I. DEVICE CONTROLLING SYSTEM USING ARTIFICIAL INTELLIGENCE AND INTERNET OF THINGS

II.CRITICAL ANALYSIS OF STARTUPS

A PROJECT REPORT

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CONTENTS

1. ABSTRACT

Smart System is a dwelling incorporating a communications network that connects the electrical appliances and services allowing them to be remotely controlled, monitored or accessed. Smart system includes different approaches to achieve multiple objectives ranging from enhancing comfort in daily life to enabling a more independent life for elderly and handicapped people. In this project, we have presented a smart system model using artificial intelligence and Internet of things. Our system will provide the comfortable management, remote access and efficient utilization of devices besides this it provides home security.

2. INTRODUCTION

Artificial Intelligence or AI is the collection of powerful and rigorous programming techniques studying the nature of intelligence by building computer systems, and the application of these concepts in solving real-world problems. The growth in the areas of AI has been increased significantly from the last decade. There exist a number of AI tools that make an automation system more sophisticated but here we will discuss the knowledge based systems only as it is used frequently. A knowledge-based system (KBS) is an AI based system that contains a significant amount of knowledge in an explicit, declarative form. KBS development is best seen as software engineering for a particular class of application problems. These applications problems typically require some form of reasoning to produce the required results. In current business practice there is an increasing need for such systems, due to progression of information technology in our daily work. For home or office automation knowledge based systems can provide the base to store the user preferences and managing the appliances accordingly. Internet of Things or IOT refers to collection of things having identities that are unique and also having connection with the internet. IOT is a new and a very revolutionizing concept and the progress in competencies in mobile devices and networking and cloud technologies drives this concept. Taking into consideration the large number of benefits that IoT offers, the project aims at controlling various devices using an app .One definition of an automated and networked system is “An automated and networked home is one in which every appliance can be remotely managed from anywhere on the Internet with a simple Web browser”. The general goal of the automatic-home movement is to use networking technology to integrate the devices, appliances and services found in homes so that the entire domestic living space can be controlled centrally or remotely. The device controlling system which we have proposed will provide a large number of services which can broadly classified into following four categories:

1) Comfortable management of appliances

2) Remote controlling of appliances

3) Efficient utilization of home resources

4) Enhancing home security

Comfortable management includes automatic adjustment of AC (air conditioning) setting, fan regulation setting etc. Remote controlling services include accessing devices from remote location and setting them ON/OFF. Efficient utilization includes running the home appliances at their optimal setting (setting at which we get the required output at minimum cost). Last category of service includes all those services which are used for securing the home environment.

In this project we will focus on how Artificial Intelligence and Internet of Things can be incorporated in this device controlling system.

3. PROBLEM STATEMENT

- Often in colleges and offices, students or employees forget to switch off the lights and fans after class thus leading to wastage of electricity.
- The elderly and disabled often require caregivers or institutional care and thus are dependent on others for very small things like controlling electrical devices.

4. EXISTING SYSTEMS

I. **Amazon Alexa**

a) Key Developers: Amazon
Founding Year: 2014

b) Alexa is Amazon's cloud-based voice service available on tens of millions of devices from Amazon and third-party device manufacturers. With Alexa, you can build natural voice experiences that offer customers a more intuitive way to interact with the technology they use every day.

II. **Google Homes**

a) Key Developers: Google
Founding Year: 2016
Based Out of: United States

b) Google Home is a powerful speaker and voice Assistant. Google Home speakers enable users to speak voice commands to interact with services through Google's intelligent personal assistant called Google Assistant. A large number of services, both in-house and third-party, are integrated, allowing users to listen to music, control playback of videos or photos, or receive news updates entirely by voice. Google Home devices also have integrated support for home automation, letting users control smart home appliances with their voice.

III. **Oakter**

a) Key People: Varun Gupta, Nithin David and Shishir Gupta
Founding Year: 2014
Based Out of: Noida

b) Oakter is set to resolve technology issues faced by Indian homes. They manufacture products which help to make your home appliances like AC, geyser, water pump, room heater, rice cooker etc. smarter. You can not only control your appliances through the Oakter mobile app but also schedule them as per your needs.

IV. Inoho

a) Key People: Deep Singh, Deepankar Garg, Gagan Singh
Founding Year: 2014
Based Out of: Bangalore

b) Inoho helps you to control your lights, fans, geysers, ACs etc from your smart phone even when you are not at home. In fact, with Inoho, you can control your devices not just through phone but also over the internet.

V. IFIHomes

a) Key Person: Rohit Khosla
Founding Year: 2013
Based Out of: Bangalore

b) IFIHomes manufactures products in various domains including home automation, secure vision, smart light, as well as solar products. Popular applications in home automation include universal remotes, smart switches, IP Camera security systems, blinds, lighting, and video door phones, security alarms.

VI. Sharp Node

a) Key Person: Mohit Agnihotri
Founding Year: 2014
Based Out of: Mumbai

b) SharpNode Technologies, an IOT based company, is working on products involving various components which helps in connecting things around you to a cloud based internet.

