

# REVIEW PAPER ON WORLD WITH AUTOMATION

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## Abstract:

*Internet of things creates an environment where objects can be controlled or sensed remotely across an existing network and hence creates opportunities for direct communication and integration of physical world with computer-based systems that further results in improved proficiency and accuracy. Health monitoring IoT platforms are being created for chronic patients which are helpful in managing health vitals and maintaining recurring medication routines. In this paper, it is being presented how IoT can be integrated in home environment for automating home appliances and various sensors with unique functionalities. It is hereby discussed, the role of IoT in automation, how tools react with the PCB for home automation. The main objective of this research is to minimize human efforts by optimizing the use of various automating tools at minimum cost.*

**Keywords:** IoT, Home automation, Sensors, Automation

## INTRODUCTION

There are several planned or developing large-scale deployments of IoT, that enable better management of cities & systems. For example, Songdo, “a ubiquitous city” in South Korea is first of its kind fully equipped & wired smart city, is under completion. For autonomous control and encompassing intelligence internet structures are not required.

In future, IoT may be a non-deterministic & open network in which self-organized or intelligent entities Web services, virtual objects will be able to act independently pursuing their own objectives or shared ones depending on their circumstances. Environmental monitoring applications of IoT typically use sensors to assist in environmental protection by monitoring quality of air, water, atmosphere, soil or soil conditions, and could even include areas like monitoring movements of wildlife along with their habitats.

The main objective of this project is to develop an automation system using an Arduino module, esp32 and other modules or tools that are being remotely controlled by any smartphone or smart device over the internet. To automate the homes, we provide you with very less tools and less complex circuits so that anyone can easily make this for themselves. We are using tools like Arduino and esp32 with some special sensors to help us ensure the proper working of our project.

When augmentation of IoT is done with sensors & actuators, technology becomes more general class of cyber-physical systems, which encircle technologies like smart homes, smart grids, and intelligent transportation. Each thing can be identified uniquely through its embedded computing system, but is able to cooperate with existing Internet infrastructure.

## LITERATURE REVIEW

The term Internet of Things was coined 16 years ago. But the actual idea of connected devices has been much longer, at least since the 70s. Back then, this idea was often termed as “embedded internet.” But the actual term “Internet of Things” was introduced by Kevin Ashton in 1999.

During his work at P&G, Ashton who was working in supply chain optimization, wanted to attract management’s attention to an exciting new technology called RFID. As the internet was the hottest new trend in 1999 and because it somehow made sense, he called his presentation as “Internet of Things”.

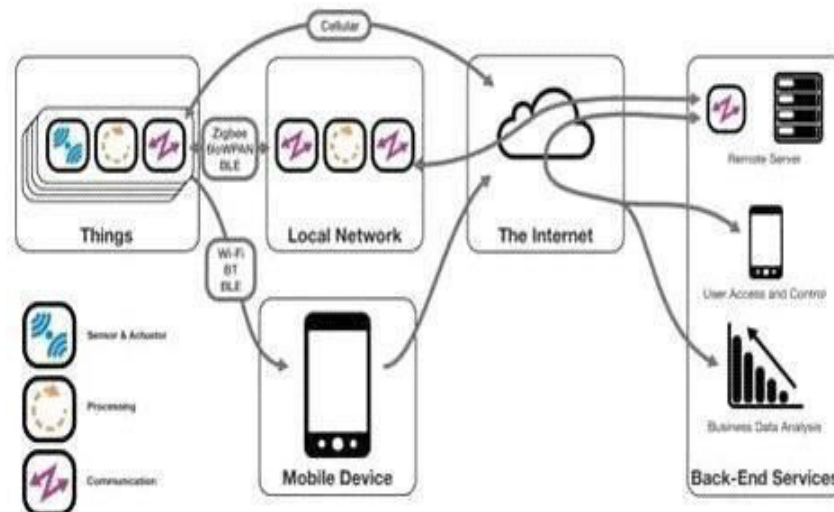
Author	[John A. Stankovic]
Title	Research Directions for the Internet of Things
Description	Many technical communities are strongly pursuing research topics that contribute to Internet of Things (IoT). Today, as sensing, actuation, communication, and control become ever more sophisticated, there is an enormous overlap in this environment which certainly requires a careful study before developing any appropriate Home Automation System (HAS) that will fulfill its requirements. Nevertheless, the latest attempts at introducing Home Automation Systems in actual homes for all kinds of users are starting to be successful, thanks to the continuous standardization process that is lowering the prices and making devices more useful and easier to use for the end users.

