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Research Article

The Qualitative Role of Big data and Internet of Things for Future Generation- A ReviewM.Arun Kumar^{1*}, K.Sathish Kumar², A.Manoj Prabakaran³, L.Ramesh⁴**Abstract**

The Internet of Things (IoT) wireless LAN in healthcare has moved away from traditional methods that include hospital visits and continuous monitoring. The Internet of Things allows the use of certain means, including the detection, processing and transmission of physical and biomedical parameters. With powerful algorithms and intelligent systems, it will be available to provide unprecedented levels of critical data for real-time life that are collected and analyzed to guide people in research, management and emergency care. This chapter provides a quick overview of IoT features and how they relate to wireless discovery and technology to deploy the medical applications you need. In the world, the revolution in any industry is to connect your products and devices to the Internet and make them independent and remotely connected, so that anyone can use and view them from anywhere and anytime. The Internet of Things provides us with a home automation system that uses smart devices to overcome this obstacle, allowing us to easily manage our appliances. A smart city is a vision to integrate a variety of information and communication solutions for residents with essential services, such as smart parking on all streets. The main motivation for using the Internet for parking objects is simply collecting data to get free parking. The IoT-based RTSSPS architecture is divided into three parts: a WSN-based smart street parking module, an IoT-based smart street parking module, and an IoT-based smart street parking module. IoT-based cloud with street parking algorithm, rating and future directions.

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1 Introduction

IoT [1,2] is the acronym for the Internet of Things [3], which is a combination of economic, technical and social significance and provides a dynamic global infrastructure with self-configuration capabilities. In IoT, objects get information by enabling and recognizing context-related decisions. The reality of IoT objects is that they can communicate and exchange

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information about them, either wirelessly or wired. The Internet of Things (IoT) is the connection between any device and the Internet, including your mobile phone, home automation system, and portable device. This new technology can be considered as a phase change tool in medical applications for patient health at a low cost. Internet-connected devices connect patients to professionals around the world. In healthcare, the Internet of Things allows you to monitor your glucose and heart rate in addition to your normal body water measurements.

In general, the Internet of Things in healthcare, (i) critical therapeutic situations, (ii) patient monitoring and routine medicine, (iii) critical treatments by connecting machines, sensors and medical devices to patients, and (iv) data transmission. Patient data via the cloud. The most important indicator of connecting the Internet of Things and healthcare services is the unification of doctors and patients with the help of smart devices, while not everyone in circulation is imitated. You can use cloud services that use big data technology to download patient data, and then the transferred data can be analysed. In general, smart devices play an important role in human life. One of the important design aspects of any device is the communication protocol implemented on the ZigBee network using reactive and proactive routing protocols.

Health care can also be provided at home, for example, by creating smart toilets that can automatically take urine samples and send data to a doctor if any disease is found in that sample, so preventive care can be provided early. It is a fact that the main power of controlling, monitoring and simplifying everything in our daily life and at home is in the hands of the home automation system. In daily life, there are so many devices in our environment and many devices in activity and use. With home automation systems, homeowners can combine activities such as entertainment, lighting, temperature control, and security. Home automation is the way to manage everything. It is easy to use and the main idea behind home automation is the ability to control everything remotely and reduce energy costs. Thanks to IoT, this study could make this parking system even more real, where objects can communicate with each other without human interference. Before this development, interfaces such as buttons and switches were used in traditional homes [8], now home automation is replacing it all with a central control system, including an easy-to-use graphical interface on smartphones, and this is economically feasible. The main purpose of a home automation or smart home is to monitor a person's actions in their environment and how a person interacts with devices. Based on these observations and interactions, the physical environment can be manipulated using IoT technology [9,10] and an improved life experience can be provided to a person. If such a controlled environment can be created, it will be of great help. It even becomes more useful when the user himself can control these devices and get information from their mobile phones.

The home automation system offers features [7] as follows:

Security and fire

Energy management

- Control of household appliances
- Entertainment

Here we present the concept of smart device control of home appliances that previously used Bluetooth to access and control devices. To overcome this inconvenience, we propose a solution that uses Wi-Fi with a much longer range - 32 m indoors and 95 m outdoors [11].

Technology background of IoT

In the context of the Next Generation Internet (NGI), everyday devices are globally connected and need a scalable and efficient addressing mechanism to manage an ever-growing number of devices. The NGI economies of scale complicate operations with energy, ubiquitous access, and secure interoperability. The Internet of Things provides us with a lot of sensory information. Continuous sensory recovery and basic driving skills are often physically performed, but ideally computerized to make them versatile [41]. The Internet of Things is currently the most popular information and communications innovation for smart cities. Internet of Things, latest cells, tablets, computer cameras, drones, sensors and more. This is the idea that all objects represent. When each of these sites is connected, it strengthens increasingly stringent procedures and governments that support basic needs, economics, environment and well-being. Many such networked objects provide extensive management capabilities and generate vast amounts of information and data. The Internet of Things provides connectivity to virtually every physical object that can represent a message and affect all aspects of life and business [5]. Computerized thinking provides systems and tools that go beyond the usual continuous choice, and robotics uses the Internet of Things example. According to [6], the idea of the Internet of Things was born at the Massachusetts Institute of Technology, which develops the Internet of Things using radio frequencies and sensor networks.

