Impact Factor (SJIF): 5.301

International Journal of Advance Research in Engineering, Science & Technology

e-ISSN: 2393-9877, p-ISSN: 2394-2444

Volume 5, Issue 3, March-2018

A SURVEY ABOUT CYBER PHYSICAL SYSTEM DEVICES COMMUNICATIONS FOR PREVENTING CHILDREN AND DISABLED PERSONS FROM ELECTRIC HAZARD

Dr.S.Hemalatha[1], Mr.G.Dhamodhara kannan[2], Mr.M.Nagagopal[3], Mr.M.Vigneshwar[4]

[1]*Professor, Department of Computer Science and Engineering, Panimalar Institute of Technology, Chennai – Tamilnadu, India.*
pithemalatha@gmail.com

[2]*UG Scholar, Department of Computer Science and Engineering, Panimalar Institute of Technology, Chennai – Tamilnadu, India.*
dharankannan97@gmail.com

[3]*UG Scholar, Department of Computer Science and Engineering, Panimalar Institute of Technology, Chennai - Tamilnadu, India.*
Naga.gopal326@gmail.com

[4]*UGScholar, Department of Computer Science and Engineering, Panimalar Institute of Technology, Chennai - Tamilnadu, India.*
iasvigneshviki@gmail.com

ABSTRACT-This paper proposes survey on the modern technological electrical devices are replaced the human daily house hold work. All the houses are having different electrical devices depends on the needs. In Parallel causes of electric hazard are also increasing. A survey reveals the major causes of electric hazard pointing objects are children and disable persons. Because of lacking of awareness about electric devices and it cautions. Consequently there is a need to develop the monitoring devices to prevent the electric hazard for the children and disabled persons. Machine learning techniques are used to learn the machine activities and able to control machine. Cyber physical system provides communication between heterogeneous systems. This two technology is incorporated in to the proposed work to provide the device which able to control the electric hazard for children and disabled person. The proposed work consists of motion sensors which monitor the movement of the object continuously. If the object nearing to the any electric machine like washing machine , fridge and iron box etc., immediately the circuit will turn off unless the object moving away from the electric device. Also the device can able to generate the sound signal and give caution to the children and disable about the dangerous of the electronic device. Along with machine learning and cyber physical system the proposed work uses the Internet of Things to connect the devices status and object status to the responsible persons who are all in the inaccessible location. The IoT can assist in integration of communications, control, and information processing across various systems. The Internet of Things allows objects to be sensed and controlled remotely. Wireless Home Automation system(WHAS) using IoT is a system that uses computers via GPRS to control basic home functions and features automatically System using GPRS through internet from anywhere around the world, an automated home is sometimes called a smart home. a home automation system using cloud combined with IOT that make use of Wireless Sensor between the controller and user section. By using this technological devices will provide secure life to the children and disabled.

KEYWORDS

Cyber Physical System (CPS) ,Wireless Network, Machine-to-Machine (M2M), Smart Home Automation System ,Machine Learning ,Electric Hazards.

