Submission list

Paper index: [1], [2], [3], [4], [5], [6], [7], [8], [9], [10], [11], [12], [13], [14], [15], [16]

[1] Ramapriya Ranganath (Microsoft). *IoT Green Corridor .*

Abstract. This is a system that combines the existing trivial traffic signal lights with sensors, which are capable of synchronizing with each other, and take certain decisions on the switching of lights as per the given set of conditions. Synchronizing of sensors is possible only by creating a network among them. Hence, the sensors are mutually connected by means of internet using an IoT (Internet of Things) network. The Internet of Things (IoT) is a new and evolving concept that provides connectivity to the Internet via sensing devices to achieve intelligent identification and management in a heterogenous connectivity environment. The aim is to design a prototype of traffic junctions which can sense the presence of an Emergency Vehicle (EMV) within a threshold distance and change the traffic flow, so that the EMV passes the signal within less time and uninterrupted. This very prototype consists of sound sensors (amplified by IC LM 358), which are connected to a circuit comprising of PIC 12F683 microprocessor, that senses the presence of the EMV by detecting the frequency of its siren. Based on the output of this frequency detecting circuit, the other sound sensors placed at the respective lanes start sending data to an Intel Galileo Board, which is a microcontroller, that takes decisions on switching of traffic lights in the junction, by comparing the inputs given by the sound sensors. As soon as the EMV leaves the junction, The Galileo Board sends a signal to a Linkit ONE board (an IoT development board) which sends a value to the Cloud, which in this case is the Ubidots cloud computing platform, signalling that the EMV has passed the junction. As soon as the cloud receives this signal an event-based action occurs, which sends a signal to the next junction, according to the pre-defined path of the EMV, indicating that it is approaching the junction. This next junction consists of a similar setup of microcontrollers and sensors, which repeat the process. This occurs at each traffic junction till the EMV reaches its destination.

Time: Jan 23, 05:40
Decision: ACCEPT
Keywords: Emergency Vehicles, IoT, Green Corridor, Goertzel's Algorithm
Paper: ✔

[2] Steven Reiss (Brown University). *IoT End User Programming Models.*

Abstract. The advent of smart devices and sensors (the Internet of Things or IoT) will create increasing demands for the automation of devices based on sensor, time, and other inputs. This is essentially a programming task with all the problems and difficulties that programming entails, for example, modularity, feature interaction, debugging, and understanding. Moreover, much of the programming for smart devices is going to be done not by professional programmers but by end users, often end users without any programming experience or computational literacy. Our research is aimed at exploring the programming space and the associated issues using a case study of a smart sign that can be controlled using a variety of sensors. We have developed a general system for programming smart devices and, in this paper, explore a variety of different user interfaces for programming this system for our smart sign.

Time: Jan 28, 17:07
Decision: Accept and recommend
Keywords: Internet of things, end-user programming, debugging, program understanding.
Paper: ✔

[3] Aleksandr Lepekhin (Peter the Great St.Petersburg polytechnic university), Alexandra Borremans (Peter the Great St.Petersburg Polytechnic University), Sami Jantunen (LUT University) and Igor Ilin (Peter the Great St.Petersburg Polytechnic University). *A Systematic Mapping study on Internet of Things challenges .*

Abstract. The challenge of developing IoT-based systems has been found to be a complex problem. It is influenced by number of factors: heterogeneous devices/resources, various perception-action cycles and widely distributed devices and computing resources. Increasing complexity and immaturity to deal with it have resulted in growing range of problems and challenges in IoT development. This paper identifies essential IoT-related challenges by conducting a systematic mapping study of existing IoT literature. To this end, we distil information with respect to IoT-related: 1) challenges, 2) experimental studies, and 3) recommendations for future research. We then discuss our findings in order to understand better the general state of IoT research, potential gaps in research, and implications for future research.

