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Automated Tranquilizer

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Abstract: On emphasizing primary dissections in the infirmaries, the patient should be in anesthetized state. If the doctor oversees to deliver the medicine to the patient within a specific time interruption, other affiliated problems might arise ailing to brain death. To restrict such hazardous problems the model of an automatically given the anesthesia through anesthesia machine based on raspberry pi is competent. The doctor can set the level of anesthesia for a precise interval and the relevant information including the patient's details can be stored and managed by the doctors in remote areas enabled by GSM service. This project will be very much useful to the doctors to inspect the current caliber of the patients by uninterrupted monitoring facilitated with alarm notification if the status of the patient becomes critical. The main conjecture of this project is to foster the administration of anesthesia automatically by proffering anesthesia injector to the afflicted persons, also storing these data in a cloud platform that enables future reference for the doctors and the physicians. This particular paper will be very much useful to the doctors to observe and monitor the patients along with a report of medicines given to them.
Keywords: (anesthesia, patient health monitoring, storage in cloud servers, automation)

I. INTRODUCTION

A. *Automation In Iot Systems*

IoT systems enables automation that significantly reduces operating expenditures when, sensors and actuators become Internet-enabled devices [1]. It's the next huge leap in productivity because there are major advantages to be derived from the acquisition and organization of previously unthinkable amounts of data. Automatic supervision of the industrial solicitations and propagates triggers or alerts and as well as take intelligent decisions using the concept of IoT. Automation systems have given us a propitious way to constitute powerful industrial systems and applications by availing wireless devices, Android, and sensors. A primary contribution of this review paper is that it contemplates the use of embedded in industries with Artificial Intelligence to monitor and control the Industry [2].

The long-predicted IoT revolution in automation is already on the rise, the need for automation in embedded systems can be enlisted as: Low-power operation is important in keeping device footprint unprecedented small and extending battery life, features that make IoT devices as efficient as possible. Embedded systems, which has long offered low-power processing, is working now to enable completely battery-free devices that scopes energy harvesting techniques [2]. ntegrated precision with analog capabilities makes it feasible for sensors to achieve high accuracy at a low cost. Automation offers this enabling technology within micro processing systems which contain analog components, such as high-resolution analog-to-digital converters (ADCs) and low-power op-amps.

B. *Iot In Healthcare Systems*

The Internet of Things also provides an end-to-end processing and connectivity enrailments for IoT-driven healthcare solutions, working toward establishing standards for these systems and stimulating innovation for organizations eager to realize the benefits of the IoT systems in healthcare [3]. The propitious use of the IoT in the preceding healthcare paradigms relies on several enabling technologies [4]. Without this, it would be impervious to enact the usability, connectivity and competencies required for applications in specific areas such as electronic health monitoring. Smart sensors, which conjoint a sensor and a microprocessor, make it feasible to reinstate the power of the IoT healthcare by precisely measuring, monitoring and scrutinizing a variety of health status indicators. These may include basic vital signs such as heart rate and blood pressure, along with the levels of glucose or oxygen saturation in the blood [5]. Smart sensors can even be incorporated into pill containers and connected to the network to check whether a person has taken a scheduled dose of medication or not. For smart sensors to work trenchantly, the embedded systems comprising of the microcontroller components must incorporate several important capabilities The IoT systems plays an eloquent role in a broad range of healthcare applications, from managing chronic and severely hazardous diseases at one end of the to preventing disease at the other. IOT systems are are mainly involved with:

1) Clinical care: Hospitalized informants and patients whose physiological conditions require close attention that can be constantly monitored using IoT-driven, non-perdurable monitoring. This type of system makes sensors to collect consorted physiological data and uses gateways and the cloud platform to observe and store the information and then send the analyzed data wirelessly to various stakeholders for further analysis and review. It replaces the process of having a health

professional abidance at regular interims to check the patient's vital signs, instead providing a continuous flow of information and data. By this way, it simultaneously improvises the efficacy of care through constant attention and reduces the cost of care by reducing the need for a caregiver to actively engage in data collection and analysis

2) *Remote health monitoring:* There are people all over the world whose salubrity may suffer because they don't have organized access to affricate health monitoring. But small, powerful wireless solutions interconnected through the IoT systems are now making it feasible for monitoring to be useful for patients. These proven ideas can be used to securely capture patient health data and other relevant information regarding a patient from a variety of sensors, apply convoluted algorithms to analyze the data and then feed it through many wireless connectivity systems with stakeholders and medical professionals who can make congruous health recommendations Many healthcare systems are being developed by incorporating remote monitoring services. Nowadays, many hospitals are being reported of late attendance of patients by the doctors. Also when the number of clinicians is outnumbered, manual monitoring of patients becomes a tedious task. Thus these systems encompasses as a mandatory measure for monitoring the patients for the current scenario and also for the forthcoming periods as well.

