



Avinashilingam

Institute for Home Science and Higher Education for Women

University

(Estd. u/s 3 of UGC Act 1956)

Coimbatore - 6410 4243, Tamil Nadu, India



UGC Sponsored

**Two Day National Conference
on Internet of Things
18th and 19th February 2016**



Organized by

Department of Computer Science
&

Department of Information Technology

Date : 18th & 19th February, 2016

Available online at www.worldscientificnews.com

Editor-in-Chief

Prof. Tadeusz Hryniewicz
Koszalin University of Technology
Koszalin
Poland

Publishing Editor

Dr. Tomasz Borowski
Scientific Publishing House „DARWIN”
Poland

Organizing Team

**Avinashilingam Institute for Home Science and Higher Education for Women,
Coimbatore, India**

Dr. G. Padmavathi
Professor & Head
Department of Computer Science
India

Dr. D. Shanmugapriya
Assistant Professor and Head i/c
Department of Information Technology
India

Dr. N. Valliammal
Assistant Professor (SS)
Department of Computer Science
India

Dr. G. Geetha
Senior Technical Assistant
Department of Computer Science
India

Ms. C. J. Kabila Kandhasamy
Assistant Professor
Department of Information Technology
India

UGC SPONSORED TWO DAY CONFERENCE ON INTERNET OF THINGS

18th and 19th February 2016

Advisory Team

Dr. B. Ramani

Executive Director
CDAC
Trivanandapuram
India

Dr. Anand Paul

Associate Professor
The School of Computer Science and Engineering
Kyungpook National University
South Korea

Dr. Shamala Subramaniam

Professor,
University Putra
Malaysia

Dr. Newlin Rajkumar

Assistant Professor
Anna University, Regional Centre
Coimbatore
India

Mr. S. Sriram

Chief Architect
PAYODA Technologies
Tidel Park, Coimbatore IT Park Road
Coimbatore
India

Mr. R. Ravi Kumar

District Informatics Officer
Government of India
Ministry of Communications and Information Technology
National Informatics Centre
Coimbatore
India

Mr. S. Ravichandran

Advisor, Data Security Council of India
AES Technologies
Coimbatore
India

Dr. T. Devi

Professor,
Department of Computer Applications,
Bharathiyar University
Coimbatore
India

Dr. Latha Parameswaran

Professor and Chairperson
Department of Computer Science and Engineering
Amrita School of Engineering
Amrita Vishwa Vidyapeetham
Coimbatore
India

Mr. Senthil Ramalingam

Product Development Team
Cognizant Technologies and Solutions
Coimbatore
India

Ms. Shobha Sampath

Deputy General Manager
Ramco Systems
Chennai
India

Ms. Barani Shaju

Technical Consultant
Robert Bosch Engineering solutions Limited
Coimbatore
India

Mr. S. Prashanth

Executive Director
Quadra systems net India P Ltd
Coimbatore
India

Table of Contents

1. <i>Challenges in Integrating Wireless Sensor Network and Internet of Things for Environmental Monitoring</i> S. R. Vijayalakshmi, S. Muruganand	8
2. <i>A Cloud Platform for the Internet of Things</i> K. Swarnalatha, Supriya N. Alankar, Y. Bhagyalakshmi	16
3. <i>Wireless Sensor Based Health Monitoring System for Co-Morbid Patient</i> D. Priyanka, A. Saranya, S. Selva Priyanka, S. Vinothini, M. Janani, S. Sangeetha ...	28
4. <i>An Approach to Secure Communication in IoT (Internet of Things)</i> G. F. Ali Ahammed, Reshma Banu, Nasreen Fathima	33
5. <i>Web Based Architecture for Internet of Things Using GSM for Implementation of Smart Home Applications</i> K. Swarnalatha, Amreen Saba, Asfiya Muhammadi Basheer, P. S. Ramya	40
6. <i>Cloud Computing and its Security Perspectives</i> M. Newlin Rajkumar, V. Venkatesa Kumar	51
7. <i>IoT and Big Data Towards a Smart City</i> Anand Paul	54
8. <i>Processing Big Data Collected from IoT and Provisioning Sources</i> S. Sriram	65
9. <i>A Survey on Resource Provisioning Heuristics</i> M. Gowthami, V. Suganya	69
10. <i>Social Internet of Things</i> S. Geetha	76
11. <i>A Survey on Privacy Preserving Data Mining</i> S. Bharanya, P. Amudha	82
12. <i>Information Retrieval System for Internet of Things: A survey</i> C. Indhu, S. Sivakumar, R. Praveena Priyadharsini	91
13. <i>Study: Protocols and Challenging Issues in IoT</i> G. Bhavani, S. Sangeetha, S. Sivakumari	98
14. <i>Anti-Spoofing Method: A Survey on Biometric Face Recognition</i> M. Saranya, P. Amudha	107
15. <i>A Study on Technologies User for implementation of Internet of Things</i> K. S. Sindhu, M. Aasha, S. Sivakumari	114
16. <i>Identity-based Encryption for device-to-device Security in IOT Environments</i> S. Mohana, T. K. S. Lakshmi Priya	120