INTRODUCTION

The Cyber Physical System(CPS) are the Combinations elements and physical entities that can interact with human through many modalities. The Security includes the malicious attempts by adversary that disrupts or destructs the functions of physical system that affects child and disabled persons from electric hazards. A variety of sensors and actuators monitor the behaviour and phenomena in the physical world and the resultant data are moved to the cyber world, where they are analysed to infer the state of the physical world and generate corresponding digital representations of the involved physical entities. The digital representation is used to derive knowledge about the state of the physical world and to optimize and control it through actions implemented through actuators. The related research area that is concerned with the integration of physical processes and computation in order to merge the physical and cyber world is termed CPS. The Internet of Things (IoT) paradigm, which seeks to interconnect computers to objects with self-configuring capabilities, plays an important role in the convergence of the physical and cyber worlds by ensuring secure and energy-efficient transfer of information (in both directions). The confluence of CPS with IoT has resulted in an impactful association of the physical world observations, sensed by the connected smart objects, with the computational processes of the cyber world. It has enabled modelling and reasoning of the physical phenomena, which coupled with efficient communication and data processing, can result in effective actuation. The variety of devices that can monitor the physical environment, encompass fixed sensor network installations.(e.g Wireless Sensor Networks (WSNs) for environment monitoring , smart home installations and sensor deployments for air quality monitoring).The high installation cost of fixed sensor networks and insufficient spatial coverage has led to mobile sensing initiatives, primarily by city authorities , which involve sensors mounted on public transportation vehicles (e.g., for environment monitoring).The objects could be physical devices that have identities, attributes and intelligent interfaces to be seamlessly integrated into the Internet through communication standard and interoperable communication protocols. With the CPS, the human lives will have another revolution. There are three major types of the components to form three tiers in a CPS. One type of the components is a group of sensors to form an environmental tier. The second type is the actuators, which form a service tier. And the last type is the controllers forming the control tier. The environmental tier is in charge of information collection from various physical systems. The major functions of the environmental tier in a CPS would be implemented by machine to machine (M2M) communication, where intelligent devices including sensors communicate with each other by utilizing both wireless and wired technologies. A M2M communication system consists of three interlinked domains: 1) A sensor area domain including sensor networks with M2M gateways, 2) A communication network domain including wired/wireless networks and 3) An application services domain consisting of the end users and applications required in the CPS [1]. The most relevant characteristic of a CPS is the tight integration between the physical process under control and the controlling digital computing system. Key issues in CPS are sensing and actuation, the modelling of the physical system, real-time computing, and networking. Example applications for CPS are in the field of manufacturing control, energy systems, automotive and avionics systems, traffic control, medical systems, cooperative robotics and smart buildings [2]. The exponential growth of wireless communication devices and the ubiquity of wireless communication networks have recently led to the emergence of wireless machine-to-machine (M2M) communications as the most promising solution for revolutionizing the future “intelligent” pervasive applications [5]. We begin with our vision of the future embedded mobile Internet. Then we look at several M2M use cases that offer significant market potential. We discuss the requirements and challenges associated with mass-scale

M2M networks, and describe potential system architectures and deployment options that can enable the connectivity of billions of low-cost devices. We describe the salient features of M2M traffic that may not be supported efficiently by current standards and provides an overview of potential enhancements [6]. Home networks are rapidly developing to include a large diversity of devices/machines/terminals, including mobile phones, personal computers, laptops, TVs, speakers, lights, and electronic appliances. With the dramatic penetration of embedded devices, machine-to-machine (M2M) communications will become a dominant communication paradigm in home networks, which currently concentrate on machine-to-human or human-to-human information production, exchange, and processing. M2M communications is characterized by low power, low cost, and low human intervention [1, 2]. M2M communications is typically composed of a number of networked devices and a gateway. The gateway is responsible for the connection among the devices, and the connection between the M2M communications area and other networks [7].Furthermore, a common M2M service platform is also needed to facilitate multi-industry M2M applications such as smart grids and smart cities, and to enable seamless M2M deployments among heterogeneous M2M systems [8].Devices-to-Device(D2D) enables devices to communicate directly with each other without traversing fixed network infrastructures such as access points or base stations [9].To achieve 1000-fold capacity increase in 5G wireless communications, Ultra Dense Network (UDN) is believed to be one of the key enabling technologies. The next generation of wireless communication systems might be implemented and operating. According to a report released by the 5G Infrastructure Public Private Partnership (5G-PPP) community, the next generation of wireless networks need to support more than 10,000 devices per square kilo meter and offer high date rate of 1 Gbps with a very low transmission delay of 1 to 10ms.The key technical requirements for 5G are believed to enable high per-user throughput, high network throughput, ubiquitous connections, and low latency[10].

