Latest IEEE 2017-18 IOT based projects

1) BLIND AID STICK: HURDLE RECOGNITION, SIMULATED PERCEPTION, ANDROID INTEGRATED VOICE BASED COOPERATION VIA GPS ALONG WITH PANIC ALERT SYSTEM

Evolution of technology has always been endeavored with making daily life simple. With a fast paced life everybody today is harnessing the benefits of technology except some parts of the society. One of them is the visually impaired who have to rely on others for travelling and other activities. This paper aims at providing one such theoretical model which incorporates the latest technologies to provide efficient and smart electronic aid to the blind. We have used IR sensors along with ultrasonic range finder circuit for hurdle detection. Bluetooth module which along with GPS technology and an Android application for blind, will provide voice assistance to desired location and in panic situations will send SMS alert to registered mobile numbers The basic objective of the system is to provide a convenient and easy navigation aid for unsighted which helps in artificial vision by providing information about the environmental scenario of static and dynamic objects around them.

2) BOTNETS AND INTERNET OF THINGS SECURITY

Recent distributed denial-of-service attacks demonstrate the high vulnerability of Internet of Things (IoT) systems and devices. Addressing this challenge will require scalable security solutions optimized for the IOT ecosystem.

3) CHILD SAFETY WEARABLE DEVICE

Technofist,

YES Complex, 19/3&4, 2nd Floor, Dinnur Main Road, R.T.Nagar, Bangalore-560032Ph:080-40969981, Website:www.technofist.com. E-mail:technofist.projects@gmail.com

This paper discusses the concept of a smart wearable device for little children. The major advantage of this wearable over other wearable is that it can be used in any cellphone and doesn't necessarily require an expensive smartphone and not a very tech savvy individual to operate. The purpose of this device is to help parents locate their children with ease. At the moment there are many wearables in the market which help track the daily activity of children and also help find the child using Wi-Fi and Bluetooth services present on the device. But Wi-Fi and Bluetooth appear to be an unreliable medium of communication between the parent and child. Therefore, the focus of this paper is to have an SMS text enabled communication medium between the child's wearable and the parent as the environment for GSM mobile communication is almost present everywhere. The parent can send a text with specific keywords such as "LOCATION" "TEMPERATURE" "UV" "SOS" "BUZZ", etc., the wearable device will reply back with a text containing the real time accurate location of the child which upon tapping will provide directions to the child's location on google maps app and will also provide the surrounding temperature, UV radiation index so that the parents can keep track if the temperature or UV radiation is not suitable for the child. The prime motivation behind this paper is that we know how important technology is in our lives but it can sometimes can't be trusted, and we always need to have a secondary measure at hand. The secondary measure used in this project is the people present in the surrounding of the child who could instantly react for the child's safety till the parents arrive or they could contact the parents and help locate them. The secondary measure implemented was using a bright SOS Light and distress alarm buzzer present on the wearable device which when activated by the parents via SMS text should display the SOS signal brightly and sound an alarm which a bystander can easily spot as a sign of distress. Hence this paper aims at providing parents with a sense of security for their child in today's time.

4) CITYGUARD: AWATCHDOG FOR SAFETY-AWARE CONFLICT DETECTION IN SMART CITIES.

Nowadays, increasing number of smart services are being developed and deployed in cities around the world. IoT platforms have emerged to integrate smart city services and city resources, and thus improve city performance in the domains of transportation, emergency, environment, public safety, etc. Despite the increasing intelligence of smart services and the sophistication of platforms, the safety issues in smart cities are not addressed adequately, especially the safety issues arising from the integration of smart services. Therefore, CityGuard, a safety-aware watchdog architecture is developed. To the best of our knowledge, it is the first architecture that detects and resolves conflicts among actions of different services considering both safety and performance requirements. Prior to developing CityGuard, safety and performance requirements and a spectrum of conflicts are specified. Sophisticated models are used to analyze secondary effects, and detect device and environmental conflicts. A simulation based on New York City is used for the evaluation. The results show that CityGuard (i) identifies unsafe actions and thus helps to prevent the city from safety hazards, (ii) detects and resolves two major types of conflicts, i.e., device and environmental conflicts, and (iii) improves the overall city performance.