5. INDUSTRIAL ANALYSIS

Cubical Labs- IoT Home Automation startup from IIT Guwahati

Started by three IIT-Guwahati graduates - Dhruv Ratra, Swati Vyas and Rahul Bhatnagar - Cubical Labs is a wireless, home automation solution which can be controlled remotely through a mobile device from anywhere in the world. The vision of the company revolves around developing products which are cost-effective, safe and contribute to energy saving and at the same time reduce human effort.

Cubical Pvt. Ltd was incorporated in November 2013, by the bright minds of IIT Guwahati, India. They are a Delhi based company with the head office located in Dwarka, New Delhi and one branch office in Mumbai. Over the past eight months, they established a wide network of distributors and dealers in 5 states (14 cities) in India, and till the end of this year, they aim to expand to 20 states along with a few south east Asian and Middle Eastern countries.The primary vision of their founders is to provide high quality, reliable and affordable solution to control or monitor the electrical appliances remotely with minimal human effort in the Indian market. Along with households, we are currently focusing on hotels ,office spaces and major housing developers as well.In the next 5 years ,they focus on being present in majority of Indian homes , owing to the ease of use of their products, our commendable easy installation, after sales services and the fact that their products are 2-3 times more economically viable than those currently present in the market.

With their patented communication protocol, Cube-R which is more suitable for the Indian market because of less data consumption and its ability to integrate with other protocols, they hope to bring a revolution in the industry of IoT ; as the future of our company intimately connected to it.

WHO THEY ARE?

They as an organization is a direct result of the kind of people they have employed and the atmosphere they have created in our workplace , which in turn reflects the core values , culture, the mission and vision of the company.With a staff strength of 70+ inspired employees, a team of highly motivated IOT enthusiasts with the mission of building the ultimate, comprehensive and affordable home automation solution from India.

WHAT DO THEY DO?

They are an IoT company which develops, designs, manufactures and markets our product. Our products include home automation products along with a few peripheral ones for households, offices , hotels etc. Technically ,they provide intelligent homes and smarter living by creating software, fabricating hardware and combing through terabytes of data.Broadly , the services provided by them are –

Home Automation installation and After sales services(e.g. guaranteed timely replacement) Research and development is one of their major focus , with the aim of developing complex technology which is easy to use and maintain. The basis of their business formation was recognizing a need in the market and putting in efforts to fulfill it. And they keep this philosophy as the background of everything that they do, which leads to constant evolution of what they do and the way they do it ; to deliver what the customers need and want.

They put in years of research and development and continue to do so to generate complex yet simple, high quality and reliable technology.

HOW THEY DO IT?

They have channeled years of research and rigorous testing procedures into product development & building a tech-driven global distribution network focused primarily

on customer support & market education; and so to fulfill our mission, we work extensively through various platforms to increase the awareness about our products and services.Their work method is based on the core values of our business , maintaining quality and putting the customer and his convenience first.Expanded to Mumbai, Pune, Kolkata, Hyderabad, Kochi, Bengaluru, Ahmedabad, Surat, Calicut, Trivandrum, Delhi-NCR, Assam, Chennai, Meerut, Vadodara, Andra Pradesh, Haryana & Nagpur.Starting off in the niche market of home automation, Cubical Laboratories competes with global giants such as Schneider, Legrand, Honeywell and Fibaro.

LEGRAND -Making Life Easier Everyday

A MyHome automation system enables all the electrical functions in a home - such as lighting, air-conditioning, audio entertainment and video intercoms - to communicate with each other and be controlled together from central points. For example, a 'Goodbye' switch at the front door could turn off all the lights, air-conditioning, and close all the curtains.
Here are the unique benefits of the Legrand MyHome system:

- Integration - All the different systems, like lighting and sound, are based on the same 2 wire simplified cabling system (SCS) so they can be integrated with ease. This reduces programming time, complexity and problems
- Uniformity - Conventional devices, such as powerpoints, share the same design aesethic as automation control devices, so all switch plates work in harmony
- Modularity - You can just install the functions that are desired; not a huge complex system that will never be properly utilised. This makes it much more cost effective
- Expandability - The system is scaleable and can be expanded at any time. So you could start with lighting control and a video intercom system, and add the sound diffusion and temperature control systems at a later date
- Ease of use - It's the easiest system to use!

SCHNEIDER ELECTRIC

Schneider Electric presents its residential control and energy management solution
Home Automation Insight is a complete solution for home automation which also provides the relevant energy awareness required by the new building regulations. The control functions improve comfort, security and flexibility for the occupant and owners. The system is complete, open and scalable. It brings a real differentiation factor and added value to your program and speeds up sales. Schneider Electric offers a tailor made solution, that is easy to implement and duplicate.
Schneider Electric has a network of installation partners trained and experimented in delivering our Home Automation Insight solution. Tools to help specify, install and commission the system enable perfect site coordination. Schneider Electric prides themselves in providing the best possible training and information through our trusted network of partners. By supporting your project through the entire process, you can rest easy knowing your project will run smoothly
Home Automation Insight combines the technologies for blinds, lighting and heating to fit occupant needs. The “away” mode enables the occupant to save energy and therefore, money when away. The “ECO” mode can be used to reduce the temp set point to reduce energy costs.