Time: Jan 31, 19:14
Decision: Accept and recommend
Keywords: Internet of Thing, IoT, IoT Challenges, IoT Development, Systematic mapping study
Paper: ✔

[4] Zayan El-Kaheld (University of Quebec at Chicoutimi), Hamid Mcheick (University of Quebec at Chicoutimi) and Fabio Petrillo (University of Quebec at Chicoutimi). *WiFi coverage range characterization for smart space applications.*

Abstract. Recently, humans are more and more dependent to communication technologies (CT) in their everyday life to get services, exchange information and communicate with their relatives. Hence, many researches have been made in order to propose convenient and low-cost solutions compatible with the context of smart spaces. This paper analyzes a solution based on WiFi in order to provide a low-cost communication solution for the smart space. Technical characteristics are illustrated and the coverage range is characterized. Furthermore, a wide deployment network model is deducted on light of obtained results.

Time: Feb 01, 02:41
Decision: Accept and recommend
Keywords: Smart space, resilient network, WiFi, coverage range, radio link quality, wireless internet service
Paper: ✔

[5] Cristiano Politowski (Concordia University) and Fabio Petrillo (Universite du Quebec a Chicoutimi). *Improving engagement assessment in gameplay testing sessions using IoT sensors.*

Abstract. Video game industry is a multimillionaire market which makes solo indie developers millionaire in one day. However, success in the game industry it is not a coincidence. Video game development is an unusual kind of software that mix multidisciplinary teams, as software engineers, designer and artists. Further, for a video game be well received, it must be fun and polished, so exhaustively well tested. Testing in video game development ranges from different types, in different parts of the process. For example, measuring the engagement of players in a test session can drive the development drastically. The designers/developers analyze actions taken by players and how they behave facing each decision in the game. Based on that, they decide if that feature/level requires rework or cut it. It is very common to throw out many hours of man/work in a feature just because it is not fun. As the designers (usually) assess the gameplay session by hand, how can they be sure that specific feature is (or is not) good enough? If we could provide more meaningful data for the designers to review we can have a better assessment of what is happening in the gameplay, what could be wrong and if there is a real need to remove or rework. In this paper, we propose an IoT environment platform to assess the player's engagement in gameplay session by adding IoT sensors together with game devices which will produce a rich output for the designers.

Time: Feb 12, 17:18
Decision: ACCEPT
Keywords: Gameplay, Testing, Internet of Things, Software quality
Paper: ✔

[6] Andrew Truelove (University of Houston), Farah Naz Chowdhury (University of Houston), Omprakash Gnawali (University of Houston) and Mohammad Amin Alipour (University of Houston). *Users Issues in using the Internet of Things Systems.*

Abstract. Internet of Things (IoT) systems are bundles of networked sensors and actuators that are deployed in an environment and act upon the sensory data that they receive. These systems, especially consumer electronics, have two main cooperating components: a device and a mobile app. The unique combination of hardware and software in IoT systems presents challenges that are lesser known to mainstream software developers and might require innovative solutions to support the development and integration of such systems.

In this paper, we analyze the more than 90,000 reviews of ten IoT devices and their corresponding apps and extract the issues that users encountered in using these systems. Our results indicate that issues with \emph{connectivity}, \emph{timing}, and \emph{update} are particularly prevalent in the reviews. These results also call for a new software-hardware development framework to assist the development of reliable IoT systems.

Time: Feb 15, 23:36
Decision: Accept and recommend
Keywords: User Review Analysis, Internet of Things, Empirical Study
Paper: ✔

[7] Juan Moreno (Universidad Nacional Mayor de San Marcos), Felipe Moreno (Universidad Católica San Pablo) and Frank Moreno (Universidad Nacional de Ingeniería). *Proposal of a New software architecture for interoperability to improve the communication in the Edge layer of a smart IoT ecosystem.*

Abstract. In the current years, IoT has evolved to such an extent to extend to all corners of each place through devices, which connected to a network, either local or internet itself, generate information to be processed with a specific purpose, to this level there is a problem called interoperability of devices where not only is the compatibility of adding or removing devices to an ecosystem and there is compatibility, it is also expected that the information generated is standardized and optimized to transmit. This paper presents a new software architecture pattern for interoperability between devices that generate heterogeneous information in the edge layer of an IoT ecosystem.