II. PRESENT SYSTEM USED:

The present system used for administering medicine is by the gas machine. Though Patient Monitoring Systems (PCM) by enabling the embedded systems are prevalent widely as a requisite one, manual incorporation of medicine is followed currently. Anesthetists play a vital role in deciding the level of medicine to be administered. The anesthetist controlled manual operation is employed, that gives rise to many quagmires such as, The Level of anesthesia can get assorted and there is a chance of getting after effects in future. If the doctor fails to mention the level of anesthesia during the predestinated period, the patient may be disrupted during the anatomization. Other contrivances developed to administer anesthesia operates by detecting the consciousness level of the patient and not by measuring his comprehensive body conditions Many anesthetic drug fallacies result from interchanging of syringes. The barcodes on syringes before drug assimilation creating syringe epithets that include barcodes and scanning the syringe label barcodes before drug administration may help to avoid errors in contrast making the syringe labels by hand that adheres with the recommendations of regulatory agencies and standards setting agencies are hard and time consuming .A digitalized system that uses syringes and generates barcoded syringe labels might address both safety problems and tags

A. Local Anesthesia

Local anesthesia is given to temporarily resist the sense of pain in a specific area of the body. The patients remain conscious during a local anesthetic [8]. For minor dissections, a local anesthetic can be given through injection to the site, or allowed to perforate into the skin.

B. Regional Anesthesia

Regional anesthesia is used for making the skin numb only for a portion of the body that will undergo the surgery [9]. Usually an injection of local anesthetic is given in the region of nerves that provide a feeling to that part of the body. There are many forms of regional anesthetics:

C. Spinal Anesthetic

A spinal anesthetic is used for lower abdominal, pelvic, rectal, or lower surgery. This type of anesthetic includes injecting a single dose of the anesthetic medicine into an area that circumvents the spinal cord. The injection is made into the lower back, below the end of the spinal cord, and produces numbness in the lower body. This type of anesthesia is often used in orthosurgical procedures of the lower extremities.

III. PROPOSED SYSTEM

Momentarily, embedded systems are used in many applications in healthcare systems and in medical field for regulating various biomedical parameters. In this proposed system, a raspberry pi controller is used for controlling the anesthesia machine automatically, depending upon the various biomedical parameters namely the body temperature, heart rate, respiration rate etc. Major anatomizations are performed to remove or reconstruct the infested parts in the human body. These operations mighresultin blood loss and pain. Therefore it is necessary to arrest the pain and the blood loss. Anesthesia plays a primitive role in the part of painkilling. Hence, anesthesia is very essential in performing painless surgeries.

A. Advantages of using the proposed system are,

1) Need for an anesthetist is reduced, provided the doctor's supervision can be made easy by the system

2) Level of the medicine preferred is not varied, so the future side effects are eliminate
3) GSM module is included in the system to send an alert message to the stakeholders of the patient and to the doctor in case of critical situations A timer is included in the system for monitoring the total anesthesia level for the entire period of the surgery time.

B. Temperature Sensor

The temperature sensor used in the system is provided with a voltage supply of 3.3v [10].when a person's finger is placed on the sensor, the body temperature of the patient is measured, regardless of the room temperature, and given to the relay circuit.
It can be functioned over the temperature specification of 0°C to +100°C, making it superlative for use in numerous 3.3 V applications The output voltage is in accordance with number of times temperature times the supply voltage

C. Heart Beat Sensor

Heart beat sensor module combines an IR LED and phototransisto
When a finger is placed in-between, it will provide a varying signal [11]
The sensor reads the heart beat rate in the form of analog data that in turn is sent to the analog to digital convertor (ADC convertor) for converting the data into a digitized form, and intimates to the raspberry Pi circuit.
Reading this analogy signal, we can interpret the varied level or signal as a heartbeat

D. RASPBERRY PI

The Raspberry Pi 3 is the third generation of a microcontroller [12]. It is more efficient than a microcontroller. Also it acts as a mini CPU, that integrates all the other systems and checks whether the data read from sensors fall within the pre-set range or not. Updation of the data read from sensors is also done by using this module. It also provides an efficient way to add additional features to the system in future and also enhancements with the existing system is also feasible [12].