17. <i>Scheduling Based Wireless Sensor Networks Integrated with IoT Environment</i> N. Mahendran	131
18. <i>GIS Enabled Internet of Things (IoT) Applications: An Overview</i> R. Vishnu Priya, S. Sivaranjani, S. Sivakumari	143
19. <i>The Internet of Things - A Survey</i> S. K. Anithaa, S. Arunaa, M. Dheepthika, S. Kalavani, M. Nagammai, M. Aasha, S. Sivakumari	150
20. <i>A Survey on Internet of Things Architecture</i> T. Nandhini, M. Sajitha Parveen, B. Kalpana	159
21. <i>Going Green with IoT for Smart World - An Overview</i> N. Sanfia Sehnaz, L. Hemalatha, M. C. S. Geetha, I. Elizabeth Shanthi	167
22. <i>A Survey on Big Data and Internet of Things</i> Bhuvaneswari Ragothaman, M. Surya Prabha, Elsa Jose, B. Sarojini	174
23. <i>Applications and Challenges of IOT: Perspective Approach</i> M. Umadevi, M. Devapriya	180
24. <i>Surveillance and sequestration Issues of Internet of Things (SSIoT)</i> Reshma Banu, Ayesha Taranum	185
25. <i>Topology Based Routing Protocols in Vehicular Ad-Hoc Networks (VANET)</i> M. Newlin Rajkumar, M. Nithya, P. Hemalatha, R. Rajeswari	200
26. <i>Reversible Data Hiding with QR Code Application</i> V. Revathi	208
27. <i>Security Requirements and Mechanisms in Vehicular Ad-Hoc Networks (VANET)</i> M. Newlin Rajkumar, M. Nithya, M. Krithika	214
28. <i>Automatic Efficient Accident Detection and Emergency System Using Smart Phones: (Accelerometer Sensor)</i> M. Newlin Rajkumar, P. Hemalatha	223
29. <i>Internet of Things – An Overview</i> Ms. Sujithra, G. Padmavathi	227
30. <i>IOT Security Challenges and Issues – An Overview</i> Ms. Sujithra, G. Padmavathi	232
31. <i>A Study on Denial of Service Attacks in Cluster Based Web Servers</i> A. Poornima, D. Maheshwari	240
32. <i>Fast Data Collection in Tree-Based Wireless Sensor Networks</i> B. M. Parashiva Murthy, K. Tanuja, M. Rakshitha, S. Supretha	248
33. <i>Analyse the Metrological Data Using Data Mining Technique</i> P. Vanitha, M. Mayilvaganan	256
34. <i>High Speed Data Streams Using Data Mining Techniques</i> R. Sangeetha	264

35. <i>Exploiting Dynamic Resource Allocation</i> G. S. Geethamani, Dr. M. Mayilvaganan	270
36. <i>Duplicate Record Detection Using Progressive Sorted Neighborhood Method</i> R. Preyadharsini, K. Deepa	277
37. <i>IoT & WSN based Smart Precision Agriculture</i> M. M. Jayashree, S. Sangeetha	288
38. <i>A Review on Data Mining Algorithms for Internet of Things</i> M. Bhuvaneshwari, K. Merlin Jeba, V. Srividhya	294
39. <i>Brewing Heterogeneous Devices for Monitoring Cerebrovascular Oxygenation</i> G. Geetha, S. N. Geethalakshmi, D. Mathivadhani	302
40. <i>Impact of Internet of Things on Future of Education - An Overview</i> N. Valliamal, V. Srividhya	307
41. <i>Mobility Management for Internet of Things</i> S. Shamala, Adnan J. Jabir	313