Time: Feb 17, 06:35
Decision: ACCEPT
Keywords: Interoperability, IoT, data encode, data decode, protocol buffer, Edge Computing, REST API, Software Architecture, IoT Ecosystem
Paper: ✔

[8] Tansu Aşıcı (Ege University), Burak Karaduman (Ege University), Raheleh Eslampanah (Izmir University of Economics), Moharram Challenger (University of Antwerp), Joachim Denil (University of Antwerp) and Hans Vangheluwe (University of Antwerp and McGill University). *Applying Model Driven Engineering Techniques to the Development of Contiki-based IoT Systems.*

Abstract. The huge variety of smart devices and their communication models increases the development complexity of embedded software for the Internet of Things. As a consequence, development of these systems becomes more complex, error-prone, and costly. To tackle this problem, in this study, a model-driven approach is proposed for the development of Contiki-based IoT systems. To this end, the available Contiki metamodel in the literature is extended to include the elements of WiFi connectivity modules (such as ESP8266), IoT Log Manager, and information processing components (such as Raspberry Pi). Based on this new metamodel, a domain-specific modeling environment is developed in which visual symbols are used and static semantics (representing system constraints) are defined. Also, the architectural code for the computing components of the IoT system such as Contiki, ESP8266, and RaspberryPi are generated according to the developer's instance model. Finally, a Smart Fire Detection system is used to evaluate this study. By modeling the Contiki-based IoT system, we support model-driven development of the system, including WSN motes and sink nodes (with ContikiOS), WiFi modules and information processing components.

Time: Feb 17, 13:52
Decision: Accept and recommend
Keywords: Model-driven Engineering (MDE), Internet of Things (IoT), Embedded Software, Wireless Sensor Network, ContikiOS, Smart Fire Detection System
Paper: ✔

[9] Snehasis Banerjee (Tata Consultancy Services) and M Girish Chandra (Tata Consultancy Services). *A Software Framework for Procedural Knowledge based Collaborative Data Analytics for IoT.*

Abstract. The outburst of data generation by machines and humans, along with emergence of sophisticated data processing algorithms have created a demand for a wide number of data analytics based services and applications. The paper presents a collaborative framework and system to carry out a large number of data processing tasks based on semantic web technology and a combination of reasoning and data analysis approaches using software engineering guidelines. The paper serves as a first step for systematic fusion of symbolic and procedural reasoning that is programming language agnostic. This approach helps in reducing development time and increases developer's productivity. The proposed software system's logical functionality is explained with the help of a healthcare case study, and the same can be extended for other applications.

Time: Feb 17, 18:22
Decision: Accept and recommend
Keywords: Procedural Reasoning, IoT Analytics, Software Framework, Software Orchestration, Developer Productivity
Paper: ✔

[10] Mehboob Hasan Rohit (North South University), Zarin Tarannum Hoque (North South University), S M Mujibul Karim (North South University) and Dr. Shahnewaz Siddique (North South University). *Cost Efficient Automated Pisciculture Assistance System using Internet of things(IoT).*

Abstract. The more the technology is getting advanced, the more it makes the life of people depending on it and one of that technologies is automation. Internet of Things (IoT) is another term which envisions every physical object that are being connected to the internet and being able to identify themselves to other devices. This paper illustrates a methodology to provide a low cost Automated Pisciculture Assistance System for indoor fish production using Wireless Fidelity (Wi-Fi). Despite being ranked third in the world in terms of inland fish production [1], Bangladesh is presently using the method of Recirculation Aquaculture Systems (RAS), because pollution of pond water is a major factor posing significant danger to hygiene issue for fish population inhabiting in pond water. In this research we have developed a complete assistance system which gives update to the user of the conditions of the water through the sensors and operate the device remotely. The key components of this system are a pocket-sized Wi-Fi module, Message Queuing Telemetry Transport (MQTT) for monitoring, controlling the sensors and alerting the user through SMS, an Android application to visualize the data provided by the module and to operate the device. Our main objective was to design a system to overcome the downsides with minimal costing and easy installation process.

Time: Feb 17, 19:05
Decision: Accept and recommend
Keywords: Internet of Things (IoT), Wireless Fidelity (Wi-Fi), Pisciculture Automation System, Wi-Fi module, Android, Sensors
Paper: ✔

[11] Orges Cico (Norwegian University of Science and Technology). *Reliable IoT Systems for Improving Quality Of Life Through The Exploitation of Cloud, Mobile and BLE Low Energy Based Technologies. Case Study: Battery Charge Protect.*

Abstract. Connecting various smart objects within an intelligent ecosystem provides high capability of developing and integrating mobile, cloud and embedded device communications based on existing internet infrastructure. This has been the trend of Internet of Things (IoT), addressing health, quality of life, smart cities.