IoT layer architecture

The architecture of the IoT layer has a dynamic nature. As shown in Figure 1, the IoT architecture consists of four layers: the sensor connection and network layer, the gateway and network layer, the management service layer, and the application layer. The network model is designed to support the need for quality of service (QoS) for connectivity, passivity, adaptability, bandwidth and security, while achieving very high consistency. IoT sensors assemble different types of different rules and systems that use unique innovations.

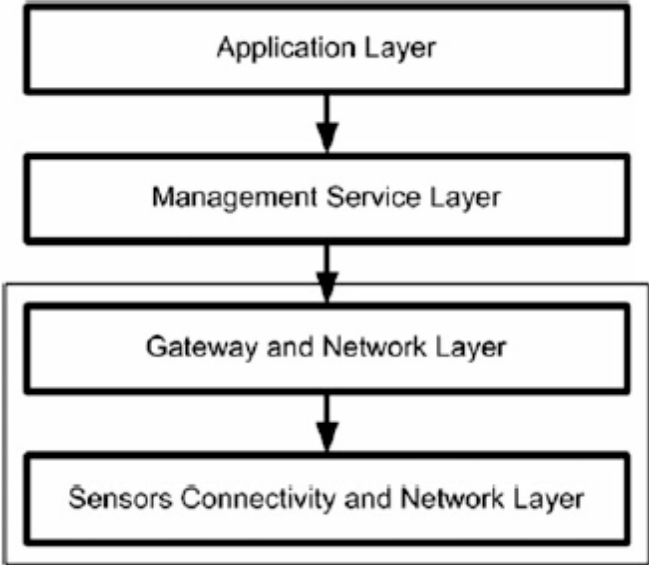


Fig1. Layers of Internet of Things.

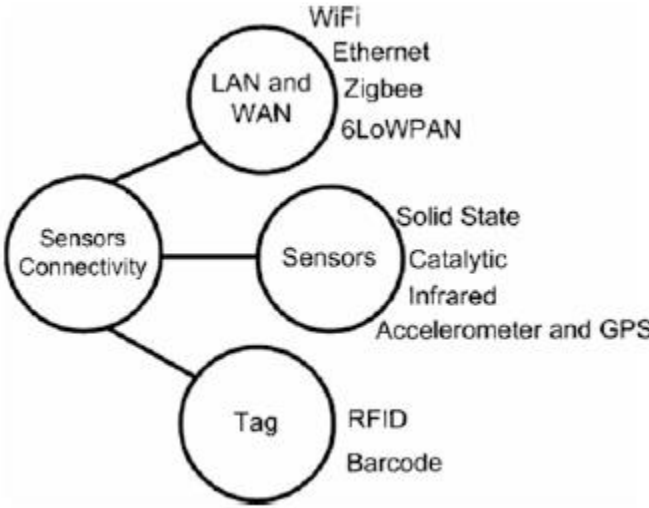


Fig2.Sensor Connectivity and Network Layer.

Gateway and Network Layer the ability of this layer is to supply the extensive database created by the sensor connections through the gateway network layer, as shown in Figures 1 and 3. For private and public network models, a performance is required. Stable and reliable [42].IoT systems need to be flexible in order to productively support a wide range of controls and applications in large systems.

Intelligent and Intelligent Parking System

Most of the smart and intelligent parking systems proposed to date are based on cameras used to monitor parking spaces. The system then uses image technology to check if that particular

location is occupied. Tang et.al [12] provides a smart street parking system based on WSN. In this system, remote sensors are placed in the vehicle for parking spaces, and all parking areas are equipped with a sensor hub that recognizes and monitors parking. Parking points are identified by sensor hubs and hold parking data through a remote sensor system [13] is equipped with a WSN-based intelligent parking system, taking into account remote sensors and used to monitor and control a person's parking space. You can also provide pre-computerized tutorials and instructions. However, all systems have their problems, such as less information for drivers about parking availability, charging is a major parking problem, and drivers spend a lot of time looking for parking spaces [47]. Inefficient use of existing street parking is a major problem for users. Excessive car use by small or large families is also a serious problem.