Home Automation Insight enables the occupant to control blinds and lights individually. You can even control by zone, time of day or central command.
Home Automation Insight provides temperature control by room, zone and centralised, giving the occupant the right level of comfort when needed. Combined with a yearly time of day schedule, it creates a substantial energy savings. When unpredictable drops in temperature happen, the frost protection mode protects the home from damage.
Integrated time scheduler/calendar function built-in the Home Automation Insight enables the occupant with the capability to plan the occupation, the temperature according to the mood or activity taking place (work, relax, weekend). When the home is unoccupied there is also the possibility to simulate occupied mode providing a first level of security.
Home Automation Insight delivers a real time display of the water, gas and electricity consumption, as well as providing historical data on a daily, monthly and yearly basis. It is even possible to export the data for further analysis and design your own statistical measurements.
IP cameras can also be connected into the Home Automation Insight visualisation platform enabling the possibility to visualise the image on the home tablet or on a smartphone remotely.

FIBARO

FIBARO knows what is the most important. The access to your home FIBARO smart home devices provide a comprehensive environment that adapts to the needs of the entire family. It is a wireless system.

Data safety
Data is protected at the highest level - through the WAF and Anti-DDoS systems, encrypted communication using the TLS protocol and passwords using bcrypt.

Plug & Play

The FIBARO system is simple to install and use. Plug & play devices are ready for use immediately after unpacking and a short configuration

Voice control

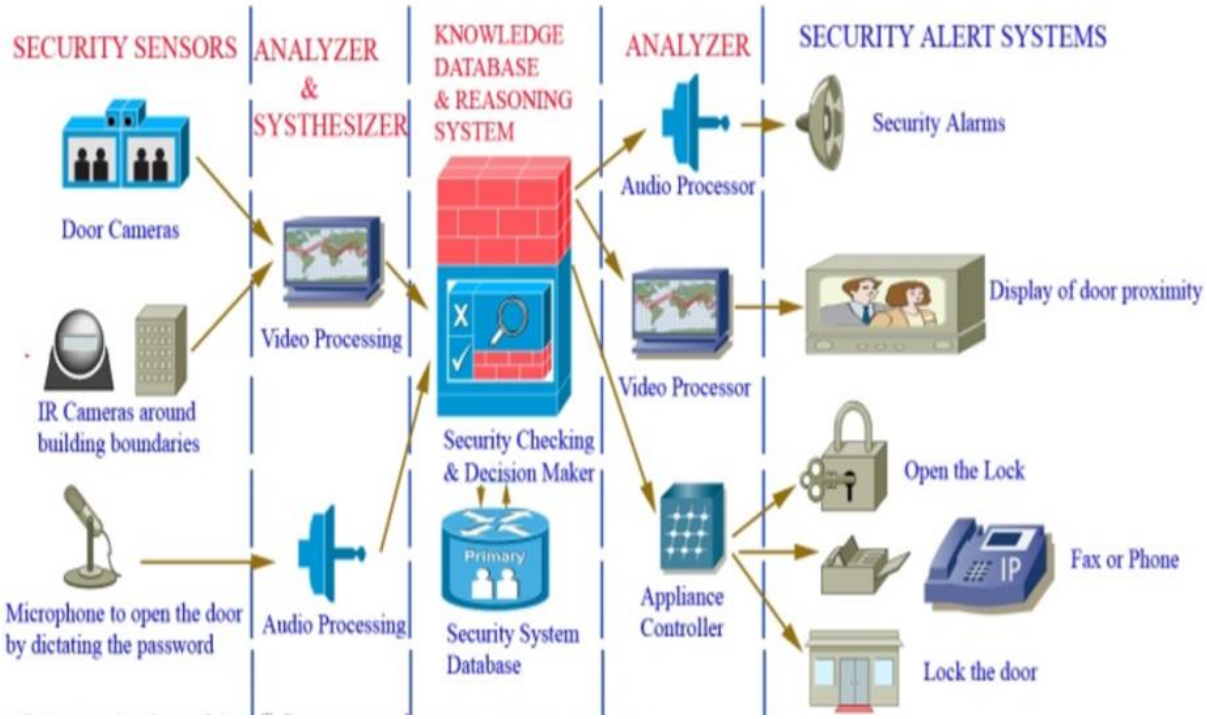
FIBARO is compatible with most voice control technologies. Simply tell the system what to do, and your wish is granted.

6. PROPOSED PLAN

6.1 IDEA

Artificial Intelligence is evolving as a technology for developing automatic systems that can perceive the environment, learn from environment, and can make decision using case based reasoning. Using Vision capability, knowledge base, learning ability, decision making and reasoning the AI provides a better solution for almost all automatic systems. Also Internet Of Things is another emerging field which has been utilized in various applications. In our system we will be combining the technology of both IOT and AI to help in remote controlling of appliances, efficient utilization of home resources and enhancing home security.