5) DEMO ABSTRACT: SIMULATING CONFLICT DETECTION IN HETEROGENEOUS SERVICES OF A SMART CITY

Despite the increasing intelligence of smart services and sophistication of IoT platforms, the safety issues in smart cities are not addressed adequately, especially the safety issues arising from the integration of smart services. Therefore, in this demo abstract, we present CityGuard, a safety-aware watchdog architecture to detect conflicts among actions of heterogeneous services considering both safety and performance requirements. This demo simulates parts of New York City to depict how CityGuard identifies unsafe actions and thus helps to prevent the city from safety hazards, detects two major types of conflicts, i.e., device and environmental conflicts, and improves the overall city performance in terms of multiple performance metrics. This demo complements the full paper on CityGuard that appears in this conference.

6) POSTER ABSTRACT: DATA-CENTRIC IOT SERVICES PROVISIONING IN FOG-CLOUD COMPUTING SYSTEMS

Fog computing is mainly proposed for IoT applications that are geospatially distributed, large-scale, and latency sensitive. This poses new research challenges in real-time and scalable provisioning of IoT services distributed across Fog-Cloud computing platforms. Data-centric IoT services, as a dominant type of IoT services in large-scale deployments, require design solutions to speed up data processing and notification, and scale up with the data volume. In this paper, we propose a service-oriented design architecture which is particularly focused on provisioning and processing data-centric IoT services over Fog-Cloud systems. In the proposed architecture, data-centric IoT services are organized in a service integrating tree structure, adhering to the hierarchical fog-based IoT computing models. A service node in the tree is empowered with features for real-time service data notification, local data processing and multi-level IoT data access. The initial results show that, along the design advantages of the proposed model, it does not impose any additional overhead as compared to state-of-the-art solutions.

7) AFTER-THE-FACT LEAKAGE-RESILIENT IDENTITY-BASED AUTHENTICATED KEY EXCHANGE.

Authenticated key exchange (AKE) scheme is one of the most widely used cryptographic primitives in practice, even in the Internet-of-Things (IoT) environments. In order to resist side-channel attacks, several works have been proposed for defining leakage-resilient (LR) security models and constructing LR-AKE protocols. However, all these LR-AKE schemes employed the traditional X.509 certificate-based public-key infrastructure authentication framework, where the online transmission and verification of the public-

Technofist,

YES Complex, 19/3&4, 2nd Floor, Dinnur Main Road, R.T.Nagar, Bangalore-560032Ph:080-40969981, Website:www.technofist.com.E-mail:technofist.projects@gmail.com

key certificate are the major drawbacks. In this paper, we first propose a general framework for constructing identity-based AKE protocols in the bounded after-the-fact LR extended-Canetti–Krawczyk security model, and show a formal proof in the standard model. Our proposed scheme offers a flexible approach to simplify the certificate management. Moreover, our result could be extended to the bounded-retrieval model, yielding the first LR-AKE protocol in this model.

8) AN NFC FEATURED THREE LEVEL AUTHENTICATION SYSTEM FOR TENABLE TRANSACTION AND ABRIDGMENT OF ATM CARD BLOCKING INTRICACIES

The flexible use of credit and debit card transactions has become increasingly ubiquitous and so have the associated vulnerabilities that make them a common target for cyber criminals. Furthermore, a prevalent complication associated with blocking of ATM cards involves tedious interactive processes and even possibly long waiting times during interaction with customer care services. Using a three factor authentication scheme employing NFC (Near Field Communication: an emerging technology evolved from a combination of contact-less identification and interconnection providing data exchange), Dash Matrix Algorithm and One-time password, we describe and quantify the potential to overcome common transaction liabilities (brute force attack, shoulder surfing, skimming of ATM cards, etc.). The auxiliary feature of blocking ATM cards is implemented using a QR code authentication scheme and NFC technology, implemented both in NFC enabled phones and non-NFC phones (with the help of an NFC transmitter, receiver and Bluetooth). The proposed system, therefore, ensures both secure usage of ATM cards and cost effectiveness by utility of novel and increasingly common technology, when also simultaneously proving to be user friendly.