Intelligent real-time parking system based on IoT

The motivation behind this work is to take advantage of society with an intelligent street parking system that uses IoT [15]. This is because the Internet of Things can collect data on parking space using drones. The project uses images from drones taken from an unmanned aerial vehicle system, the latest in geospatial data collection technology, to design free parking spaces [43]. This will significantly reduce the cost and time of the project. The video output of the drone is stored in a database and this data can be viewed using a Google 2D map of the captured area. Frames containing the XY coordinates of individual frames created by the captured video are used to turn these cases into vector maps. The generated vector map is stored on both the ArcGIS server and a specific cartographic engine. Each free car park is stored under a unique identifier. The government has worked hard over the last 15 years to reduce parking problems on uncontrolled roads. Mechanical engineering is running out of free space at an astonishing rate. The proposed RoSPS-based IoT prototype is divided into three modules, each segment having four layers according to the IoT architecture. The IoT-based RTSSPS prototype was created using IR sensors in each parking space to match the number of vehicle detection chips [16-20].

True IoT implementation

Global manufacturers such as Bosch, FCA, Harley-Davidson, Cisco and General Electric (GE) are working on intelligent systems to make their products work in the Industrial Internet of Things (IIoT) environment.

- Companies like Siemens are good examples of IIoT. He turned 75% of the work into car-to-car communication. It also manages the errors that occur and the actions that need to be taken at this time [21-26]. In industries like GE, more than 10,000 sensors operate automatically to provide data to specific locations. It is also provided based on power consumption or notifies when low power notification is activated. Harley Davidson can create a real-time performance management system that develops all the actual product portals for each phase provided by the advertising system [44]. It also monitors and notifies you of processes.

Modules of the System

In this section, you will learn about the tools you can use to build your home automation system. The modules used to build the system are: 1. Serial stick. 2. Wi-Fi mode 3. Bascom controller 4. Relay card 5. ASP USB charger 6. Bascom AVR-IDE.

Soros bot

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This is the Simon Hope Communication application that provides access to any integrated device via Bluetooth or Wi-Fi. This app is easily available in the toy store. It is a Telnet / SSH client that integrates RS232 serial connection via Wi-Fi or Bluetooth serial connection [27-32]. You can use serial robots to connect to serial ports, such as industrial equipment, router console components, and more. Other devices that have an RS232 connection on our Android devices. This is a terminal application designed specifically to support serial ports over a Wi-Fi or Bluetooth connection for serial adapters. Its size is 778 KB and the current version is 1.8.1. This allows you to easily send commands to the device connected to it. 2.2 Robodu UART Wi-Fi module we used the Wi-Fi module from Hi-Link, which is shown in Figure 2. With the Wi-Fi module, the serial device does not need to change the configuration, and we can easily transfer data to the Internet [33-40]. It supports wireless and wired networking standards such as IEEE 802.11n, IEEE 802.11g, IEEE802.11b for wireless networking, and IEEE 802.3, IEEE 802.34 for wireless networking. The wireless baud rate is as follows

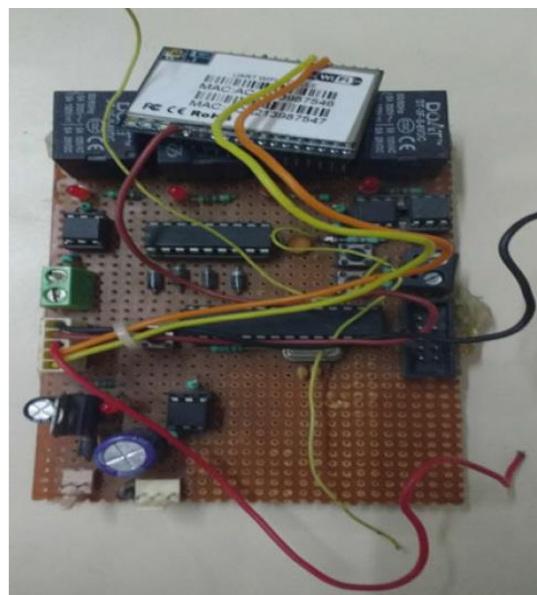


Fig3. Design of Bas Com Controller

I / O Ports

There are three ports and 23I / O, PORT B, PORT C and PORT D three port names are available. There are two interrupt sources external to PORT D, and internal devices generate 19 events that support 19 different types of interrupt vectors.

Timer / counter

There are three internal timers, 2 8-bit timers and 1 16-bit timer, which support internal or external synchronization and offer different modes of operation.

Serial peripheral interface

SPIAT Mega8 integrated with 3 communication devices is one of the serial peripheral interfaces.

USART

The most powerful communication solutions support USART and ATmega8, synchronous and asynchronous data transfer schemes. For this, 3 pins are selected

Two-wire interface

ATmega8 has another communication device called a two-wire interface. Designers can establish communication between two different devices using two wires with a common ground connection. Open collector outputs create TWI outputs, so external resistors are needed to form the circuit.

Analog comparators

The IC has a built-in comparison module that allows the connection of the two inputs of the analog comparators to the two voltages through external contacts, which in turn are connected to the microcontroller.

Opto coupling (OC)

It's a kind of optical coupling. Opto Coupler is also known as photocoupler, an optical splitter. Light transmits electrical signals between two isolated circuits [14]. The main function is to protect the high voltage circuit. There are different types of Opto connectors. The most widely used maximum power is 30, 70 and 80 V and the maximum power of the opto coupling can reach 80 kV. Four common types of opto couplings are available; they have infrared LED sources which have different photosensitive devices. These four OCs are called: Photo-transistor, Photo-Darlington, Photo-SCR and Photo-triac.