6.2 ARCHITECTURE



6.3 WORKING ACCORDING TO EACH OBJECTIVE

A. Use of proposed technology in Comfortable Systems

In these systems the application of AI is limited as most of the part can be easily implemented using some electronic circuitry. Here the only part where the AI is effective is the knowledge based database which should be learnable for system to be truly comfortable. But here we can make use of IOT by speaking on the mobile and controlling the devices by simply sitting at one place. Since AI tools are little bit costly it will increase the cost of the system but will make the system more comfortable, flexible, easy updatable etc.

B. Use of proposed technology in Remote Controlling Systems

In these systems AI can be applied in the authorizer as well decision maker stage. Applying AI at the authorizer will increase the responsiveness and security and is more applicable when the environment under consideration is an industry where security is a major concern (e.g. Banks). On the other hand, Decision making part can utilize the case based reasoning of AI for effective and efficient management as it has to decide that which of the target device is corresponding to this particular instruction. As stated previously IOT can be used here for controlling the devices remotely by using an app based interface.

C. Use of proposed technology in Optimizing the Resource Performance

In this system AI can be used to implement knowledge base as discussed for previous systems and for Analyzer as it makes it more efficient in deciding the particular

action. Moreover, if analyzer is learnable from its experience then it will make the system more optimized.

D. Use of proposed technology in Secure Systems

The biggest use of AI is in these systems. Here we can apply following tools of AI for various applications especially in security:

1) Video Processing for security threat analysis

2) Image Processing for security threat analysis

3) Audio processing for security threat analysis

4) Knowledge base system for Security system database

5) Case based reasoning for analyzer and synthesizer

6) Decision Making in Security Checking and Decision making

6.4 TARGET AUDIENCE

- Age
  It can be used by everyone above 5 years of age.

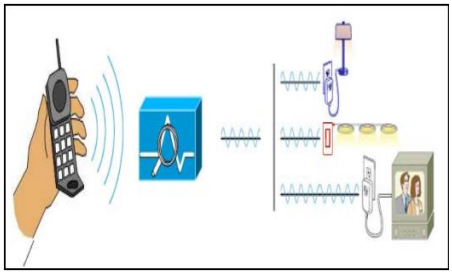
- Gender
  It can be used by both the genders.

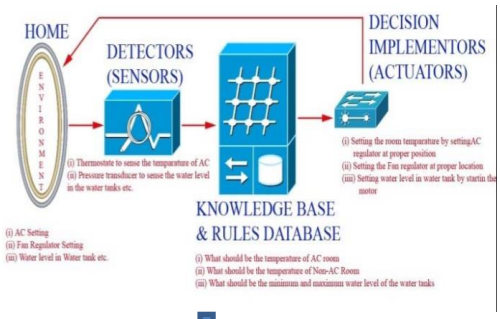
- Region
  First we would launch our system in metropolitan cities. This is because it will give us better idea of customers need and help us correct any issues before going global. Specifically it can be used by the following:

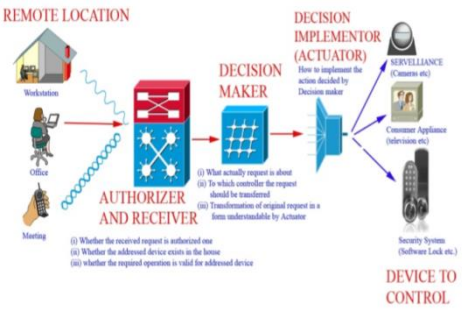
    - Home Owners
    - University Staff and Children
    - People in commercial buildings and industries

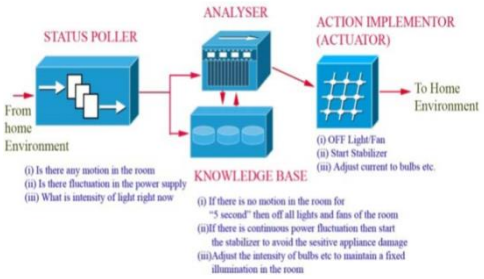
- Price
  According to the following parameters:
    - Subscriber and Acquisition costs
    - Installation and Service Costs
    - Maintenance cost of installed systems
    - Marketing campaign