Brewing Heterogeneous Devices for Monitoring Cerebrovascular Oxygenation

Dr. G. Geetha¹, Dr. S. N. Geethalakshmi², Dr. D. Mathivadhani³

Department of Computer Science, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, India

¹⁻³E-mail address: geethakumaravel@gmail.com , sngethalakshmi@gmail.com , mathithanika@gmail.com

ABSTRACT

Technologies encumbering Wireless Sensor Network with its effulgence and ubiquity in Sensing plays a dominant role in Health care industry and Health monitoring System. Impeccable blending of Actuators and networking them for a viable communication across varied platforms paves gateway for triumphant IoT solution. IoT plays a predominant role in revitalizing the healthcare sector with appendages of several smart devices deliberated to facilitate medicos, surgeons and subjects to monitor each and every aspect of their health. Customary health checkups allow patients to distinguish health issues sooner and get treatment accordingly. IoT offers a cost effective solution adjunct with a timely intervention.

Keywords: Internet of Things (IoT); Traumatic Brain Injury (TBI); Hypoxia, Anoxia; Wearable devices; PbtO₂

1. INTRODUCTION

The Internet of Things (IoT) is one of the most sophisticated technologies that has the potential in effecting the health, safety, efficiency of replacing billions of people thereby

having a major economic impact. It is a conglomeration of physical objects which are embedded with sensors, actuators, computing and data communication devices. The final assortment is coupled to networks for data transportation. Heterogeneous resources can be cumulated and abstracted according to tailored requirements, thus enabling Things as a Service prototype, or “Cloud of Things”

2. TRAUMATIC BRAIN INJURY (TBI)

Traumatic Brain Injury is defined as brain and head injury which leads to one of traumatic consequences like concussion, contusion, Coup-Contrecoup, Penetration and Acquired Brain Injury (ABI) [1]. Traumatic Brain Injury (TBI) is a silent pandemic of recent times, as unidentified head injury patients are usually neglected until the outcomes are somber. It is very difficult to owe an adequate standardization, capture on data of incidence rate caused by TBI and swerving quantification of the burden caused by TBI. TBI leads to serious conditions like Anoxia and Hypoxia. Anoxic Brain Injury is an outcome when the brain does not receive any oxygen and Hypoxic Brain Injury is a consequence when the brain receives some, but not enough oxygen. Such irksome effects even sometimes lead to fatal bereavement i.e. death. Rehabilitating patients after post hospitalization under such a grave condition is fraught with challenges. Concocting devices to ascertain surveillance is the need of hour for these recuperating patients. A rehabilitation support of social workers or caretakers can be reinstated by the state-of-art devices.

3. METHODOLOGY

Cerebral Oxygenation evaluates the balance between oxygen delivery and consumption. Oxygen guided Management could lead to improve neurological outcome

4. PBTO₂ MONITORING

Pbto₂ monitoring technology has been used in varied number of functionalities like brain tumor surgery. It has also been used for continued postoperative monitoring. This representation is noteworthy because it demonstrates technology that can be safely used in subjects undergoing physical exercises. It also demonstrates the cortical hyper oxygenation in a human breathing natural air without oxygen supplemental [2]. Pbto₂ is a sensor consisting of 2 electrodes is placed in the brain. A polarographic electrode which continuously measures real time Pbto₂ in blood tissue

5. BRAIN TISSUE OXYGENATION

Tissue Oxygenation and Hemoglobin concentration are sensitive indicators of tissue status. Tissue oxygenation is determined by incessant and mellifluous flow of oxygen, which in turn is reflected by product of blood flow and oxygen content and consumption. The golden