Author	[ Manisha Khattar , Arpan and Coding Ninjas]
Title	Interface to interact with tools like ESP32.
Description	With the help of our author and mentors, we design the interface who can react with the tool like ESP32 and other sensors as well. We came to know that how to design the responsive and dynamic website or interface which help our clients, friends and other people who are interested in technological Internet of Things (IoT). Moreover, this interface is specially for those who want to automate their homes by using our tips and tricks. We here provide you with less tools and less complex circuits which help you to design the same interface that we achieve.

Author	[Nuno Santos and tutorialsx]
Title	Connecting ESP32 With The WIFI Network
Description	<p>ESP32 is a module with low-cost, minimum power system on a chip, microcontrollers along with integrated Wi-Fi and dual-mode Bluetooth. ESP32 series employs a Tensilica Xtensa LX6 microprocessor in both the dual-core as well as single-core variations along with built-in antenna switches, power amplifier, receive amplifier, filters, and power-management modules. ESP32 is created and developed by Espressif Systems, a Shanghai-based company, and is manufactured by TSMC using their 40 nm process. It is a successor to the ESP8266 microcontroller. TECHBASE's Moduino X series X1 and X2 modules are ESP32-WROVER/ESP32-WROVER-B based computers for industrial automation and supporting digital inputs/outputs, analog inputs, and various computer networking interfaces.</p>

Author	[ Jim Pinto]
Title	The Automation Internet of Things
Description	<p>With the help of IoT, literally everything will be connected to everything. Some people estimate that 50 billion devices will be connected by this technology by 2020. After discussing the broad concepts of IoT previously (Automation World, April 2011) here our focus will be on the emergence of IoT in the automation world. The primary drive for automation using IoT, is to significantly reduce operating expenses when automation devices (smart devices), sensors and actuators become Internet-enabled devices. It's the next huge step in productivity because there are major benefits which can be derived from the acquisition and organization of previously unthinkable amounts of data. New Enterprise Manufacturing Intelligence software, EMI brings data related to manufacturing together from many sources for reporting, visual summaries, analysis and passing data between enterprise level and plant-floor systems.</p>

### ARCHITECTURE OF



**Fig. 1** Architecture of IoT

The initial idea of a globally interconnected network of devices, objects and things in general emerged with the RFID technology, and this concept has been extended to the current vision that foresees the interaction of a plethora of heterogeneous objects.

### Various Layers in Architecture:

- **Things:** Define the objects to be automated like home appliances.
- **Local Network:** It is the network connecting objects with internet
- **The Internet:** Service provided by the Internet Service Provider (ISP) to connect local network with Back-end services
- **Mobile Devices:** Include various hand-held devices.
- **Back End Services:** It is the collection of Remote services required at the time of automation.

### CHARACTERISTICS & TRENDS

IoT can function as a tool with the help of which people can save their money within their households. If their home appliances are able to interact then, they can operate in an energy efficient manner. Finally, IoT can help people with their day-to-day plans. A very interesting example, is the communication between many devices that adjust automatically to let an individual sleep.

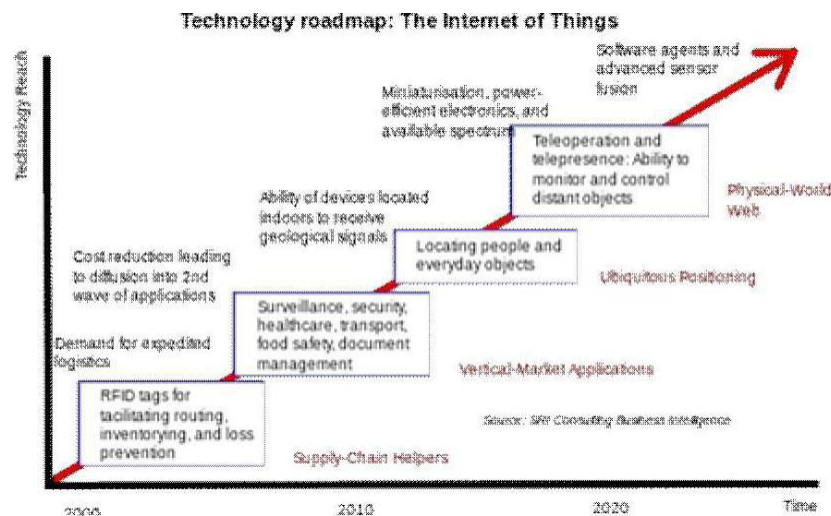


Fig. 2 Technology Roadmap: Internet of Things

IoT can be useful in many different ways including shipping and location, security of people, individual tracking, and conservation of energy. As mentioned previously, IoT allows the interaction between devices, commonly referred to as Machine-to-Machine (M2M) communication.