[2] Tullio Facchinetti and Marco L. Della Vedova Evaluate the physical system is modelled as a set of periodic activities that can be scheduled by adapting traditional real-time scheduling algorithms. The goal is to limit the peak of power consumption, while guaranteeing a specific behaviour of the environment. Such behaviour is encapsulated in the variation of state variables related with the physical process under control. The proposed method has been applied to loads associated with physical state variables having constant dynamics with stochastic disturbance on the state variable evolution. The innovative approach presented in this paper fosters the possibility to use real-time scheduling techniques to organize the activation of electric loads in a power system. Future works will address the release of some assumption made in this paper, the study of alternative system models to explore the application of the proposed techniques to energy systems in general (gas, water, compressed air, etc.), and the integration of renewable sources in the model. Another possible issue to look at is to model real-time parameters as multiple of a finite time quantum, as it happens in practical implementations, instead of allowing them to take any real value. In this case, it should be evaluated how the choice of the time quantum impacts on the system performance. Moreover, an important improvement will deal hard user requirements, where violations to user requirements are not tolerated.

[3] Lui Sha, Sathish Gopalakrishnan, Xue Liu, and Qixin Wang Propose of the President's Council of Advisors on Science and Technology (PCAST) has placed CPS on the top of the priority list for federal research investment . This article first reviews some of the challenges and promises of CPS, followed by an articulation of some specific challenges and promises that are more closely related to the Sensor Networks, Ubiquitous and Trustworthy

Computing Conference Most of the material presented here originated from discussions, presentations, and working group documents from NSF workshops on Real-time GENI and from NSF workshops on Cyber-Physical Systems .The authors thank all the workshop participants for their insightful contributions.

[5] Rongxing Lu, Xu Li, Xiaohui Liang, and Xuemin (Sherman) Shensu Suggest that emerging M2M communications in terms of the potential GRS issues. We have to achieve green M2M communications by employing efficient activity scheduling techniques for energy saving. Although we have discussed the GRS issues in the general M2M communications paradigm to shed light on this research line, further efforts are needed to identify the GRS issues in specific M2M communications. The flourishing of M2M communications still hinges on fully understanding and managing the existing challenges: energy efficiency (green), reliability, and security (GRS) without guaranteed GRS, M2M communications cannot be widely accepted as a promising communication paradigm to promote an energy-efficient, reliable, and secure M2M communications environment.

[6] Geng Wu, Shilpa Talwar, Kerstin Johnsson, Nageen Himayat, and Kevin D. Johnson Investigate a Mobile Internet is evolving towards embedded Internet. M2M presents both challenges and opportunities to the industry. Although there are significant business and economic motivations for wireless operators and equipment manufacturers to invest in future generations of M2M services, the highly fragmented markets remain a hurdle and risk the forecasted growth of M2M markets. Two things are needed for the embedded Internet vision to materialize: the development of new technologies that scale with the growth of M2M markets, and a broad standardization effort in system interfaces, network architecture, and implementation platforms.

[7] Yan Zhang, Rong Yu, Shengli Xie, Wenqing Yao and Yang Xiao present the architecture of home M2M networks decomposed into three subareas depending on the type of applications and their service ranges. The standardized radio technologies and their potential applications in these three subareas .Considering the increasing visual and multimedia requirements and rapid penetration of multimedia devices in home surroundings. Three multimedia sharing standards and their QoS architectures are outlined. A cross-layer joint admission and rate control design is proposed for QoS-aware multimedia sharing. The design is able to analyze sand predict QoS performance, and adaptively allocate appropriate wireless bandwidth to accommodate more multimedia sessions without QoS degradation. It Can indicate that the joint design is able to intelligently allocate resources based on QoS demands resource-constrained home M2M networks.