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It is installed by various independent technologies and devices that are essential components of the Internet of Things.

- Hardware that makes physical objects respond and allows them to retrieve data and respond to instructions.
- Software technologies that collect, store, process, process and instruct data.
- The most important communication interface of the entire communication infrastructure, which includes protocols and technologies, helps devices to communicate and interact with each other, as well as transfer data.
- Intelligent Internet of Things is based on a combination of sensors + communication + people and processes.

The interaction between these elements creates a new type of application that is intelligent enough to perform various functions [5]. The devices used in the IoT application fall into two categories:

For this type of device, the actuator control mechanism can be moved.

2. The nodal system is the second part of the entire IoT system, which is used to make decisions at the end of the task [3]. The gateway can be divided into three types of functions that are required for the default gateway to function properly.

IoT Protocols

The need for an IoT protocol is to follow a structure such as communication between devices when the device is more than 30,000 feet above the ground, or possibly underground. Here data can be sent from one device to another monitoring server [8]. The server infrastructure is built like a device that connects to too many other devices and servers. IoT protocols can be defined as follows: MQTTit is work on the concept of device-to-server communication, in which data is collected from a device and sent to a server [45]. Depending on the use of DDS, it will be compatible in industrial and integrated applications.

In a network, an operational device is a device that provides an entry point to the underlying corporate or service provider networks. Examples include routers, router switches, integrated access devices, multiplexers, and various LAN and WAN access devices [50]. Edge devices provide connectivity to both service provider networks and service provider networks. Network operators and others have increased the computing power of intelligent systems and the ability to run applications and analytics on these extreme devices.

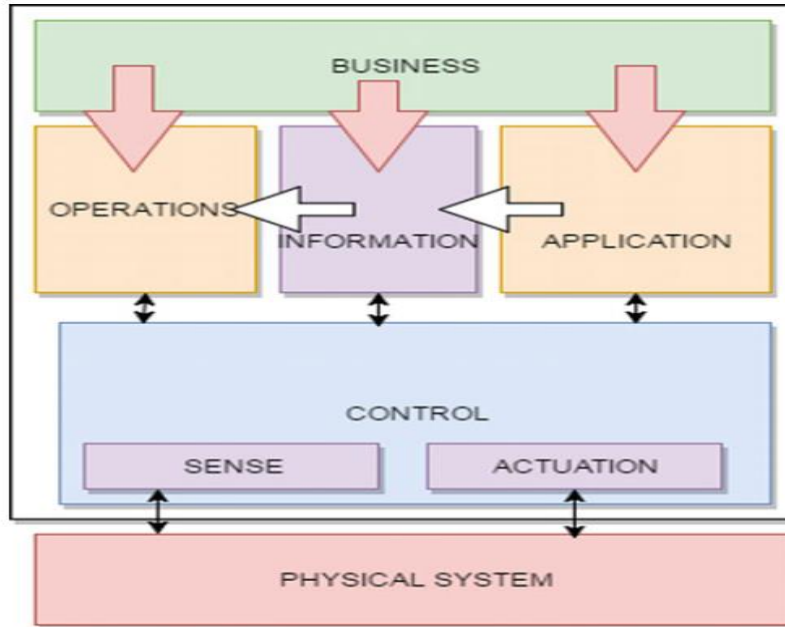


Fig5.IoT's Application Architecture

Advances in digital and network technologies allow the control node, sensor node, RFID and home appliances such as televisions, air conditioners, internet protocol, wireless communication protocol to be used for 'information and exchange [4] so that integrate low connectivity - setting the scale here - providing two characteristic times with a distributed system to achieve the goal of complexity in IoT development, providing two functionalities in a distributed system of IoT development. The grid layer acts as a bridge between the other two layers [46]. If the system is ubiquitous or if there are branches in the system, this type of bridge is required.

IoT approach to motion detection

The IoT has a limitation: the processing power of the devices is limited. Due to the problem, it is unable to perform its security function, so overcoming this IoT limitation will revolutionize daily life and provide assistance in situations such as data management by various sensors [48]. Smart homes and fire protection systems, health care. Also, while running an IoT project at the time, we looked at issues with the IoT. The Internet of Things has three main aspects to consider

1. Each device requires a unique communication address.
2. Database management at all levels.
3. Security policing must be properly exercised and confidentiality is an important factor.

Linux-based Raspberry Pi operating systems run Raspberry Pi and a kernel known as Raspbian is a special kernel used by Raspberry Pi. The advantage of the kernel is that it is compatible with running all types of Linux-based software [3].