### INTELLIGENCE

In the original concept of “Internet of Things” Ambient intelligence & autonomous control were not considered. They do not necessarily require Internet structures, either. However, there is a transition in research to integrate concepts of

IoT & autonomous control, with initial outcomes towards the direction considering objects as a driving force for autonomous IoT.

Autonomous behavior through collection & reasoning of information as well as object’s ability to detect changes in the environment, faults affecting sensors & introduce suitable measures constitute a major research trend, which clearly provide credibility to IoT technology. Modern IoT products & solutions in marketplace use various unique technologies to support such context-aware automation, but to deploy sensor units in real environments more sophisticated forms of intelligence are requested.

## APPLICATIONS OF IOT

### Medical & healthcare systems

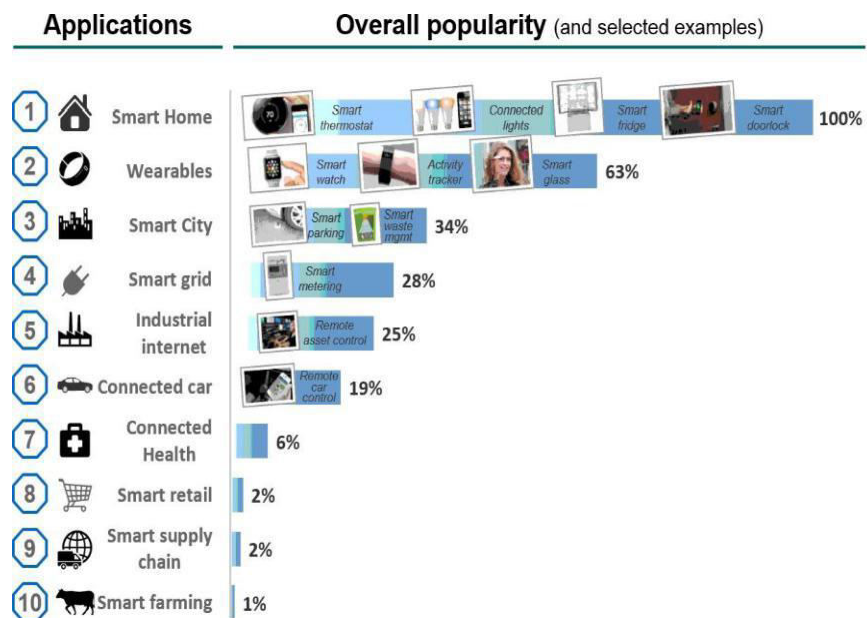
Remote health monitoring & emergency notification systems can be enabled with the help of IoT. These health monitoring devices can analyze basic blood pressure & heart rate monitors to advanced devices capable of monitoring specialized implants, such as pace-makers, electronic wristbands or advanced hearing aids. Specialized sensors can be used to monitor health & general well-being of senior citizens, while also ensuring that proper treatment is being given to them & assisting people regain lost mobility via therapy as well. Other consumer devices to promote healthy living, such as, connected scales or wearable heart monitors, are also a possibility with IoT.

### Building & home automation

IoT devices can be used to monitor & control mechanical, electrical & electronic systems used in various types of buildings (e.g., public & private, industrial, institutions, or residential) in home automation & building automation systems.

### Transportation

The IoT can assist in integration of interaction, control, & information processing across various transportation systems. Application of IoT can be extended to all aspects of transportation systems (i.e. vehicle, infrastructure, & driver or user). A dynamic interaction between all the above mentioned components of a transport system enables inter & intra vehicular communication, smart traffic control, smart parking, smart electronic toll collection systems, vehicle control, safety & road assistance.



**Fig. 3** IoT Applications chart

### **Large scale deployments**

There are several planned or ongoing large-scale deployments of IoT, to give better management of cities & systems. For example, Songdo, “a ubiquitous city” in South Korea is first of its kind fully equipped & wired smart city, is under completion. Nearly the entire city is planned to be wired, connected & turned into a stream of data that would be monitored & analyzed by cluster of computers with little, or even no human intervention.

Another application of IoT, is currently undergoing project in Santander, Spain. For the deployment of this project, two approaches have been adopted. In a city populated with, 180,000 inhabitants, the city has already seen 18,000 application downloads. This app, connected to 10,000 sensors, enable services like environmental monitoring, parking search, digital city agenda among others. Information related to city is used in this deployment so as to benefit merchants through a spark deals mechanism based on city’s behavior.

## **BENEFITS OF TECHNOLOGY**

Initially, automation was seen as a luxury item but now it has gone from a luxury item to a trend, and a must-have technology. Here’s a look at some of the biggest benefits provided by the home automation-

### **1) Security:**

Tap the finger to turn on the lights after reaching home so we are worried about what’s hiding in the shadows, or in our pathways, or we can just automate to turn on when we aren’t home. Door locks are another example of automated home products that can increase our home security.

