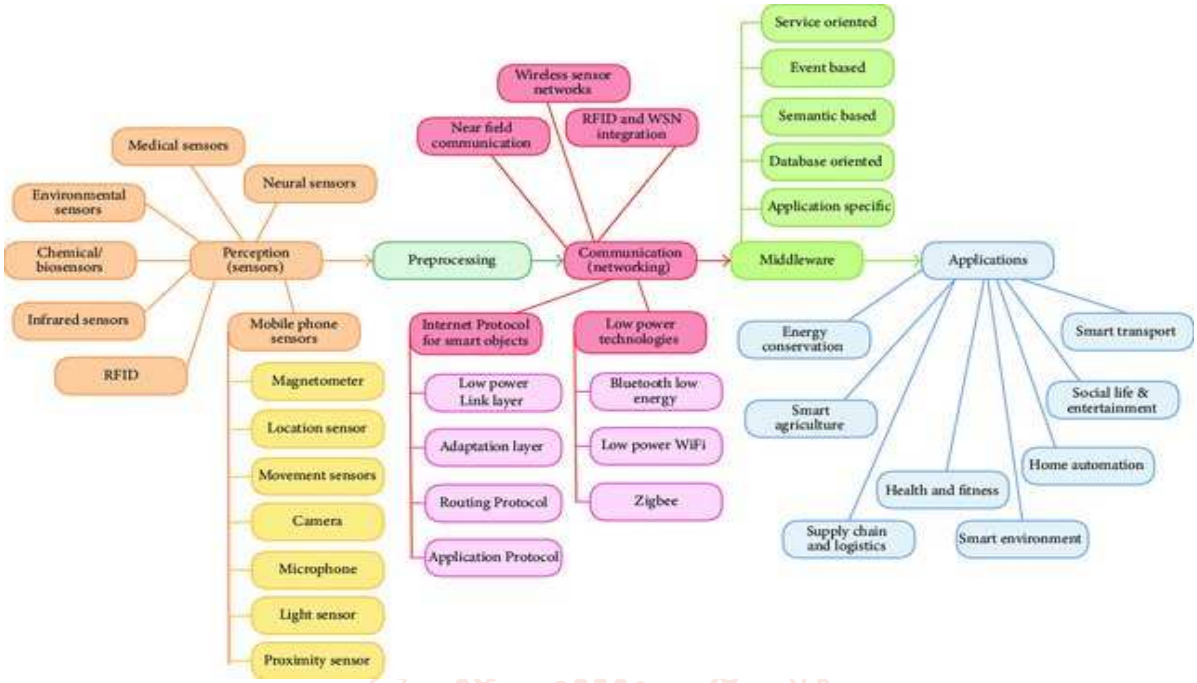

Fig1. The taxonomy of Iot applications

Security and privacy: IoT has no unified architecture and less protection. Therefore, different types of attacks, such as unauthorized access to tags, denial of service, and malicious code injection, are threatening different parts of the IoT architecture. IoT objects are simple and cannot be applied to some security measures, so they are vulnerable to these attacks. Because IoT security issues can cause serious disasters, especially in critical applications such as medical and financial applications, security and privacy issues need to be considered further in an IoT environment. Therefore, certification during several stages of development of IoT applications is also a major challenge, the best explanation of which has not yet been recognized. Figures 2 and 3 show the percentage of the evaluation environment and the percentage of the evaluation elements of IoT applications shown in the literature.

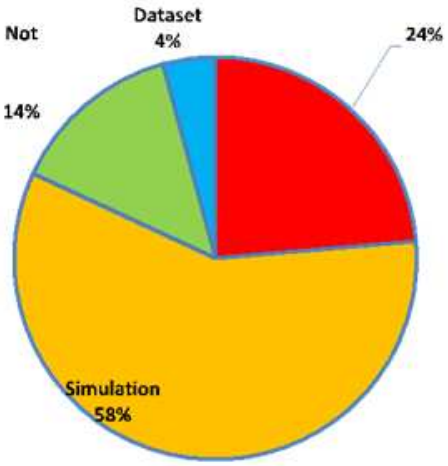

Fig. 2. Percentage of the presented evaluation environments in the literature.

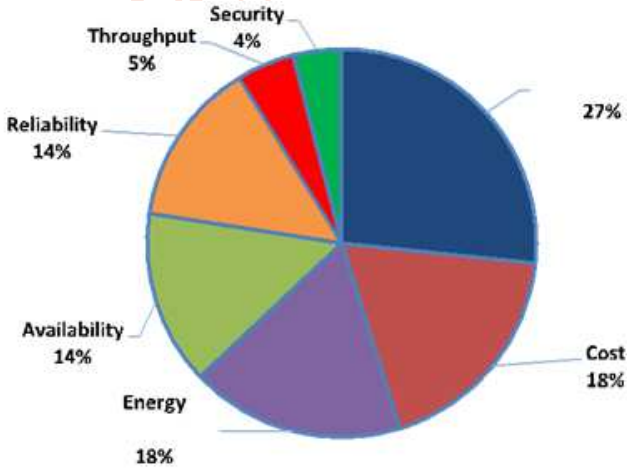

Fig. 3. Percentage of evaluation factors of IoT applications

As such, it cannot process all collected data that generates big data. This means that it may not be worth it unless you analyze, interpret, and understand the data collected. Context-aware computing allows you to store contextual information related to sensor data. Therefore, their interpretation can be made easier and more expressive. In addition, knowledge of the context information makes communication performance between machines easier. Context awareness as an important task that plays a significant role

The role that determines what data needs to be processed. Occurs when a large number of sensors are deployed and generates data. Thus, the old-style application-based approach is less efficient. To address this infeasibility, a number of middleware solutions have been introduced that emphasize various features of IoT, especially context awareness. Therefore, the main challenge remaining is to develop context-aware applications [30,31]. These types of applications typically apply frameworks, libraries, and tools to collect contextual information, preprocess,

4. Conclusion

In this review, an SLR-based method will be presented in IoT applications. During this investigation, a comprehensive understanding of IoT applications and considerations for open issues were achieved. In this paper, we used search queries in 185 papers published between 2011 and 2018 to demonstrate an SLR-based process. Finally, we analyzed 72 papers focusing on IoT applications. The smart city approach has the highest percentage of application approaches at 29% of the literature quota. Of course, according to AQ1, 20% for healthcare applications, 14% for commercial applications, 12% for environmental applications, 12% for general aspects of IoT applications, and 10% of IoT for industrial applications there is. According to AQ2, 21 studies found that QoS-aware approaches were the most common, and 17 studies showed intelligent monitoring. Regarding AQ3, we observed that 24% of research studies implemented the proposed approach for developing IoT applications. To compare the evaluation factors, the configuration approach was evaluated with a response time factor of 27%, cost of 18%, energy of 18%, availability of 14%, reliability of 14%, and an AQ4 survey throughput of 5%. %, Security is 4%. For SLR-based methods, we may not have analyzed all existing studies. As a result, non-English, non-peer-reviewed and edited papers, book chapters, and survey articles have been omitted. In this review, we conducted a comprehensive study of the IoT application approach, using the findings of various authors and various studies.

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