[8] Jorg Swetina, Guang Lu, Philip Jacobs, Francois Ennesser, And JaeseungSong Suggest a global standard across various industry verticals is necessary to ensure easier use of M2M technology, data interoperability, and efficient development of M2M systems. Use cases and requirements are mainly collected from vertical M2M domains and existing specifications of member SDOs. The collected requirements are then used to derive a set of functionalities that the one M2M functional architecture has to provide. In order to support addressed functions, one M2M includes support of a RESTful resource-based architecture style and protocols. Standardization activities for other fundamental functions, such as security , device management, and device abstraction and semantics. After the initial release, the oneM2M system could be extended in various aspects, such as plug-in of value-added new services, supporting local area network interworking, and adding advanced security functionalities. The 3GPP only supports a device triggering feature for machine type

communications (MTC).A new work item, Service Exposure and Enablement Support (SEES), has been agreed by 3GPP SA1 to support oneM2M interworking for 3GPP. We believe this new work item will enable M2M applications to use various network services exposed by underlying 3GPP networks.

[9] Michael Haus, Muhammad Waqas, Aaron Yi Ding, Yong Li, Sasu Tarkoma, and Jörg Ott Propose the state-of-the-art solutions to tackle security and privacy challenges in Device-to-Device (D2D) communication. They span across a variety of D2D network communication, peer discovery, proximity services, and location privacy. The existing solutions according to security and privacy requirements. Based on the analysis, It can derive "best practices" and identify open problems that deserve with respect to lessons learned, the major consideration include device diversity, resource limitation, user incentive, solution deployability, requirement conflicts, evaluation tools and legal concern. It can serve as a reference guide for researchers and developers to facilitate the design and implementation of D2D security and privacy solutions.

[10] Shuyi Chen, Ruofei Ma, Hsiao-Hwa Chen, Hong Zhang, Weixiao Meng, and Jiamin Liu Propose in most of the previous works, UDNs were considered basically for H2H communications only, without considering M2M communications. M2M communications will play an important role in future 5G systems. Thus, it is necessary for UDNs to support M2M communications, together with H2H communications. In order to support M2M communications in UDNs efficiently, different methods were identified in terms of implementations of PHY, MAC, network, and application layers, respectively. Two important issues, security/privacy and network virtualization, were also discussed in this paper, and it was pointed out that security/privacy of M2M communications will be a serious issue in UDNs. Even though network virtualization is a trend for UDNs, it is hard to be implemented for M2M communications in a cost-effective way.

[11] Fabio Pasqualetti, Florian Dörfler, and Francesco Bullo, Suggest a We have analysed fundamental monitoring limitations for cyber-physical systems under attack modelled by linear time invariant descriptor systems with exogenous inputs. In particular we have characterized undetectable and unidentifiable attacks from system theoretic and graph-theoretic perspectives, we have designed centralized and distributed monitors , we have provided illustrative examples. Future and on-going work includes a detailed analysis of the convergence of our distributed monitors, the design of distributed identification monitors, and the design of monitors robust to system noise and unmodelled dynamics.

PROPOSED SYSTEM

The aim of this work is to design and develop a control system using IOT and Zigbee technology to remotely control the machine over a infrastructure. The device comprises four main units, namely: the mobile phone or a computer system, the IOT Module, the switching unit and the Zigbee module. One feature that makes the developed system better than other related existing works is its ability to use two means of control. It makes use of Zigbee when the operator is within the coverage area of the network of about 100 metres to the device, at no cost, otherwise it uses IOT containing certain codes to control the machines. A SIM card is placed in the IOT Module from the transmitter are sent to module via Web Application. They gives an impressive performance with both IOT and Zigbee technology.

ADVANTAGE

- We propose an end to end GPRS communication for machine to machine communications.
- It makes the machines to possess its own deciding time, throughput, efficiency , error, accessing method with new algorithms.
- IOT principles makes simpler controlling in industry machines with predefined time with its own available controller.

CONCLUSION

The Main aim of our Projects The electronic hazards are very dangerous especially for the child and disabled person.in this proposed project support to monitor child and disabled person to avoid external hazards using communication between machines which implemented by cyber physical system.

REFERENCES

[1] Tullio Facchinetti and Marco L. Della Vedova , "Real-Time Modeling for Direct Load Control in Cyber-Physical Power Systems (2011)," IEEE Transactions On Industrial Informatics, Vol. 7, No. 4, November 2011, pp. 689-698.