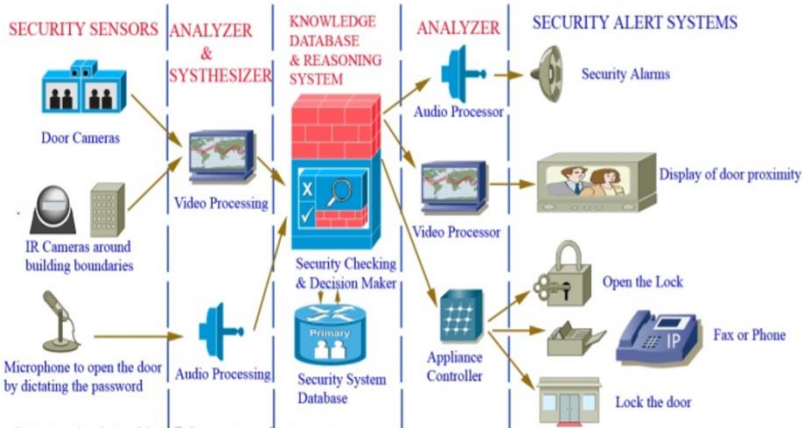
6.5 MINIMUM VIABLE PRODUCT FOR OUR PROPOSED MODEL



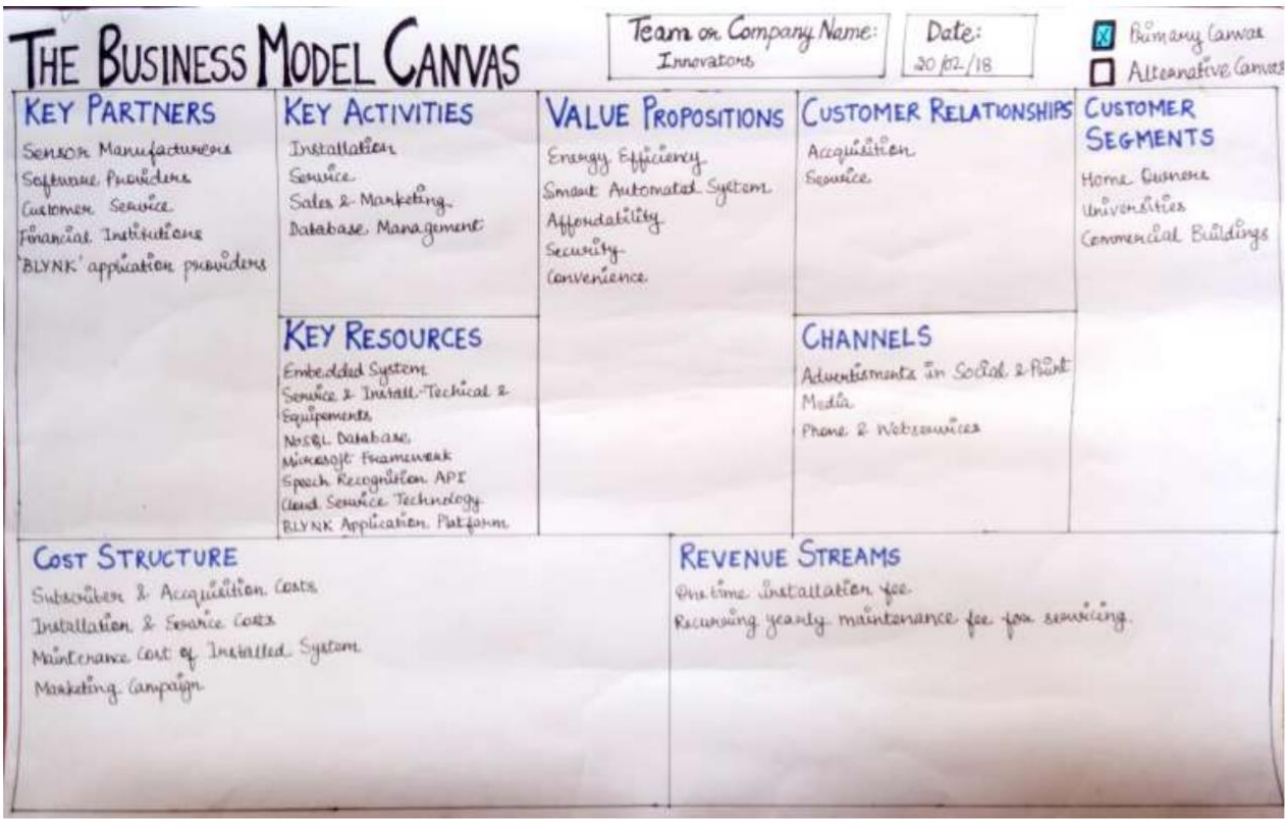








6.6 BUSINESS MODEL



7. FUNDING PLANS

- **Amount of money required**

  We will need a seed funding of 20 lakhs with 5% equity stake in our company. The seed funding can be provided in rounds, during the first iteration, we can get 5 lakhs to set up the prototype for showcasing it in the market and then in future iterations we can start receiving 2-2.5 lakhs as per the requirements, this will assure the investor that the money is not going waste. After 3-4 years in market we will need inventory and warehouses for manufacturing of our product, here we will be looking for an angel investor where we will ask somewhere between 3-5 crores for 20% stake in our start-up depending on our locations, customer base, demand and many more parameters.

- **Time of requirement of money**

  The money will be required as soon as the working prototype is ready, the money will be distributed in partitions and a burning rate will be decided for each term. Initially the burn rate will be set according to the portions of money and later it will gradually increase once the product hits the market.

- **What the money will be used for**

  The money coming from the initial seed funding will be put to use immediately for building more number of products. The app will need continuous cloud services and database support, so some part of the funding (around 5%) will be put to use for cloud services for both the app and the IOT connected devices . More concentration will be put on getting all the required parts for the products, such as sensor, actuators and processors.

8. FINANCIAL PLANNING

5-YEAR FINANCIAL PLAN OF OUR COMPANY

Innovators & Co.