E. Gsm Module

A GSM modem is a device that can function either as a mobile phone or as a modem device that can be used to make a computer or any other processor to communicate over a network [15]. A GSM modem includes a SIM card to be operated over a network range subscribed by the network operators and subscriber identity module in this project, the GSM module is used to send alert messages to the concerned stakeholders or doctors if the patient's condition becomes critical where the data read from the sensors shows abnormal range of parameters

F. Solenoid Pump

Solenoid valves are the most frequently used control elements in fluidics. Their tasks are to shut off, release, dose, distribute or mix fluids [16]. The solenoid pump is mainly used to deliver the medicine or any fluid, regarded to be given in the intensive care units, at regular intervals [17]. The timer set using the raspberry Pi, enables the emancipation of the medicine properly.

G. Components Required For The System

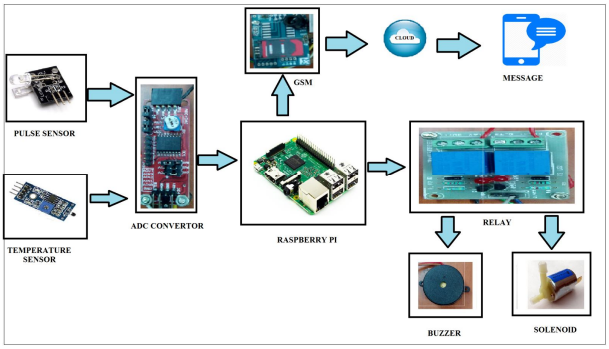
COMPONENTS	VOLTAGE
Heart beat sensor	5v
Temperature sensor	3.3v
GSM	4.1v
Relay	12v
ADC convertor	3.3v
Raspberry pi version 3	5v 8GB
Solenoid	12v
Buzzer	12v

IV. WORKING OF THE SYSTEM

By making use of the keypad provided along with the raspberry Pi, the doctor can preset the level of medicine to be given to the patient in terms of milliliters per hour (1ml to 500ml),for prolonged period of operation. After sensing the anesthesia level from the keypad, the raspberry Pi controls the system to administer medicine to the prescribed level. It then scrutinizes various bio-medical parameters obtained from the sensors and feed the data into the analog to digital converter (ADC convertor). Both

the heart beat and temperature sensors fitted into the system gives the input data the data into the analog to digital converter, to convert the signals received in analog form into the digital data. If the level of medicine is reduced to a lower level than the preset value, the buzzer gets activated to alert the doctor to attend the patient immediately and to reset the level of medicine in the solenoid pump to continue the process. Also, if the patient's condition becomes critical, an alert message is sent to the doctor through a GSM module fitted into the system. In this system design, the raspberry pi is connected to the other devices in the system through the putty software, enabled with the raspberry Pi, all the sensor fed data are updated in the cloud platform using thinkspeak platform of a private cloud service. This enables the doctors and the anesthetists to review the condition of the patients from anywhere, and it also serves as an ease of access.

A. Block Diagram



B. Scenario Based Implementation

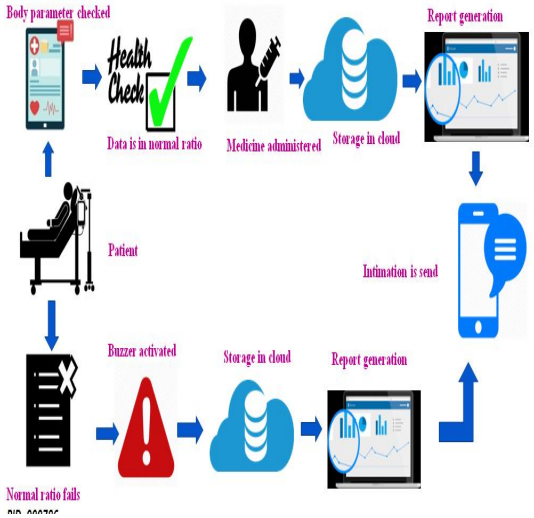
The working of the system is illustrated with the below mentioned diagram as follows:

1) A patient, who undergoes a major surgery, needs to be continuously monitored. She/he is initially acquiesced with checking of the body parameters namely temperature and heart beat using the proposed system.