9) SELF-POWERED ZIGBEE WIRELESS SENSOR NODES FOR RAILWAY CONDITION MONITORING

Technofist,

YES Complex, 19/3&4, 2nd Floor, Dinnur Main Road, R.T.Nagar, Bangalore-560032Ph:080-40969981, Website:www.technofist.com.E-mail:technofist.projects@gmail.com

A track-borne energy transducer is a smart device for harvesting energy of trains or rail transportation systems. In this paper, the authors extend this application through introducing a self-powered ZigBee wireless sensor node. The proposed hardware prototype consists of a ZigBee coordinator at road-side and a series of sensors (Accelerometer, temperature sensor, humidity sensor, and infrared detector) connected to a ZigBee end device at rail-side. The ZigBee end device is powered by the magnetic levitation energy harvester and communicated wirelessly with the ZigBee coordinator. The magnetic levitation oscillator is selected due to its broad-band response characteristics. The results indicate a peak-peak output voltage of 2.3 V under the condition that the vehicle travels over the rail-borne device at the speed of 105 km/h.

10) TOWARDS SAFER ROADS THROUGH COOPERATIVE HAZARD AWARENESS AND AVOIDANCE IN CONNECTED VEHICLES.

Roadway safety is a serious public health issue. Vehicle crashes on the roads and highways cost loss of lives and damages to properties. Technology exists today to help identify and respond quickly to crashes, which is specially critical in rural areas. A feature that enables a car to warn its driver against an eminent crash or to recommend the proper speed based on traffic and weather conditions is much needed in today's Internet of Things (IoT) era. Connected Vehicle (CV) technologies are contributing towards fulfilling this need. In this paper, we present a safety driving system through a cooperative hazard awareness and avoidance (CHAA) system based on V2V (vehicle-to-vehicle) and V2I (vehicle-to-infrastructure) communications. Our approach is based on DSRC-based V2V communications. It aims to alert drivers and recommend the proper speeds for vehicles that are approaching a hazardous zone due, for instance, to low visibility conditions. We also validate the proposed hazard alert and speed recommender system under various scenarios through simulations using the iTetris platform and SUMO simulator and we demonstrate its outperformance, compared to a regular environment, in terms of risk reduction and road safety efficiency. To this end, we have adapted iTetris by updating some of its existing

Technofist,

YES Complex, 19/3&4, 2nd Floor, Dinnur Main Road, R.T.Nagar, Bangalore-560032Ph:080-40969981, Website:www.technofist.com. E-mail:technofist.projects@gmail.com

features (like the Geo-broadcast routing capability) which is another contribution of this paper.

11) A PROVABLY SECURE GENERAL CONSTRUCTION FOR KEY EXCHANGE PROTOCOLS USING SMART CARD AND PASSWORD.

Key exchange protocols using both smart card and password are widely used nowadays since they provide greater convenience and stronger security than protocols using only a password. Most of these protocols are often limited to simple network systems, and they may have security risks. We propose a general construction for key exchange protocols using smart card and password to avoid these flaws. The constructed protocol from the general construction has only one additional communication round than the original public encryption scheme. This construction is proven secure under random oracle model, so it can resist several common types of attacks. It is also adapted well to various networks. Compared with related protocols, the proposed key exchange protocol generated from the general construction has better secure properties and good computational efficiency in storage cost and operation time.

12) IOT SENTINEL: AUTOMATED DEVICE-TYPE IDENTIFICATION FOR SECURITY ENFORCEMENT IN IOT

With the rapid growth of the Internet-of-Things (IoT), concerns about the security of IoT devices have become prominent. Several vendors are producing IP-connected devices for home and small office networks that often suffer fromm flawed security designs and implementations. They also tend to lack mechanisms for firmware updates or patches that can help eliminate security vulnerabilities. Securing networks where the presence of such vulnerable devices is given, requires a brownfield approach: applying necessary protection measures within the network so that potentially

Technofist,

YES Complex, 19/3&4, 2nd Floor, Dinnur Main Road, R.T.Nagar, Bangalore-560032Ph:080-40969981, Website:www.technofist.com. E-mail:technofist.projects@gmail.com

vulnerable devices can coexist without endangering the security of other devices in the same network. In this paper, we present IOT SENTINEL, a system capable of automatically identifying the types of devices being connected to an IoT network and enabling enforcement of rules for constraining the communications of vulnerable devices so as to minimize damage resulting from their compromise. We show that IOT SENTINEL is effective in identifying device types and has minimal performance overhead.