FORECASTED REVENUE	Units sold annually	Average price per unit	Annual revenue per product
Smartify	250	6,999.00	17,50,000.00
Smart Switches	400	500.00	2,00,000.00
Smart Wash	210	250.00	52,500.00
TOTAL OF FORECASTED REVENUE			20,02,500.00

COST OF GOODS SOLD	Expected gross margin	Annual cost of goods sold
Smartify	30%	5,25,000.00
Smart Switches	25%	50,000.00
Smart Wash	25%	13,125.00
TOATL COST OF GOODS SOLD		5,88,125.00

ANNUAL MAINTENANCE, REPAIR AND OVERHAUL	
Factor (%) on capital equipment	15%

ASSET DEPRECIATION	
Number of Years	5

TAX	
Annual Tax Rate	33%

INFLATION	
Annual Inflation Rate	3%

PRODUCT PRICE INCREASE	
Annual Price Increase	2%

FUNDING		
Series A	3,00,00,000.00	20%
Seed Funding	20,00,000.00	5%
Monthly rate	235.03%	

9. HOW IS OUR MODEL DIFFERNET FROM EXISTING MODELS?

Our system uses security sensors like door camera, IR Cameras around building boundaries and Microphone to open the door by dictating the password. The output from these sensors is the input for analyzers and synthesizers like Video Processing Unit and Audio Processing Unit. The output from these units is passed into the Knowledge Database and Reasoning System. The knowledge base consists of a database which has multiple instances for particular cases. Like if the input is a video, the knowledge base holds records of multiple faces, objects and things to identify what that video is trying to represent. Same way if the input is an audio clip, the knowledge base will have lots of different sound waves held in its database, so as to identify what is the speaker trying to say. Generally for images, this is what is done in the knowledge base, we took it one step further to introduce Artificial Intelligence in it, where we are using a deep neural network with weights for video and audio processing. For images the type of neural network we are using is a Convolutional Neural Network (CNN) which has multiple max-pooling and convolution layers, they are a state of the art way to identify images and the extract different features from that image.

For audio processing, we are using a special type of neural network called LSTM(Long short term memory) neural network. This type of network uses a sequence to sequence model. This type of model has two Recurrent Neural Network which run in a bidirectional way, one is used as an encoder for the input sequence and the other as the input audio signal whose wavelets are used for input. This RNN produces a feature vector which has probabilities for all the corresponding words in the input. This feature vector is passed into the Decoder which is another RNN which decoded the vector and produces the output in the desired format. RNN's have been in use by Google, Microsoft and Apple, in their Chatbots which also takes in audio signals. We are introducing this technology in our IoT device.

10. INCORPORATION OF OUR TECHNOLOGY IN EXISTING DEVICES

Conventional home automation systems require you to almost rebuild your entire home because of the extra wiring needed to switch lighting and devices on or off. This is something one does not want to do when simple and affordable solutions are available. Our device can easily be incorporated in the presently existing devices in the following ways:

- We use a devise that operate as a plug between the lamp or device and the mains outlet, allowing you to switch on/off the connected load and wireless wall switch button to add an additional wall switch to any room. Next to an existing wall switch button or on a different location.
- We can use uart-wifi module which used to make traditional appliances wireless enable. It is a low cost module which will be installed in the old appliances to make them easy to connect to the internet.
- We can connect all the devices to the central management unit (CMU). CMU monitors operate and control all smart-home components by checking status and sending commands. The CMU - using application software-services, equipment, and built-in database (local DB) information - stores preferences and operation modes. With artificial Intelligence (AI) components, the CMU can manage smart scenarios and emergency situations. The CMU's independent operating system bridges between smart-home components and different interfaces.
- Smart sensors are used to monitor the environment and the stored data is send to the CMU and that control the smart IR learning module which controls the appliances according to the user likings.

11. ADVANTAGES AND DISADVANTAGES OF OUR SYSTEM

Advantages

- Convenience. All of your products will be programmed to your needs.
- Customization. You can include as many or as few of these products as you choose.
- Security. As mentioned above, smart homes are well-known for their improved security.
- Ease of use. It’s quick and simple to install these systems.
- Environmentally friendly. Thermostats, air conditioning, and lighting can all be controlled for optimal energy efficiency.
- Managing all of your home devices from one place. The convenience factor here is enormous. Being able to keep all of the technology in your home connected through one interface is a massive step forward for technology and home management. Theoretically, all you’ll have to do is learn how to use one app on your smartphone and tablet, and you’ll be able to tap into countless functions and devices throughout your home. This cuts way back on the learning curve for new users, makes it easier to access the functionality you truly want for your home.
- Flexibility for new devices and appliances. Smart home systems tend to be wonderfully flexible when it comes to the accommodation of new devices and appliances and other technology. No matter how state-of-the-art your appliances seem today, there will be newer, more impressive models developed as time goes on. Beyond that, you’ll probably add to your suite of devices as you replace the older ones or discover new technology to accompany your indoor and outdoor

spaces. Being able to integrate these newcomers seamlessly will make your job as a homeowner much easier and allow you to keep upgrading to the latest lifestyle technology.