Big data, predictive analytics and advanced output

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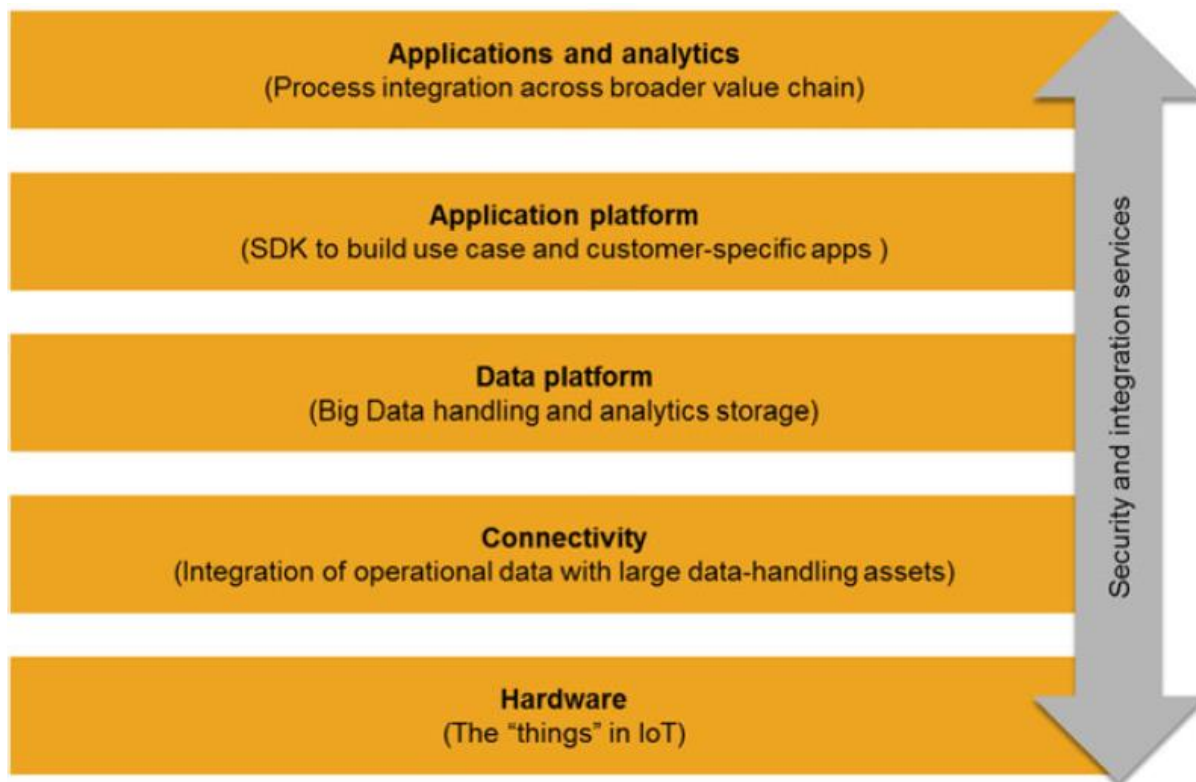
Big data refers to large-scale information management and analysis technologies [17,34] that go beyond the capabilities of traditional data processing technologies [4,6]. The most important progress for V&B today is to improve product quality and productivity (number of products per unit of input) [19][51]. This requires process data to be made available as a new source of quality data beyond the existing operational data set (eg post-processing (PP), Betriebsdatenerfassung (BDE)) to provide the necessary details to obtain advanced knowledge.

Advanced production system requirements

The combination of tools and resources to improve pottery production has historically relied heavily on human experience. This approach has not evolved well and - in a company operating on a global scale - has not yielded any investment benefits.

and things on the same network connection. Sensors and data acquisition systems enable the collection and synthesis of information on the operation of equipment. The key to this is the systems and infrastructure themselves, which need to be reliable, resilient and up to date. To accelerate the transformation of IoT production, V&B focused on the essential elements that truly meet the various requirements of the system:

- Associated production is based on the Internet of Devices. The availability of a physical cyber platform that includes intelligent machines, storage systems and production equipment capable of autonomous, independent initiative and the exchange of managerial information offers great benefits: The short-term advantage is that less staff is required. for data entry. Covering the processes during production, the technology fully includes production as "raw material for the final product".



Big data and predictive analytics

The overall goal was to ensure the production flow to achieve "Right First", which means the highest possible final yield (= error-free production and all post-processing). To capitalize on big data and predictive analytics for significant productivity gains, V&B needs to build a modernized IT platform to complement the sophisticated network in its factories to capture machine data as the main point of connected manufacturing. This move made it possible to overcome the lack of transparency in manufacturing processes, health and productivity of manufacturing systems, which previously led to inaccurate and late decisions on product quality. In addition, V&B segments the entire manufacturing process into groups of related manufacturing steps. For each set of manufacturing steps, real-time data is collected about the process steps, materials used and other environmental data and collected in a central database [19].