### **2) Energy efficiency:**

The energy efficiency of our home can be increased by remotely powering off systems and appliances when they aren’t in use. In addition to the, standard home automation products that gives us active control, some products actively monitor systems and provide the home owner with knowledge and an insight to achieve greater control and energy efficiency.

### **3) Comfort:**

Connected home products like the Wi-Fi Thermostats lets us conveniently adjust our home temperature from the mobile application so our family is always comfortable.

### **4) Savings:**

Sometimes home automation can is a bit expensive to install but, in the end, it will literally pay off everything. We don’t have to waste our money on lights left ON when we aren’t at our home, or spend money on gas to drive home because we forgot to lock the door. Monetary savings are apparent, but a lot of our time will be saved as well.

### **5) Convenience:**

With home automation, convenient control of our home will be at our fingertips. We don’t have to trust/rely on someone else with our most valued possessions while travelling, because a system is there inspecting our home regularly.

## DRAWBACKS OF TECHNOLOGY

Three of the main concerns that go along with the IoT are the breach of our privacy, excessive-reliance on technology, and the loss of jobs. Of course, there are some security measures that are taken to protect information, but the possibility of hackers breaking into the system and stealing the data is always there. For example, Anonymous, a group of individuals, hacked into federal sites and released their information to the public (which was supposed to be kept confidential). Therefore, if all of our information is stored on the internet, there is always some chances of hacking that information. Apart from that some companies can misuse the information that they are given access to. For example, recently Google got caught using information that was supposed to be kept private.

Another argument that goes against the IoT is the excessive-reliance on technology. Relying on technology on a day-to-day basis and making decisions by the data that it gives up could lead to despoliation. As we know that no system is robust and fault-free. We see glitches constantly in technology, specifically which involves the internet. Therefore, the more we depend on the Internet, more it could lead to a potentially catastrophic event if it crashes.

Finally, as more and more devices are getting connected through the internet, the more it is resulting in loss of jobs. Hence, we can say that the automation of IoT “will have a devastating impact on the employment of less-educated workers”. For example, as devices can not only communicate between each other, but transmit that information to the owner, so people who evaluate the inventories will suffer from serious job loss. Thus, we can say that these disadvantages can be largely devastating to society, as well as individuals and consumers.

## FUTURE SCOPE

Some advanced principal technologies and a rapid increase of devices have helped increase the growth of Internet of Things. In fact, investments in IoT technology are projected to grow at 13.6 percent per year till 2022. Thanks to new sensors, more computing power, and reliable mobile connectivity due to which further growth has been made possible in this field.

Finally, for the growth of this IoT market existing IT devices will need to be linked to the IoT. Growth in traditionally connected IT devices is found moderate-only about 2 percent per year. However, the huge foundation laid by more than five billion smart phones, two billion personal computers, and one billion tablets indicate a massive market for device integration.

## CONCLUSION

From the above review paper, it is concluded that all the home automation system techniques use wireless technology. Arduino, Esp32 and IoT Techs based home automation techniques have been implemented in order to provide ease to the people to control their home appliances.

While developing this project we have gone through a lot of rough ideas and tutorials which tells us about the basic connections and the implementation of sensors.

Various sensors can be used for automating our homes like, with sound sensor we can easily turn ON and turn OFF the light of our room using of hand gestures. With flame sensor we can detect that some kind of fire is surrounding us and we can get to safe zone as quickly as possible.

Main purpose of home automation system is to provide ease to people to control different home appliances with the help of the android application present in their smart phones along with saving time, electricity and money. This system also helps the user to protect their homes from burglars when they are away from the home by producing alert sounds.

## REFERENCES

- [1]. International Journal of Development Research, 2020. Low-cost home automation with ESP32, pp.36802-36808.
- [2]. International Journal of Science and Research (IJSR), 2017. Internet of Things: Smart Home Automation System using ESP32 . 6(1), pp.901-905.
- [3]. YUAN, Q., 2020. Development Direction and Countermeasures to Internet of Things Industry Planning in China. DEStech Transactions on Social Science, Education and Human Science, (icpcs).
- [4]. IEEE Internet of Things Journal, 2014. IEEE Internet of Things Journal publication information. 1(5), pp.C2C2.
- [5]. Myers, B., 1995. User interface software tools. ACM Transactions on Computer-Human Interaction, 2(1), pp.64-103.
- [6]. IEEE Sensors Journal, 2016. IEEE Sensors Journal Special Issue on Smart Sensors for Smart Homes. 16(19), pp.7300-7300.
- [7]. 熊, 宇., 2019. Design Buzzer Sensor for Flame Detection in Living Room Based on ESP32. Computer Science and Application, 09(11), pp.2010-2019.