2) Temperature range should be 37.2 degree Celsius and the heart beat range should be 60-100 beats per minute. These values are priorly stored in the raspberry Pi for cross-verification.

3) After the body parameters are checked, anesthesia is given to that particular patient.

4) Also, the data read from the sensors are automatically updated in the cloud platform and a report is generated, indicating the date and time when the data is deduced.



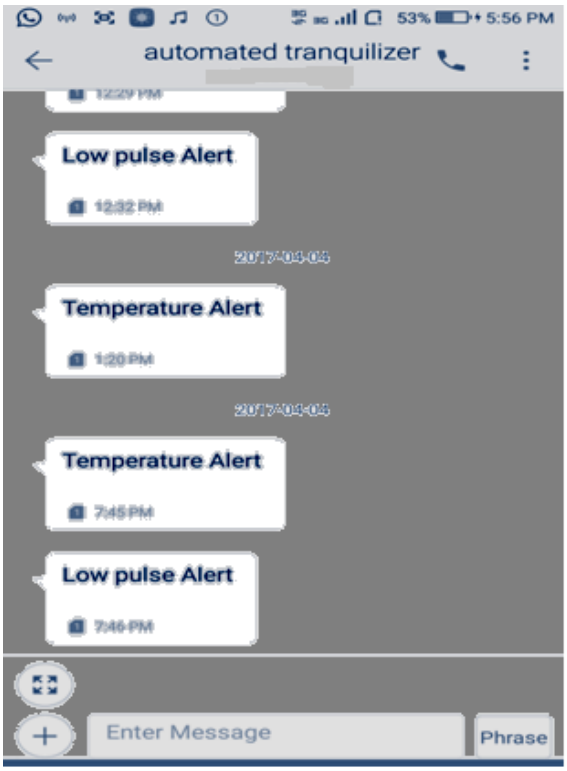
C. Experiment

1) Reporting the pulses and temperature parameters: The patient's parameters like temperature range and pulse rate is reported continuously to the doctors by the file generated from the cloud platform or via mobile phones.

The below screenshot specifies the interface of raspberry Pi with the desired android device using the Putty software installed priorly.

2) *SMS alert to mobile phone through GSM:* If the patient condition is perilous, an alert is sent through an SMS to the concerned persons.

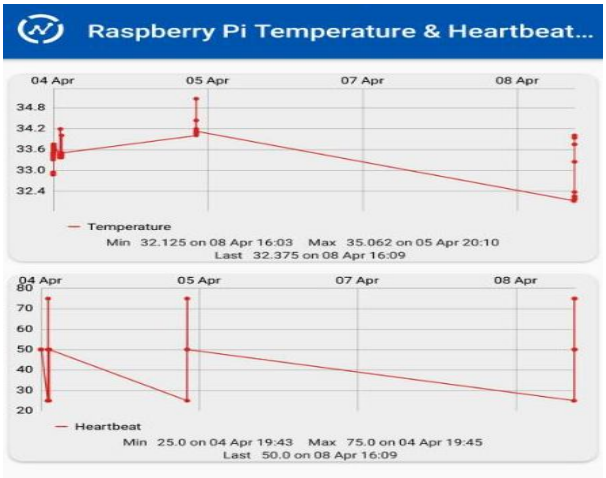
This picture relates the body parameters and levels to be checked by the sensors. A temperature alert is shown here where the solenoid pump is OFF.



The above illustrated screenshot shows the working of the GSM module. If the condition of the patient becomes critical, in this case) an alert message is sent to the concerned doctor.

D. Report Generation And Cloud Storage

The data is stored in cloud and the report is generated in the form of graph. The platform used to represent these results in thinkspeak platform, which is used for integration of embedded devices onto cloud [18]. The below picture includes a graph, which includes the temperature range and pulse rate respectively, with the exact date and time in which the parameters are read from the patients [19].