This allows detailed analysis of the process data, as well as the identification of patterns and relationships between the stages of the process, to provide transparency of factors and their impact on performance and enable operational decisions to be made in the process. If you want to think of it this way, predictive analytics is another logical step after the evolution of big data input into the field of advanced analytics, designed to provide smarter, more visual (predictive) and functional analytics. To make better decisions and become better, imagine and streamline your decision-making process. Improving the efficiency of product quality assurance becomes simple and effective. Integrated and simplified quality management with integrated IoT connectivity and predictive analytics, improved quality measurement with fault logging, flexible scheduling and management, realistic action with real-time monitoring and variance management - quality is now a reality [49]. The benefits of predictive analytics for V&B can be summarized as follows: Understand that by switching from transactional data to analytics, IT allows organizations to access all data, provide data for self-service and management, and gain more insight in real time. With the flexibility and ease of moving from transactional data to analytic data, V&B ITI and Scales offer companies easy-to-use, understandable, manageable and manageable solutions. In addition, the analysis platform provides a cleaner, simpler, and more flexible architecture. Transform the future with business scenarios to visualize new results, anticipate new opportunities, and plan new strategies based on a scalable open platform with a lower total cost of ownership (TCO). The meaningful and proactive use of Big Data, which is now being demonstrated at V&B, allows you to answer complex questions that business intelligence does not yet answer. Although we now have a (large) amount of real-time data (and we still have historical data) and we can apply statistical estimates [16] to previously defined production areas, another level of transparency is achieved: knowledge integrated into the production process and their human plant digitization experts are now unpacked in two ways:

- Semantics, which creates evidence-based relationships between objects and observations when the manufacturing process is under control.
- Measure data and measure data to understand the evidence and enable the acquisition of knowledge, not just data. V&B has created an IT solution to summarize knowledge of the entire manufacturing process and provide comprehensive data analysis to help engineers do their jobs and thus reduce their efficiency.

Conclusion

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Smart manufacturing is harnessing the power of “smart manufacturing”. The key is increasing versatility and awareness of manufacturing environments, from maintenance and manufacturing to machinery and equipment data, sales and financing. In challenging production environments, this can mean improving overall equipment. The proposed architecture and algorithm were successfully implemented in a real situation due to the correct connection of each module, such as the intelligent street parking module. IoT street smart parking mode and IoT street smart parking mode in cloud. The sensors should be installed on the side of the road, connected to the controller at the intersection and communicate with the WSN IoT oriented intelligent parking module. It is exhausting work to do before implementing the system, but once implemented it will make our parking system more convenient and smarter.

References

1. Benadda, M., Bouamrane, K., & Belalem, G. (2017). How to manage persons taken malaise at the steering wheel using HAaaS in a vehicular cloud computing environment. *International Journal of Ambient Computing and Intelligence (IJACI)*, 8(2), 18.
2. Javid, Mohd, and Ibrahim Haleem Khan. "Internet of Things (IoT) enabled healthcare helps to take the challenges of COVID-19 Pandemic." *Journal of Oral Biology and Craniofacial Research* 11.2 (2021): 209-214.
3. Safa, M., and A. Pandian. "A Review on Big IoT Data Analytics for Improving QoS-Based Performance in System: Design, Opportunities, and Challenges." *Artificial Intelligence Techniques for Advanced Computing Applications*. Springer, Singapore, 2021. 433-443.
4. Kimbahune, V. V., Deshpande, A. V., & Mahalle, P. N. (2017). Lightweight key management for adaptive addressing in next generation internet. *International Journal of Ambient Computing and Intelligence*, 8(1), 20.
5. Alam, Tanweer, et al. "Big Data for Smart Cities: A Case Study of NEOM City, Saudi Arabia." *Smart Cities: A Data Analytics Perspective*. Springer, Cham, 2021. 215-230.
6. Karthick, R., et al. "Overcome the challenges in bio-medical instruments using IOT—A review." *Materials Today: Proceedings* (2020). <https://doi.org/10.1016/j.matpr.2020.08.420>
7. Manian, Venkatesan, and P. Vadivel. "Advanced Deep Learning Applications in Big Data Analytics: Introduction of Internet of Things." *Advanced Deep Learning Applications in Big Data Analytics*. IGI Global, 2021. 1-28.
8. Odella, F. (2016). Technology studies and the sociological debate on monitoring of social interactions. *International Journal of Ambient Computing and Intelligence*, 7(1), 26.
9. Awotunde, Joseph Bamidele, et al. "MIoT-Based Big Data Analytics Architecture, Opportunities and Challenges for Enhanced Telemedicine Systems." *Enhanced Telemedicine and e-Health: Advanced IoT Enabled Soft Computing Framework* (2021): 199-220.
10. Biswas, S. P., Roy, P., Patra, N., Mukherjee, A., & Dey, N. (2016). Intelligent traffic monitoring system. *Advances in Intelligent Systems and Computing*, 380, 535–545.
11. Karupusamy, Sathishkumar, M. Ramalingam, and Boopathi Kumar Eswaran. "Big Data Analytics and Management in Internet of Things." *Journal of Information Technology Management* 13. Special Issue: Big Data Analytics and Management in Internet of Things (2021): 1-5.
12. Tang VW, Zheng Y, & Cao, J. (2006). An intelligent car park management system based on wireless sensor networks. 1st International Symposium on Pervasive Computing and Applications. <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.460.6553&rep=rep1&type=pdf>262P.