In this paper we are a focused on similar aspects with a proper case study in an embedded system, used in protecting batteries of mobile devices. Cloud/Mobile applications interconnected with embedded devices shall be presented. The research undertaken present not just the technological innovation, exploiting state of the art technology, but also the security benefits and prolongation of battery life. The system has been fully developed, tested and it's benefits evaluated throughout the paper. We have been able to integrate and provide a real life case study adopting this integrated architecture to be reused for future implementations.

Time: Feb 17, 21:02
Decision: Accept and recommend
Keywords: Internet-of-Things, Smart Devices, Fall detection, Energy efficiency, Wearable devices
Paper: ✔

[12] Nadine Kashmar (Université), Mehdi Adda (Université), Mirna Atieh (Lebanese University) and Hussein Ibrahim (Institut Technologique de Maintenance Industrielle (ITMI)). *A New Dynamic Smart-AC Model Methodology to Enforce Acess Control Policy in IoT layers.*

Abstract. Internet of Things (IoT) is the conversion of everyday tangible devices or machines to smart objects. This means that these objects would be able to think, sense and feel. For example, your home devices will be able to detect and feel your absence to turn off the lights of empty rooms, close doors, lock the gates, and other tasks. Thus, would it be acceptable to find intruders who might mess up your daily life style or control your home appliances? Absolutely not! The same idea for factories, they definitely reject to detect any unacceptable access from any foreigner to their logical/physical assets or machines who might be able to locally or remotely control, for example, any machine operation. This would cause a significant loss for their reputation or investments, since any vulnerability or attack can produce, for example, fault products. So far, IoT is considered as one of the most essential areas of future technologies, especially for the industries. Hence, finding an environment full of smart devices needs a smart security methodology to prevent any illegal access. In this domain, various researches are conducted to find Access Control (AC) models to enforce security policies that prevent any unauthorized detection of sensitive data and enable secure access of information. For this purpose, we present a new dynamic Smart-AC model methodology to enforce security policy in IoT layers.

Time: Feb 18, 00:03
Decision: Accept and recommend
Keywords: IoT, access control, smart, security, model, policy
Paper: ✔

[13] Elizabeth Reilly (Massachusetts Institute of Technology), Matthew Maloney (Massachusetts Institute of Technology), Michael Siegel (Massachusetts Institute of Technology) and Gregory Falco (Massachusetts Institute of Technology). *A Smart City IoT Integrity-First Communication Protocol via an Ethereum Blockchain Light Client.*

Abstract. Smart city IoT is responsible for communicating system-critical data about urban infrastructure that keeps our modern cities functioning. Today, IoT devices lack communication protocols with data integrity as a priority. Without data integrity, smart city infrastructure is at risk of actuating urban environments on compromised data. Attackers can use this IoT communication flaw to wage cyber-physical attacks on Smart Cities. We designed and developed an integrity-first communication protocol for IoT that is distributed and scalable based on the Ethereum blockchain. Our light client ensures data communication integrity for systems that require it most.

Time: Feb 18, 00:09
Decision: Accept and recommend
Keywords: IoT Security, Blockchain, Smart Cities, Communication Integrity, Ethereum, IoT Communication Protocol
Paper: ✔

[14] Davino Mauro Junior (CIn-UFPE), Walber Rodrigues (CIn-UFPE), Kiev Gama (CIn-UFPE), José A. Suruagy (CIn-UFPE) and Paulo André da S. Gonçalves (CIn-UFPE). *Towards a Multilayer Strategy Against Attacks on IoT Environments.*

Abstract. The Internet of Things market has seen a large growth in numbers in the recent past. With it, security is becoming a usual concern among consumers. Taking an already existing categorization of typical IoT attacks grouped by TCP/IP network layers as a starting point, we did a non-exhaustive search of solutions addressing each attack. We found that solutions are typically focused on a single layer or even a specific attack only. Furthermore, these solutions lack flexibility to incorporate new attacks. To avoid the non-practical approach of having multiple non-extensible tools, this paper presents an ongoing work that focuses on a multilayer approach to IoT threats. The proposed system leverages an autonomic architecture to analyze network traffic in a distributed manner, detecting suspicious behavior with preconfigured rules being applied by a Complex Event Processing (CEP) engine.