13) WEARABLE 2.0: ENABLING HUMAN-CLOUD INTEGRATION IN NEXT GENERATION HEALTHCARE SYSTEMS.

With the rapid development of the Internet of Things, cloud computing, and big data, more comprehensive and powerful applications become available. Meanwhile, people pay more attention to higher QoE and QoS in a "terminal- cloud" integrated system. Specifically, both advanced terminal technologies (e.g., smart clothing) and advanced cloud technologies (e.g., big data analytics and cognitive computing in clouds) are expected to provide people with more reliable and intelligent services. Therefore, in this article we propose a Wearable 2.0 healthcare system to improve QoE and QoS of the next generation healthcare system. In the proposed system, washable smart clothing, which consists of sensors, electrodes, and wires, is the critical component to collect users' physiological data and receive the analysis results of users' health and emotional status provided by cloud-based machine intelligence.

14) CLOUD BASED WEB APPLICATION SUPPORTING VEHICLE TOLL PAYMENT SYSTEM

The requirements for new web applications supporting different types of devices and purposes are continuously growing. The main advantages of web application development as well as popular development features covering integration with different technologies are considered initially in this paper. Integration and possibilities of application of cloud based web applications in real scenarios with different embedded Internet of Things (IoT) devices are considered and described in this paper. The design and implementation of a cloud based web application supporting vehicle toll payment system using IoT device is presented and described. The development framework as well as featured and popular technologies used to realize a vehicle toll payment by IoT device are described. The concept of vehicle toll payment over an online payment system is also described. Processing, monitoring and control in the cloud based web application of such payments using IoT devices are described and presented.

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15) CLOUD BASED WEB APPLICATION SUPPORTING VEHICLE TOLL PAYMENT SYSTEM

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16) EFFECTIVE WAYS TO USE INTERNET OF THINGS IN THEFIELD OF MEDICAL AND SMART HEALTH CARE

The recent advancements in technology and the availability of the Internet make it possible to connect various devices that can communicate with each other and share data. The Internet of Things (IoT) is a new concept that allows users to connect various sensors and smart devices to collect real-time data from the environment. However, it has been observed that a comprehensive platform is still missing in the e-Health and m-Health architectures to use smartphone sensors to sense and transmit important data related to a patient's health. In this paper, our contribution is twofold. Firstly, we critically evaluate the existing literature, which discusses the effective ways to deploy IoT in the field of medical and smart health care. Secondly, we propose a new semantic model for patients' e-Health. The proposed model named as `k-Healthcare' makes use of 4 layers; the sensor layer, the network layer, the Internet layer and the services layer. All layers cooperate with each other effectively and efficiently to provide a platform for accessing patients' health data using smart phones.

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YES Complex, 19/3&4, 2ⁿᵈ Floor, Dinnur Main Road, R.T.Nagar, Bangalore-560032Ph:080-40969981, Website:www.technofist.com.E-mail:technofist.projects@gmail.com

17) THE INTERNET OF THINGS FORSOUTH AFRICAN TOURISM

This paper presents examples of internet of things (IoT) applications that could enhance the management of tourism activities in South Africa. Although information and communication technologies (ICT) have been adopted in some aspects of the tourism industry, there is further room to enhance this functionality through the adoption of IoT technologies. The IoT technologies in this research have been categorised under wildlife monitoring and tracking, monitoring seas and waters, monitoring birds, plant species monitoring, tourist information services, hospitality services, tourism marketing and mountaineering and weather monitoring as identified from the South African Department of Tourism website. A literature review was conducted to identify IoT applications in tourism in the international arena that would apply in the South African environment. An architecture of a wildfire detection and alert system using IoT is given as an example. The question that this research answers therefore is, "What IoT technologies can be adopted to impact on South Africa's tourism industry".

18) AN IOT-AWARE ARCHITECTURE FOR SMARTHEALTHCARE SYSTEMS

In recent decades the aging of the population has led to a change in the health held with special attention to the issue of home care and e-health. The aim is to provide different types of health care services to the patient's home rather than in hospital so improving the quality of life of patients by allowing them to stay in their own home environment. The healthcare sector is undergoing profound transformation thanks to the possibilities offered by the Internet of Things and new technologies, the mobile and wearable. The new model is oriented to the overall health of the patient, stimulated and implemented through a strong pro activities of the patient and realized using mobile devices and multi-channel technology. The idea is to introduce a set of functionalities in order to support the family or the patient, to act independently or to support existing treatments coaching systems. With this aim the paper proposes an architecture, based on a cognitive model, to realize a coaching system for daily living activities which relies on solving a problem as an human so modeling human cognition. The idea is to handle the process of acquiring skills as a transition from use

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of declarative knowledge of procedures that can be applied quickly and automatically in specific situations.