13. Ahmed, Imran, et al. "A framework for pandemic prediction using big data analytics." *Big Data Research* 25 (2021): 100190.
14. Deshpandey, A., Nath, S., Gibbons, P. B., & Seshan, S. (2003). IRIS: Internet-scalable resource-intensive sensor services. In *ACM SIGMOD International Conference on management of data* (pp. 664–667).
15. Lv, Zhihan, et al. "Big Data Analytics for 6G-Enabled Massive Internet of Things." *IEEE Internet of Things Journal* 8.7 (2021): 5350-5359.
16. Karthick, R., and P. Meenalochini. "Implementation of data cache block (DCB) in shared processor using field-programmable gate array (FPGA)." *Journal of the National Science Foundation of Sri Lanka* 48.4 (2020). <http://doi.org/10.4038/jnsfsr.v48i4.10340>
17. Watkins, Darren. "Real-Time Big Data Analytics, Smart Industrial Value Creation, and Robotic Wireless Sensor Networks in Internet of Things-based Decision Support Systems." *Economics, Management, and Financial Markets* 16.1 (2021): 31-41.
18. Nawaz, S., Efstratiou, C., & Mascolo, C. (2013). ParkSense: A smartphone-based sensing system for on-street parking. In *Proceedings of the 19th Annual International Conference on Mobile Computing and Networking* (pp. 75–86). ACM. <https://www.cl.cam.ac.uk/~cm542/papers/mobicom2013.pdf>
19. Qaffas, Alaa A., Rakibul Hoque, and Najah Almazmomi. "The internet of things and big data analytics for chronic disease monitoring in Saudi arabia." *Telemedicine and e-Health* 27.1 (2021): 74-81.
20. Reddy, P. D., Rao, A. R., & Ahmed, S. M. (2013). An intelligent parking guidance and information system by using image processing technique. *International Journal of Advanced Research in Computer and Communication Engineering*, 2(10), 4044–4048.
21. Venkata Ramana, N., Nagesh, P., Lanka, S., & Karri, R. R. (2019). Big data analytics and iot gadgets for tech savvy cities doi:10.1007/978-3-030-03302-6_12.
22. Yuga Vamshi, B., Nikhil Sai, M., & Ali Hussain, M. (2019). Iot based smart appointment alert system. *International Journal of Innovative Technology and Exploring Engineering*, 8(5), 956-959.
23. Sai Prasanthi, M., Katragadda, V. B., Perumalla, H., & Sowmya, B. (2019). Hybrid approach for securing the IoT devices. *International Journal of Innovative Technology and Exploring Engineering*, 8(4), 147-151.
24. Karthick, R., and M. Sundararajan. "A Reconfigurable Method for Time Correlated MIMO Channels with a Decision Feedback Receiver." *International Journal of Applied Engineering Research* 12.15 (2017): 5234-5241.
25. Srinivasa Rao, P., Hussain, M. A., & Sriharika, C. (2019). Automatic door unlock system using IOT and RFID. *International Journal of Innovative Technology and Exploring Engineering*, 8(5), 619-623.
26. Sathwik, K., Ramesh, N. V. K., & Reshma, S. K. (2019). Estimation and monitoring of vital signs in human body by using smart device. *International Journal of Innovative Technology and Exploring Engineering*, 8(5), 1035-1038.
27. Kathavate, P. N., & Amudhavel, J. (2018). Route map of privacy preservation to IoT. *International Journal of Engineering and Technology (UAE)*, 7, 825-833.
28. Karthick, R., and M. Sundararajan. "PSO based out-of-order (ooo) execution scheme for HT-MPSOC." *Journal of Advanced Research in Dynamical and Control Systems* 9 (2017): 1969.
29. Kumar, C. N. S., & Hussain, M. A. (2018). A review on employee's health monitoring system using IOT. *International Journal of Engineering and Technology (UAE)*, 7, 988-992.