Time: Feb 18, 03:30
Decision: Accept and recommend
Keywords: Security, Internet of Things, MAPE-K
Paper: ✔

[15] Hironori Washizaki (Waseda University), Nobukazu Yoshioka (National), Atsuo Hazeyama (Tokyo Gakugei University), Takehisa Kato (Toshiba Digital Solutions Corporation), Haruhiko Kaiya (Kanagawa University), Shinpei Ogata (Shinshu University), Takao Okubo (Institute of Information Security) and Eduardo B. Fernandez (Florida Atlantic University). *Landscape of IoT Patterns.*

Abstract. Patterns are encapsulations of problems and solutions under specific contexts. As the industry is realizing many successes (and failures) in IoT systems development and operations, many IoT patterns have been published such as IoT design patterns and IoT architecture patterns. Because these patterns are not well classified, their adoption does not live up to their potential. To understand the reasons, this paper analyzes an extensive set of published IoT architecture and design patterns according to several dimensions and outlines directions for improvements in publishing and adopting IoT patterns.

Time: Feb 18, 10:43
Decision: Accept and recommend
Keywords: Patterns, Internet of Things (IoT), Design, Architecture, Survey, Systematic Literature Review (SLR)
Paper: ✔

[16] Narayana Sashi Rekha Dada (Tata Consultancy Services, Hyderabad) and Aditya Allamraju (Andhra University College of Engineering (A), Visakhapatnam). *IOT based Air Pollution Monitoring and Control Mechanism using UAVs.*

Abstract. Air pollution in India is a serious issue which is increasing rapidly and reaching to hazardous levels. One of the major sources being sulphur dioxide (SO2) is emitted from the combustion of fossil fuels like coal and petroleum. Traffic congestion in India's most noticeable cities and towns is severe. It is caused due to increase in number of vehicles per kilometer of available road, chaos due to poor enforcement of traffic laws, obstacles in the road causing a blockage and merger etc. Complete lack of traffic sense in Indian public is the main reason for the chaos on the roads. Traffic congestion reduces the average traffic speed. At low speeds, it is scientifically proved that vehicles burn fuel inefficiently and pollute more per trip. In most of the highly congested Indian city roads, the average trip is less than 20 kilometers per hour. At such speeds, vehicles emit air pollutants 4 to 8 times more than they would, with less traffic congestion; and also consume a lot more carbon footprint fuel per trip than they would if the traffic congestion was less.

In context with the above issue in India, the present idea is to trace the vehicles which are emitting carbon dioxide (CO2) and other hazardous pollutants beyond the permitted levels especially at the points of huge traffic congestion. The thermal sensors mounted on the Unmanned Aerial Vehicles (UAVs) or drones can be used to detect the vehicles that are emitting higher amount of pollutants (beyond threshold amount) and when detected should also snap an immediate picture of the vehicle registration number. The picture is then scanned using image scanning techniques and based on the registration number, the corresponding image will be uploaded into RTO website as evidence thereby updating the Government records. In parallel from the RTO website, the vehicle owner's details can be fetched. Email/phone number linked to any of the person's identification proof like that of Aadhar number/ PAN number or address linked to the registered number should be sent an E-mail/SMS/letter of the receipt of fine and asking them to get the vehicle repaired to emit lesser pollutants.

This system works with the assistance of the technology of Internet of Things (IOT) which is a rising technology based on the fusion of electronics and computer science. The embedded sensors in the system help to detect major air polluting gases such as CO2, SO2 and CO. The concept of IOT helps to access data from remote locations and save it in database so that we don't need to actually be present in that area. This would be a benefit to keep a constant check on pollution, in keeping the country greener and also to avoid corruption thereby saving a lot of money to the nation.

Time: Feb 21, 13:38
Decision: ACCEPT
Keywords: Traffic congestion, Unmanned Aerial Vehicles, Internet of Things
Paper: ✔