

Home Automation - Today and Tomorrow, India and World

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Abstract— Smart Home Automation refers to using management systems and information technology to operate, manage and control daily use home appliances such as lights, fans, televisions, thermostats doors, windows, etc and doing so reducing the need for human interference. The world is moving towards a digital era and implementing Internet of Things devices will be a necessity, this paper presents an insight into the current scenario of Home Automation across India and feasibility and Future Scope of Smart Home Automation in India. India's growing economy has led to an increasing population receiving higher wages which in turn will increase the standard of living, thus augmenting the demand for Home Automation Devices. Home Automation is still a niche market in India catering to the upper class. This paper will focus on the scope and adaptability of Home Automation in India from 3 perspectives - Energy, Safety & Comfort. The importance and limitations on Smart Home Devices will be discussed and trends in Smart Home Automation will be analyzed through the course of paper. Challenges and feasible solutions will be considered to device an efficient smart home system.

Key words: Home Automation

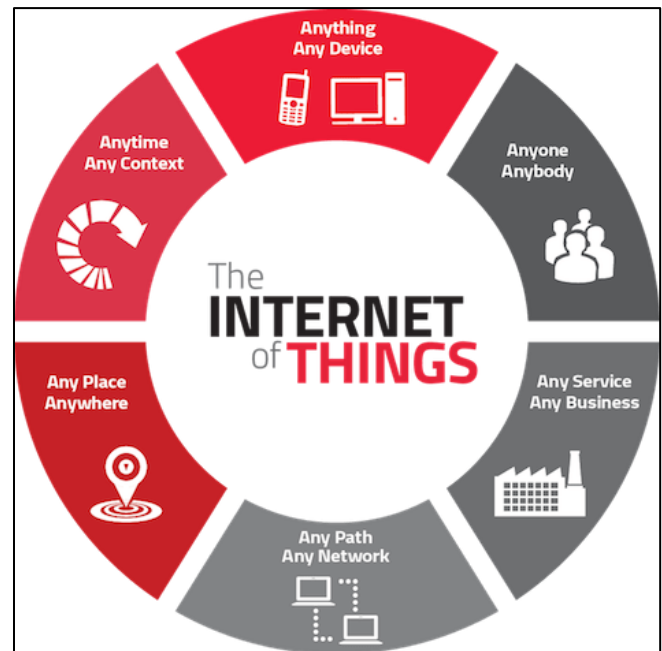


Fig. 1: showcases the scope for Internet of Things with Home Automation as an application.

I. INTRODUCTION

Home Automation can be defined as an ability to operate, control and monitor tasks automatically and remotely. It is a concept which defines working together of all household devices and Appliances working together and inter connected to a controller device. An efficient smart home will have the ability to control everything from Thermostats, Air Conditioning, CCTVs and Security Surveillance Devices, Kitchen Appliances, Televisions, Home Theatres.

Home Automation includes a plethora of devices and has been existent since 1955, when we had TV remotes which used Ultrasonic tones and then we had Infrared, which is still prevalent. It includes Bluetooth devices which are prevalent in the market since 2000's including mobile phones, hearing aids, headphones, remotes etc. Wi-Fi was also made commercially available since the 2000s and has changed the entire perspective towards home automation with the recent development in Internet of Things and the increase in usage of smart phones and smart devices over the last 10 years.

Internet of things has made life easier for everyone and has the ability to carry out minute tasks to complete processes combined of hundreds of tasks made possible by simple software to hardware configuration.

II. HOME AUTOMATION- PRESENT

The global home automation market trends are influenced by the sudden growth in the need of efficient solutions to control and monitor various domestic appliances including lighting, HVAC (heating, ventilation and air conditioning), safety and security, energy management, and entertainment (Audio & Video). The concept of home automation has been around for a long time, but there has been a surge in the market over the last 5 years. The various reasons for this surge include the growing awareness about wireless technologies and abundant developments in the field of integration of wireless and wired technologies.

Even though the home automation technology is prevalent from quite some time, but it has only begun to enter mainstream recently. Significant developments on both demand side as well as supply side has led to increase in popularity of home automation. Rapidly rising trends in income level and standard of living which when combined with greater concern for energy saving and security has led to an increase in demand. These concerns tend to enhance the attractiveness of these gadgets and improve the quality of life of the owner keeping in mind the three aspects of home automation- Safety, Energy & Comfort

The drastic reduction in the cost of Home Automation devices due to huge competition and less installation cost & complexity due to introduction of a wide variety of standardized appliances and highly compatible devices. Until a few years ago, Home Automation was a was limited only for the Elite and Upper Class and had a very limited market, but the market is spreading alongside the decline in rates for the devices. The cost of installation, labour expense and training electricians to install and

customize these devices is still one of the major inhibiting factors.