standard for continuous oxygen monitoring is by inflicting an intraparenchymal probe and enforcing a direct measurement of local PbtO₂. As the measure of oxygen is highly dependent on the locality of probe, a closed polarographic clark type electrode is imposed over a tissue area of around 15mm³ in order to streamline the brain blood flow and metabolism heterogeneity. Oxygen disseminates into the permeable membrane adjoining the probe and enters into an electrolyte solution thereby creating an electrical and projects percentage of oxygen's existence in blood such that which the probe is able to measure an area of 18mm². A viable solution to augment monitoring is by acquiring strengthened signals to interpret the readings is by placing the probes in white matter or it can be a choice of the neurosurgeon. Normal range is and PbtO₂ <15 mmHg is considered. When Brain Hypoxia (PbtO₂ <10-15 mmHg) is associated with worse conditions and increases the likelihood of death after severe TBI. According to the history the normal range for a rivulet blood flow is 25-50 mmHg. When the observation of PbtO₂ <15 mmHg it indicates critical threshold for Hypoxia. With further decrease in values it is possible to realize detrimental effects ensuing Brain Hypoxia and Anoxia. The microcontroller designed to be used for this work is a wearable device which has a LCD to view and monitor the values of PbtO₂. The microcontroller is programmed in such a way that when the threshold value or critical value is reached, it alerts the subject.

6. MICROCONTROLLER

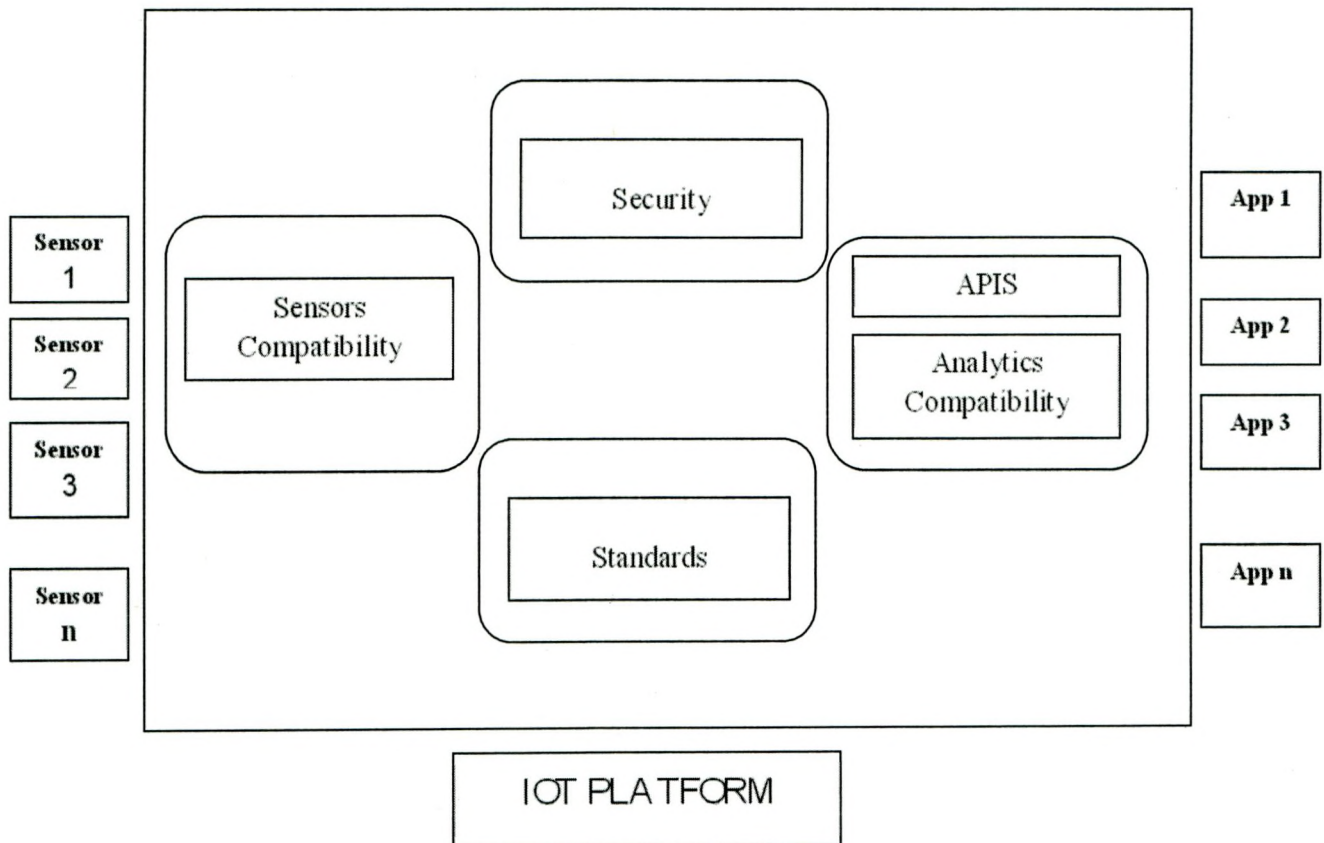


Figure 1. Platform of IoT.