- Remote control of home functions. Don't underestimate the power of being able to control your home's functions from a distance. On an exceptionally hot day, you can order your house to become cooler in just enough time before you get home from work. If you're in a hurry to get dinner started but you're still at the store, you can have your oven start to preheat while you're still on your way home. You can even check to see if you left the lights on, who is at your front door, or make sure you turned off all your media while you're away.
- Increased energy efficiency. Depending on how you use your smart-home technology, it's possible to make your space more energy-efficient. For example, you can have more precise control over the heating and cooling of your home with a programmable smart thermostat that learns your schedule and temperature preferences, and then suggests the best energy efficient settings throughout the day. Lights and motorized shades can be programmed to switch to an evening mode as the sun sets, or lights can turn on and off automatically when you enter or leave the room, so you never have to worry about wasting energy.
- Improved appliance functionality. Smart homes can also help you run your appliances better. A smart TV will help you find better apps and channels to locate your favourite programming. A smart oven will assist you with cooking your chicken to perfection -- without ever worrying about overcooking or undercooking it. An intelligently designed home theatre and audio system can make managing your movie and music collection effortless when entertaining guests. Ultimately, connecting your appliances and other systems with automation technology will improve your appliance effectiveness and overall make your home life much more easier and enjoyable!
- Home management insights. There's also something to be said for your ability to tap into insights on how your home operates. You can monitor how often you watch TV (and what you watch), what kind of meals you cook in your oven, the type of foods you keep in your refrigerator, and your energy consumption habits over time. From these insights, you may be able to analyse your daily habits and behaviours and make adjustments to live the lifestyle you desire.

Disadvantages

- **System crashes due to any damage in the interconnection:** If there is any damage due to rupturing of cables or the fibers the entire system gets crashed. This will not be the case of radio signals or the other signals. Here there will be a problem of signal receiving. The wiring of the system results in crash in most of the systems.

- **Human errors:** If the human does not handle the kit safely or if he/she does not use the correct keys to perform the operations, human errors may occur. Human errors also lead to destructions of the machine. Then there will be a huge system crash.
- **Reliability:** Smart devices are reliant on your internet connection.
- **High Cost:** Creation of artificial intelligence requires huge costs as they are very complex machines. Their repair and maintenance require huge costs. They have software programs which need frequent up gradation to cater to the needs of the changing environment and the need for the machines to be smarter by the day. In the case of severe breakdowns, the procedure to recover lost codes and re-instating the system might require huge time and cost.
- **Compatibility:** As of now, there is no standard for tagging and monitoring with sensors. A uniform concept like the USB or Bluetooth is required which should not be that difficult to do.
- **Safety:** There is a chance that the software can be hacked and your personal information misused. The possibilities are endless. Your prescription being changed or your account details being hacked could put you at risk. Hence, all the safety risks become the consumer's responsibility.

12. CONCLUSION

In this project we started our discussion with device controlling system by defining four major applications of these systems which are comfort ability, remote control, optimal resource utilization and security. After that we see the detailed structure of device controlling using AI and Internet of Things for implementing these services one by one explaining the working of each system and use of heuristic based tools in these systems, especially how we can work on the existing devices to make them smart devices. Then we have discussed what will be our funding plan for our product. At the last we discuss about how these differ from the existing systems and what are the benefits offered by this system.

From this discussion it is clear that IOT and Artificial Intelligence is emerging as a very useful and applicable technology for device automation. On the other hand, these automation systems provide IOT and AI a vast range of Application.

13. CRITICAL ANALYSIS OF TWO SUCCESSFUL STARTUPS

- **<u>Paytm</u>**

  Paytm started as a prepaid mobile recharge website. Currently its business is not only limited to recharge but has expanded as online payment platform including mobile recharges, utility bill payment, wallet payment and wallet to wallet and wallet to bank transfers for many leading internet based companies like Bookmyshow, Makemytrip, FoodPanda, IRCTC and many others.It was founded under the implemented idea of Vijay Shekhar Sharma and has got the first mover advantage in the mobile industry. The company has been backed up by Alibaba group and Ratan Tata.

  Paytm has different product lines such as online recharge, retail products and it also has its own E-wallet.

  Factors of success

  - Quick and Easy – Online recharge has become quite easy as now you don't have to go to any vendor, you can straight away right at your home within secs can recharge almost anything.
  - Safe and secure – Paytm has invested a lot in making the website safe and secure for users to do transaction on the website and it is also PCI DSS certified.

- Attractive deals and cashback – If any website should be given credit for the start of cashback trend online it should be Paytm. It was a unique idea instead of giving discounts they give cashback in the form of wallet money because of which the money remains with them only as customer has to do some transaction on website again in order to use that.
- Effective promotional ads – Paytm has invested a lot in promotion of its products with tagline Paytm kro and also doing effective promotion on all social mediums with hashtag #paytmkro.
- Newer deals- Flipkart started cash on delivery, yebhi started try and buy, myntra started exchange on return similarly paytm started bargain and buy in which you can directly bargain with seller ask for a price and if the seller is ready you can buy at that price.

❖ **Uber**

Uber Technologies Inc. is a peer-to-peer ridesharing, food delivery, and transportation network company headquartered in San Francisco, California, with operations in 633 cities worldwide. Its platforms can be accessed via its websites and mobile apps.