19) A LOW COST WEB BASED REMOTE MONITORING SYSTEM WITH BUILT-IN SECURITY FEATURE FOR VULNERABLE ENVIRONMENTS

24×7 monitoring of environmental phenomena and security are the two prime areas of concern in an industrial setup. This paper mainly focus on the design and implementation of an intelligent, low cost and fully automated system which will be able to provide full time monitoring and eventual security to the concerned setup. The targeted area includes all type of susceptible environment like gas filling station, research and development laboratories etc. The system has the flexibility to add more number of nodes to the setup. The mode of communication implemented in the system is wired and could be migrated to wireless as required.

20) A RECONFIGURABLE SMART SENSOR INTERFACE FOR INDUSTRIAL WSN IN IOT ENVIRONMENT

A sensor interface device is essential for sensor data collection of industrial wireless sensor networks (WSN) in IoT environments. However, the current connect number, sampling rate, and signal types of sensors are generally restricted by the device. Meanwhile, in the Internet of Things (IoT) environment, each sensor connected to the device is required to write complicated and cumbersome data collection program code. In this paper, to solve these problems, a new method is proposed to design a reconfigurable smart sensor interface for industrial WSN in IoT environment, in which complex programmable logic device (CPLD) is adopted as the core controller. Thus, it can read data in parallel and in real time with high speed on multiple different sensor data. The standard of IEEE1451.2 intelligent sensor interface specification is adopted for this design. It comprehensively stipulates the smart sensor hardware and software design framework and relevant interface protocol to realize the intelligent acquisition for common sensors. A new solution is provided for the traditional sensor data acquisitions. The device is combined with the newest CPLD programmable technology and the standard of IEEE1451.2 intelligent sensor specification. Performance of the proposed system is verified and good effects are achieved in practical application of IoT to water environment monitoring.

Technofist,

YES Complex, 19/3&4, 2nd Floor, Dinnur Main Road, R.T.Nagar, Bangalore-560032Ph:080-40969981, Website:www.technofist.com. E-mail:technofist.projects@gmail.com

21) DESIGN OF A WSN PLATFORM FOR LONG-TERM ENVIRONMENTAL MONITORING FOR IOT APPLICATIONS

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22) IMPLEMENTATION OF A WEB OF THINGS BASED SMART GRIDTO REMOTELY MONITOR AND CONTROL RENEWABLE ENERGY SOURCES.

This paper describes a Smart Grid architecture implemented with the help of Web of Things. Web of Things comprise of a set of Web services provided on top of a number of Internet enabled Embedded devices. The Web browser on any computer can act as an interface to the services provided by these Web of Things. The Embedded devices are ARM Cortex M3 Processor based devices with Ethernet capabilities. CMSIS Real Time Operating System is used for process control on each of these embedded devices. LwIP Protocol Stack is implemented on top of each of these devices so that IP connectivity can be established. The Web interfaces provide us real time information on each of the energy meters that are installed on site and communicate to the Embedded Internet devices using MODBUS communication protocol. Real Time energy source scheduling, energy source selection, power connection and disconnection are some of the services that are provided to an on-line

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YES Complex, 19/3&4, 2nd Floor, Dinnur Main Road, R.T.Nagar, Bangalore-560032Ph:080-40969981, Website:www.technofist.com.E-mail:technofist.projects@gmail.com

authenticated user. The Embedded Systems lab Infrastructure at the TIFAC CORE for 3G/4G Communication at National Institute of Science and Technology was used for the hardware testing of the embedded modules. We were greatly helped by the Software developers at NIST Technology Consultancy Services in designing the web applications and interfaces for our Web of Things architecture.

Technofist,

YES Complex, 19/3&4, 2nd Floor, Dinnur Main Road, R.T.Nagar, Bangalore-560032Ph:080-40969981, Website:www.technofist.com. E-mail:technofist.projects@gmail.com