[2] L. Sha, S. Gopalakrishnan, X. Liu, and Q. Wang, "Cyber-physical Systems: A New Frontier," Proceedings of IEEE International Conference on Sensor Networks, Ubiquitous and Trustworthy Computing (SUTU), June 2008, pp. 1-9.

[3] Shushan Zhao, Akshai Aggarwal, Richard Frost, Xiaole Bai , "A Survey of Applications of Identity-Based Cryptography in Mobile Ad-Hoc Network," IEEE Communications Surveys & Tutorials, Vol. 14, No. 2, Second Quarter 2012, pp.380-400.

[4] Rongxing Lu, Xu Li, Xiaohui Liang, and Xuemin (Sherman) Shensu, "GRS: The Green, Reliability, and Security of Emerging Machine to Machine Communications," IEEE Communications Magazine, April 2011, pp.28-35.

[5] Geng Wu, Shilpa Talwar, Kerstin Johnsson, Nageen Himayat, and Kevin D. Johnson, "M2M: From Mobile to Embedded Internet (2011)," IEEE Communications Magazine ,April 2011, pp. 36-43.

[6] Yan Zhang, Rong Yu, Shengli Xie, Wenqing Yao and Yang Xiao, "Home M2M Networks: Architectures, Standards, and QoS Improvement,"IEEE Communications Magazine , April 2011 , pp.44-52.

[7] Jorg Swetina, Guang Lu, Philip Jacobs, Francois Ennesser, and JaeseungSong "Toward A Standardized Common M2M Service Layer Platform: Introduction To OneM2M ," IEEE Wireless Communications , June 2014, pp.20-26.

[8] Michael Haus, Muhammad Waqas, Aaron Yi Ding, Yong Li, Sasu Tarkoma, and Jörg Ott, "Security and Privacy in Device-to-Device (D2D) Communication: A Review," IEEE Communications Surveys & Tutorials, Vol. 19, No. 2, Second Quarter 2017 , pp.1054-1079.

[9] Shuyi Chen, Ruofei Ma, Hsiao-Hwa Chen, Hong Zhang, Weixiao Meng, and Jiamin Liu, "Machine-to-Machine Communications in Ultra-Dense Networks—A Survey," IEEE Communications Surveys & Tutorials, Vol. 19, No. 3, Third Quarter 2017, pp.1478-1503.

[10] Fabio Pasqualetti, Florian Dörfler, and Francesco Bullo, "Attack Detection and Identification in Cyber-Physical Systems" IEEE Transactions On Automatic Control, Vol. 58, No. 11, November 2013, pp.2715 -2729.

Dr.S.Hemalatha did her Bachelor degree in Computer Science and Engineering and Masters in Computer Science and Engineering University of Madras and Anna University Chennai , India in 2000, and 2004 respectively. She completed PhD in Computer Science and Engineering from Anna University, India in 2016. She has totally 17 years of experience in different engineering colleges and currently she is working as a Professor in Computer Science and Engineering in Panimalar Institute of Technology, Chennai, India. Shea has published 45 national and International journals and 30 papers in international conferences. She is the recipient of Distinguished Professor award from CSI Mumbai chapter in the year 2016, Professional achiever award from IEEE madras section in the year 2017. She has guided many UG and PG level projects and being a committee member for Research Scholars in Anna University. Her research areas are Network Security, Mobile Communication and Mobile Application Development. She is a member of CSI, IEEE and ISTE.

Mr.G.Dhamodhara Kannan, is a final year Computer Science and Engineering student in Panimalar Institute of Technology. He is a member of Computer Society of India.

Mr.M.Nagagopal , is a final year Computer Science and Engineering student in Panimalar Institute of Technology. He is a member of Computer Society of India.

Mr.M.Vigneshwar ,is a final year Computer Science and Engineering student in Panimalar Institute of Technology. He is a member of Computer Society of India.