III. HOME AUTOMATION- FUTURE

- Rise of Virtual Personal Assistants (VPA) - The compatibility and scope of Artificial Intelligence when combined with Chatbots is incredible in the field of home automation. With the market flooded with devices like Amazon Echo, Google Home, etc and VPA's like Alexa, Cortana, Pixby, etc have the ability to control almost every smart device just with a touch or voice command.
- Standardization - Companies are shifting towards launching standard Smart Home Appliances which are very easy to install and use and are highly compatible. The goal is to attain a complete DIY Smart Home. Large Players in the field of domestic electricals (Legrand, Syska, Anchor/Panasonic, Schneider, etc) have started phasing out standard highly compatible devices such as Smart Switches, Smart Fans, etc. Appliance manufacturing companies are launching Smart Appliances ready to be controlled by any smartphone. LG, Samsung have come up with a Smart Refrigerator which has a led panel on the door.
- Plug & Play- Home Automation devices will become so user friendly and easy to operate which will lead to eradication of middlemen involved in the process such as Electricians & Distributors. These products will be widely available online and at climate, and set up the appliances with all considerations. For Eg: If your Kid enters the home, the thermostat will automatically increase the temperature, the video surveillance camera will notify you, the television will automatically showcase his/her favorite shows and due to high compatibility of the products, these can be mass produced. Both these reasons will lead to a steep fall in prices and will make these devices more accessible to the mass.
- Artificial Intelligence and IoT Combined to personalize experience- A series of Home Automation devices will behave according to personal preferences of each individual automatically sensing the individual, his/her mood, analyze behavior patterns, local
- Smart Appliances reducing Human Effort: Almost all appliances will be based on Artificial Intelligence and Sensors customizing every aspect of the use. Washing machines will have the ability to sense the type and weight of clothes and wash them accordingly. Microwave and refrigerators will set there temperature automatically sensing the type of food stored in them and will caution you for food products becoming stale or burnt.
- All Round Utility: Smart Homes will have the ability to offer almost all the required services either by touch or voice or hand moments.

IV. OBSTACLES IN HOME AUTOMATION

A. Globally

- 1) Installation -Even though a lot of standardized and highly compatible products are in launch phase, installing a

home automation is still a very complex issue for bigger residences and offices and will be a huge burden on the owner. It will cost you money if you hire an outside party to install and it will take a lot of your time if you plan to do it yourself.

- 2) Extent of Home Automation- However Simple and Efficient a home automation might sound, we would sometime like to operate a electric appliance with the old fashioned switch. Therefore, to choose the Home Automation System perfect for you, it is a very important aspect to decide on an extent of home automation, because you wouldn't want to control all the appliances in your home with a smart phone.
- 3) Compatibility - One of the major concerns during Home Automation is to control all aspects of automation from one device or one application, but this becomes very difficult or impossible because not all systems are compatible with each other. For eg- Your Security Surveillance System might require one app on your phone and your air conditioner requires another. It is better to invest in a centralized platform/application to control all systems and devices from one location
- 4) Safety and Security - Smart home are often considered safer than traditional homes, but Smart home is just a home connected to internet which makes it vulnerable to cyber-attacks and can easily provide hackers information about your home. A research carried out by Saarland University found that criminals gain insight about the behavioral patterns of residences through home automation devices. They were able to track settings of ventilation and thermostats and used it to figure out when the home was vacant. So a lot has to be done to make Smart Home a secure home.

V. OBSTACLES IN INDIA

- 1) Internet Connectivity: India ranks 67th for Broadband/Wi-Fi Internet Connection and 109 for Mobile Internet Connection in terms of Speed. The global average is 42.71 mbps whereas 20.2 mbps is the average in India. A smart home is majorly based on Internet and it is very important to have a high speed and highly reliable Internet Connection at all times. The use internet for almost every aspect of our life and a Smart Home takes it to next level. For Eg: Imagine being stuck out of your house in rain due to slow internet connection which is preventing you to enter your home or open your garage.
- 2) Unorganized Market-. Like most things in India, The home automation market is unorganized with a few major manufacturers and a lot of small and big installation companies. Proficiency, Knowledge and Skillset is very important in the field of home automation and hence it makes it very difficult to find a reliable installer at affordable prices. This is gradually changing in metro cities due to launch of various startups like Oakter, Inoho and Cubical Labs which are trying to make this sector organized and easily accessible by the mass.
- 3) Quality & Presentation: Although there are quite a few Startups in India in Home Automation Sector and are into providing retrofit systems and have good service at

affordable price. These companies being technology startups focus more on features and cost reduction and not on look and feel or presentation of the product.

But in the domestic market products with cheap look and feel, that is considerably low price and marketed by a unknown/new brand is considered to be of poor or low quality. Therefore, Good Solutions and reasonable pricing is still unable to make significant impact in Indian Market.

VI. CONCLUSION

Home Automation market will go through a steady surge in demand and supply in the coming years. The Home Automation industry is projected to an annual \$21 Billion by 2020. The domestic home automation market is expected to cross Rs.30000 Crore by 2022. The industry is all set to overcome the challenges and drawbacks faced and make a disruptive entry in the market. Home Automation will become more user friendly and compatible than ever, where apart from a just a few necessities, residents will be able to buy and install Home Automation products themselves without the aid of any technical support. The industry is dominated by various international players such as Schneider Electric, Philips, Siemens, Amazon, Samsung etc who are in rush to develop standardized products where as a series of Indian Startups like Oakter, IFIHomes, Thamsai Labs etc have standard items with a wide variety of customized applications giving significant competition. Automation will affect our lifestyle in a significant way not only inside homes but also outside.

Naya Raipur is the first integrated city in India and aims to develop four pillars of smart city across, institutional (including governance/legal framework), physical, social and economic infrastructure with implementation of the integrated Command and Control Center (CCC) along with utility management system (Electrical and Water SCADA) and intelligent Building Management System (BMS) . It leverages IoT, mobility, sensing, analytics, and cyber security technologies to ensure safety, reliability, efficiency, sustainability and connectivity to citizens.

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