A comparative study of the existing system with the proposed system is enlisted below as follows

S.NO	PARAMETERS	EXISTING SYSTEM	PROPOSED SYSTEM
1	Method of deliverance	The current system includes deliverance of anesthesia via a gas machine that might release harmful gases and produce combustion	The infiltration of medicine is done either intravenously or extravenously
2	Patient monitoring	Does not have proper monitoring parameters prior to deliverance of medicine	The sensors fitted in the system enables checking the condition of patients
3	Interims	Proper time intervals between deliverance of medicine is not maintained	Raspberry- pi enables setting up of a timer to regulate the time intervals
4	Notification to various stakeholders	No source of intimation to the doctors or the families	A GSM module is fitted into the system to enable offline notification to the doctors regarding the patient
5	Alert system	Alert system in case of emergency situations is not maintained	A buzzer timing circuit is fitted into the system for sending an alert in case of emergencies
6	Updation in cloud	Digitalized information of patients is used for reviewing in future	The data read from the sensors are automatically updated in the cloud platform
7	Report generation	Manual generation of reports is done	The details updated in the cloud platform is generated in the form of a graph

V. CONCLUSION/FUTURE ENHANCEMENTS

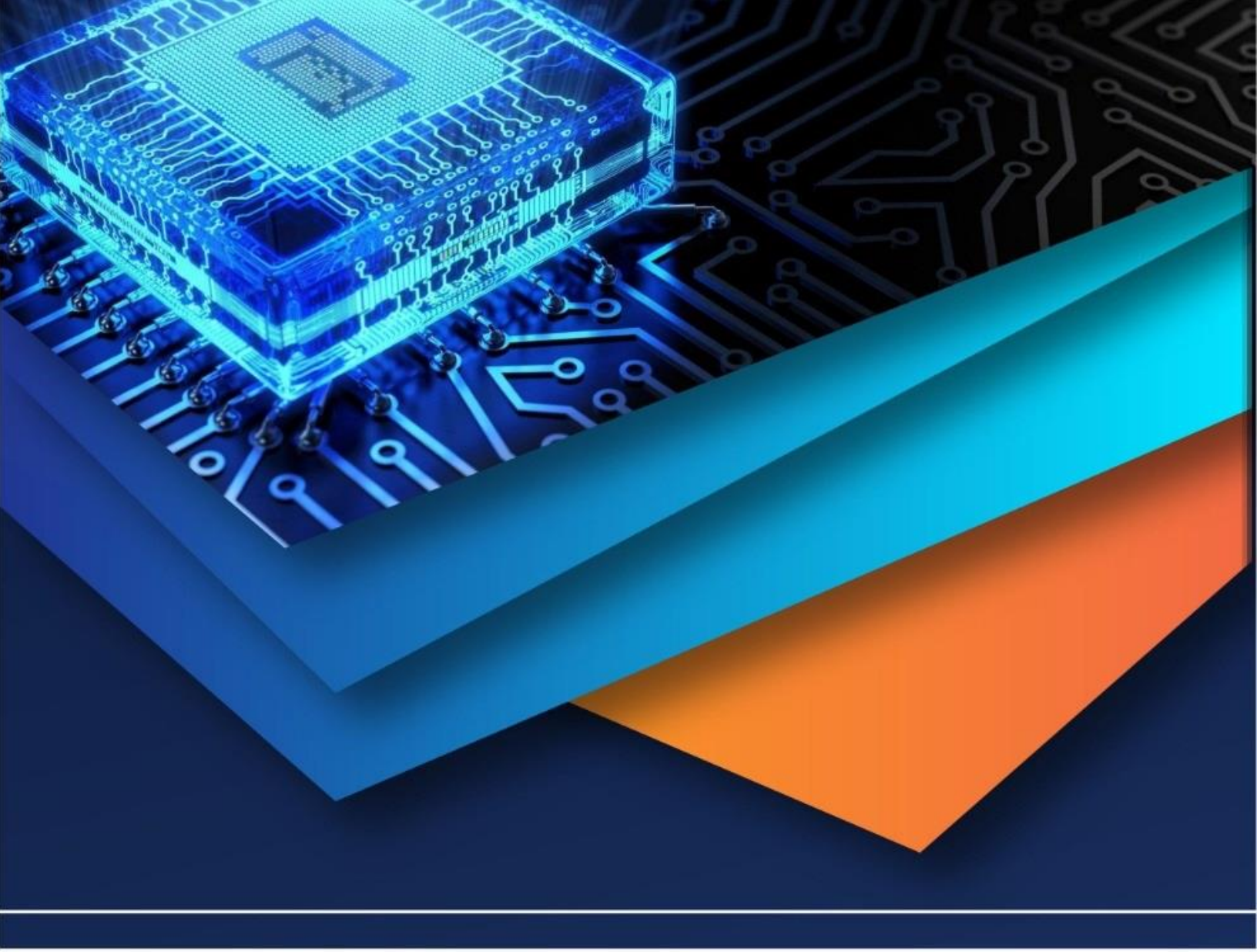
Many modern technologies have propagandized that promotes a comfortable and for a better life which is disease free. The real perception for the future is that these various smaller applications and healthcare systems will convocate to form a whole integrated system .protection against diseases is intelligent than prevention and our project on AUTOMATED TRANQUILIZER is one of the efficient and efficable systems in monitoring a patient and delivering medicine automatically as well.