30. Kumar, D. A., Sastry, A. S. C. S., Kishore, P. V. V., & Kumar, E. K. (2018). 3D sign language recognition using spatio temporal graph kernels. *Journal of King Saud University - Computer and Information Sciences*, doi:10.1016/j.jksuci.2018.11.008
31. Karthick, R., and M. Sundararajan. "SPIDER-based out-of-order execution scheme for Ht-MPSOC." *International Journal of Advanced Intelligence paradigms* 19.1 (2021): 28-41. <https://doi.org/10.1504/IJAIP.2021.114581>
32. Sabarish, P., et al. "An Energy Efficient Microwave Based Wireless Solar Power Transmission System." *IOP Conference Series: Materials Science and Engineering*. Vol. 937.No. 1.IOP Publishing, 2020. doi:10.1088/1757-899X/937/1/012013
33. Vijayalakshmi, S., et al. "Implementation of a new Bi-Directional Switch multilevel Inverter for the reduction of harmonics." *IOP Conference Series: Materials Science and Engineering*. Vol. 937.No. 1.IOP Publishing, 2020. doi:10.1088/1757-899X/937/1/012026
34. P. Sabarish, R. Karthick, A. Sindhu, N. Sathiyathan, Investigation on performance of solar photovoltaic fed hybrid semi impedance source converters, *Materials Today: Proceedings*, 2020, <https://doi.org/10.1016/j.matpr.2020.08.390>
35. Karthick, R., and M. Sundararajan. "A novel 3-D-IC test architecture-a review." *International Journal of Engineering and Technology (UAE)* 7.1.1 (2018): 582-586.
36. Karthick, R., and M. Sundararajan. "Design and implementation of low power testing using advanced razor based processor." *International Journal of Applied Engineering Research* 12.17 (2017): 6384-6390.
37. Suresh, HelinaRajini, et al. "Suppression of four wave mixing effect in DWDM system." *Materials Today: Proceedings* (2021). <https://doi.org/10.1016/j.matpr.2020.11.545>
38. M. Sheik Dawood, S. SakenaBenazer, N. Nanthini, R. Devika, R. Karthick, Design of rectenna for wireless sensor networks, *Materials Today: Proceedings*, 2021. <https://doi.org/10.1016/j.matpr.2020.11.905>
39. M. Sheik Dawood, S. SakenaBenazer, R. Karthick, R. Senthil Ganesh, S. Sugirtha Mary, Performance analysis of efficient video transmission using EvalSVC, EvalVid-NT, EvalVid, *Materials Today: Proceedings*,2021. <https://doi.org/10.1016/j.matpr.2021.02.287>
40. Karthick, R. "Deep Learning For Age Group Classification System." *International Journal Of Advances In Signal And Image Sciences* 4.2 (2018): 16-22.
41. A Manjunathan, A Lakshmi, S Ananthi, A Ramachandran, C Bhuvaneshwari, "Image Processing Based Classification of Energy Sources in Eatables Using Artificial Intelligence", *Annals of the Romanian Society for Cell Biology*, vol.25, issue.3, pp.7401-7407, 2021.
42. P Matheswaran, C Navaneethan, S Meenatchi, S Ananthi, K Janaki, A Manjunathan," Image Privacy in Social Network Using Invisible Watermarking Techniques", *Annals of the Romanian Society for Cell Biology*, vol.25, issue.5, pp.319-327, 2021
43. Bhuvaneshwari C, Manjunathan A, "Advanced gesture recognition system using long-term recurrent convolution network", *Proc. ICONEEEA*, 2019 pp. 1-8.
44. Kaarthik K Sivaranjani S, "Iot Based Intelligent Parking System at Airport" *International Journal of Recent Technology and Engineering*, Vol. 7, Issue No.6S4, 2019, PP.513-516.
45. L.Ramesh, M.Monisha, A.ShirleyPradeeksha, P. Sowmiyaa, S.K. Vedhashree, "Driver & Drowsiness detection and alerting system", *International Journal of Pure and Applied Mathematics*, Online ISSN No.: 1314-3395, Print ISSN No.: 1311-8080, Vol. No.: 118, Issue No.: 20, pp. 2247-2252, 2018.

- 46.KaarthikK ,Vivek C, “Weed Remover In Agricultural Field Through Image Processing”, International Journal of Pure and Applied Mathematics, Online ISSN No.: 1314-3395, Print ISSN No.: 1311-8080, Vol. No.: 118, Issue No.: 8, pp. 393-399, February 2018.
- 47.Indumathi K, Manjunathan A, Balasundhari G, Dharani M, “IoT technology for remote controlled watering system”, International Journal of Engineering Research & Technology, vol.5, issue 13, pp. 1-3,2017.
- [48] C Bhuvaneshwari, A Manjunathan, “Reimbursement of sensor nodes and path optimization”, Materials Today: Proceedings, 2020.
- [49] C Bhuvaneshwari, G Saranyadevi, R Vani, A Manjunathan, “Development of High Yield Farming using IoT based UAV”, IOP Conference Series: Materials Science and Engineering 1055 (1), 012007
- [50] Manjunathan A, Divya P, “Modernistic strategy for surveillance of wind turbines based on CAN bus”, International Journal of Applied Engineering Research, 2015, 10(20), pp. 16183–16186
- [51] Murugan, S., Jeyalakshmi, S., Mahalakshmi, B., Suseendran, G., Jabeen, T. N., & Manikandan, R. (2020). Comparison of ACO and PSO algorithm using energy consumption and load balancing in emerging MANET and VANET infrastructure. Journal of Critical Reviews, 7(9), 2020.