As microcontroller plays an imperative role in designing an application, some of the factors considered in choosing a pertinent microcontroller are:

- Calculation of data available from PbtO2
- Supporting LED to view the values in the wearable unit
- Transmitter used to convert analog to Digital values
- Harmonizing with a Bluetooth's Receiver
- Miniscule Size of microcontroller with utmost number of pins

Arduino pro microcontroller outfits to all the aforementioned criterion .The next paramount matter of contemplation is to probe into different communication standards. Bluetooth standard attires the mode of communication which builds a wireless bridge between the microcontroller and phone application. Microcontroller program was developed in Arduino IDE an open source Arduino environment. Illustration of how a platform for IoT can be fabricated is given below

7. BLUETOOTH COMMUNICATION

The cerebral data which is of vital importance and processed by microcontroller is to be transferred to user's android device [3]. As the distance between the microcontroller and device is stable and short employing Bluetooth as a wireless technology standard for exchanging data. This communication uses short wavelength UHF radio waves in the unlicensed industrial scientific and medical ISM band from 2.4 to 2.485 GHz from fixed and mobile devices.

After establishing a connection between Microcontroller and Bluetooth data is being sent via Bluetooth. Communication path is established and the calculated values exit from Microcontroller's Transmitter pin T_xD and reach the Bluetooth's Receiver pin R_xD . Thus transfer takes place in the android device. The real intricacy lies in Bluetooth communication and following are the essentialities in deriving one:

- Setting up Bluetooth connection
- Tracing out devices and checking out if they are either paired or available in local area.
- Connecting to the available device
- Transferring data to the device

To implement the tasks, we need to call several classes and interfaces such as Bluetooth Adapter, Bluetooth Socket, Bluetooth server socket and Bluetooth profile Next.

8. ANDROID APPLICATION

These days' mobile phones are very much dependable, reliable, very easy to handle and can be equipped with software features and in order to make the best use of the features a phone app was designed that incorporates Google android OS. The predominant feature of using Android OS is the liberty it offers in invoking Bluetooth APIs. An android phone application connects with the Bluetooth and is used for real time record of oxygen saturation.

Another function that was included in the application is that we can send the result to another phone. The hardware and software were integrated is an intertwining of PbtO₂ sensor, wearable micro-controller and fully fine wearable devices.

To develop the app an integrated Device Enterprise Eclipse IDE is used which contains a base workspace and extensible plug – in system which helps in tailoring to the needs of the user. The language used is Java. After combining the phone app with the system, the project is more usable. The function of our phone app is to record real time O₂ saturation data by clicking the connect button on user interface and by tapping the send button the result can be sent directly to android phone by using text messages [4].

9. CONCLUSION

TBI in India is a significant social and financial burden which requires prioritized attention and urgent therapeutic intervention. The mortality rate ought to be reduced with better structured systems of trauma care. TBI is an issue that requires a gamut of acute care. A post trauma consequence like Hypoxia and Anoxia can be put under surveillance with cost – effective planning and tools. One such tool is to delve the usability of Heterogeneous devices to acclimatize a system to provide universal emergency care at a right time. Cost-effectiveness should be the concern while designing the tool. The currently designed tool brewing Heterogeneous devices facilitating android application support is an appropriate one and offers a gamut of the functionality support and care for a post Traumatic Brain Injury patients.

References

- [1] Shymal Patel, Hyung Park, Paolo Bonato, Leighton Chan, Mary Rodgers, "A review of wearable sensors and systems with application in Rehabilitation", Journal of NeuroEngineering and Rehabilitation (2012), Vol. 9, Issue 21.
- [2] Maria Celeste Pinheiro Dias Firreira, "Evaluation of Cerebrovascular Reactivity after severe head injury" . ISBN 978-989-20-5529-9, Porto, 2015.
- [3] Fangpeng Kong, Yubo Qin, Zhengyu Yang, Zhongtian Lin, "A wearable Pulse Oximeter", Capstone Design. Rutgers University, 2014.
- [4] Jeffrey McCarthy, "Licox Brain Tissue Monitoring System", Integra NeuroSciences, 2012.