A. Several parameters like Blood pressure, retinal size, age and weight can be included as controlling parameters in the future.
B. Specialized embedded anesthesia machine can be developed, thereby deducing the size, cost and therefore increasing efficiency.

REFERENCES

[1] Wollschlaeger M, Sauter T, Jasperneite J. The future of industrial communication: Automation networks in the era of the internet of things and industry 4.0. IEEE Industrial Electronics Magazine. 2017 Mar;11(1):17-27.
[2] Rao YR. Automatic smart parking system using Internet of Things (IOT). Int J Eng Technol Sci Res. 2017 May;4(5).
[3] Chen M, Ma Y, Li Y, Wu D, Zhang Y, Youn CH. Wearable 2.0: Enabling human-cloud integration in next generation healthcare systems. IEEE Communications Magazine. 2017 Jan;55(1):54-61.

[4] Wu T, Wu F, Redouté JM, Yuce MR. An autonomous wireless body area network implementation towards IoT connected healthcare applications. IEEE Access. 2017;5:11413-22.
[5] Ali F, Islam SR, Kwak D, Khan P, Ullah N, Yoo SJ, Kwak KS. Type-2 fuzzy ontology–aided recommendation systems for IoT–based healthcare. Computer Communications. 2017 Oct 9.
[6] McDonnell NJ, Paech MJ, Muchatuta NA, Hillyard S, Nathan EA. A randomised double-blind trial of phenylephrine and metaraminol infusions for prevention of hypotension during spinal and combined spinal–epidural anaesthesia for elective caesarean section. Anaesthesia. 2017 May 1;72(5):609-17.
[7] Krom AJ, Cohen Y, Miller JP, Ezri T, Halpern SH, Ginosar Y. Choice of anaesthesia for category-1 caesarean section in women with anticipated difficult tracheal intubation: the use of decision analysis. Anaesthesia. 2017 Feb 1;72(2):156-71.
[8] Zhan C, Wang W, Santamaria C, Wang B, Rwei A, Timko BP, Kohane DS. Ultrasensitive phototriggered local anesthesia. Nano letters. 2017 Jan 6;17(2):660-5.
[9] Hadzic A. Textbook of regional anesthesia and acute pain management. McGraw-Hill Medical Publishing Division; 2017.
[10] Tan Q, Luo T, Wei T, Liu J, Lin L, Xiong J. A wireless passive pressure and temperature sensor via a dual LC resonant circuit in harsh environments. Journal of Microelectromechanical Systems. 2017 Apr;26(2):351-6.
[11] Ouyang H, Tian J, Sun G, Zou Y, Liu Z, Li H, Zhao L, Shi B, Fan Y, Fan Y, Wang ZL. Self-Powered Pulse Sensor for Antidiastole of Cardiovascular Disease. Advanced Materials. 2017 Oct 1;29(40).
[12] Valle B, Simonneau T, Boulord R, Sourd F, Frisson T, Ryckewaert M, Hamard P, Brichet N, Dauzat M, Christophe A. PYM: a new, affordable, image-based method using a Raspberry Pi to phenotype plant leaf area in a wide diversity of environments. Plant Methods. 2017 Dec;13(1):98.
[13] Gupta V, Kaur K, Kaur S. Developing Small Size Low-Cost Software-Defined Networking Switch Using Raspberry Pi. InNext-Generation Networks 2018 (pp. 147-152). Springer, Singapore.
[14] Sahni N, Srinivasan K, Vala K, Malgaonkar S. Study and Research on Raspberry PI 2 Model B Game Design and Development. InInformation and Communication Technology for Sustainable Development 2018 (pp. 475-483). Springer, Singapore.
[15] Ghosh S, Majumder A, Goswami J, Kumar A, Mohanty SP, Bhattacharyya BK. Swing-Pay: One Card Meets All User Payment and Identity Needs: A Digital Card Module using NFC and Biometric Authentication for Peer-to-Peer Payment. IEEE Consumer Electronics Magazine. 2017 Jan;6(1):82-93.



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