The name "Uber" is a reference to the common (and somewhat colloquial) word "uber", meaning "topmost" or "super", and having its origins in the German word über, meaning "above". In May 2010, Uber's services and mobile app officially launched in San Francisco in 2011. Originally, the application only allowed users to hail a black luxury car and the price was 1.5 times that of a taxi. During the initial development of the Uber app, the company created a think tank consisting of a nuclear physicist, a computational neuroscientist, and a machinery expert who worked on predicting demand for private hire car drivers and where demand is highest.

Factors of success

- Benefits for Customers : The service provides a ride for those individuals who need taxi cab services at reasonable prices
- Benefits for Uber Drivers : The company is creating jobs for drivers and limo companies that are having difficulty finding work in the city
- Early Adopters :They knew opening in the San Francisco area was a smart move on their part as they would have access to a highly interactive tech community who would take an interest, and be looking for services that would improve their quality of life
- Embrace marketing : Their digital marketing strategy focused on raising brand awareness – sponsorship of relevant major events and publicity ‘stunts’ such as the motorcades on President’s Day, where their tagline was “This President’s Day, take a trip in the UBERcab”
- Disrupting Old Industry : They are doing this by transforming car ownership and transportation, and re-inventing and introducing it in a whole new way.

14. CRITICAL ANALYSIS TWO FAILURE STARTUPS

- **Stayzilla**

Launched in: 2005

Founders: Yogendra Vasupal(Yogi),Rupal Yogendra, Sachit Singhi

Category: Hotel aggregator

Headquarters: Bengaluru

Brief Overview: The founders initially launched the platform as an online travel agency for hotel bookings named as Inasra. Later, they renamed the platform to Stayzilla and pivoted to a hotel aggregator model in 2010.

Funding: Stayzilla raised $33.5 Mn funding in three funding rounds – $500K in 2012, $20 Mn in 2015 and$13 Mn in 2016. It was backed by investors including Matrix Partners and Nexus Ventures.

Shutdown Reason: In a Medium blog post on February 23, 2017, co-founder Yogi announced the shutdown of the company. He described the shutdown reason as lack of local network effect, inability to expand quickly, and cost-effectively plus high costs and low revenues. Post-shutdown, however, the startup became a nationwide sensation in June 2017, when Yogendra Vasupal, CEO, and co-founder of Stayzilla, was arrested on charges of fraud for about $265K (INR 1.72 Cr) by Jigsaw Advertising Agency. Recently, the Supreme Court has given an interim order of status quo in an appeal against the insolvency proceedings of the homestay aggregator. The order thus freezes the insolvency resolution process (IRP) ordered by the National Company Law Tribunal (NCLT) in September this year.

What Are Founders Upto: The founders' LinkedIn profile still showcase the same designations. There is no further information on their current whereabouts.

Factors of failure

- The founder said one of the major reasons was that they were Forced to match prices and how they could not even recoup what they put in, necessitating very large capital requirement simply to sustain growth.
- "The travel marketplace does not have local network effects and, therefore, we can't really take a focused city-by-city approach in terms of matching supply and demand. The demand and supply for homestays was non-existent 18 months back, excluding a few small pockets. As a result, we had to invest extensively in both sides of the marketplace, creating homestays as well as guests who would choose a homestay across the country. We were actually successful at this – we have created 8,000 homestays in over 900 towns – but this stretched us thin."
- Budget accommodation for a large market like India looks good on paper, but it works on wafer-thin margins. Small hotels and homestays run on a shoestring budget, and it's hard to get substantial commissions out of them. Customer acquisition costs are high in a competitive environment. Put the two together, and you have a business model that only runs as long as there's VC money to fuel it.

- Matters only got worse for Stayzilla with the entry into India of the cash-rich and popular unicorn Airbnb, which became profitable last year. Stayzilla still had a niche in the alternative accommodation space, but its large network spread around the country could not have been sustained without more funding.
- Stayzilla was trying to raise additional capital in the past few months but the global funding winter since last year played spoilsport.

❖ **Quixey**

Quixey was a company located in Mountain View, California that called itself "The Search Engine For Apps. Users could search for an app on Quixey by describing in natural language what they want to do. The company invented a new type of search, "Functional Search," that gathered app information from review sites, blogs, social media sites, and additional sources.The technology allowed users to search across multiple platforms, eliminating the need for multiple searches using different mobile devices. In 2015, Quixey raised a $60 million investment round at a valuation of approximately $600 million. Quixey was co-founded in 2009 by Chief Strategy Officer (and former CEO) Tomer Kagan and Chief Science Officer Liron Shapira. The company spent a year and a half building Functional Search before it launched in private beta on April 7, 2011. On December 4, 2012, Quixey partnered with the federated search engine, Ask.com.

A month later, the company stated that it was powering nearly 100 million queries per month and had grown to over 50 employees. On June 27, 2013, the company announced its Sponsored Apps program, an app advertising product and Quixey's first step toward monetization. In February 2016, several executives reportedly left Quixey as the company missed revenue targets. The company shut down in February 2017.

Factors of failure

- During its lifetime, Quixey often made the press and sparked discussion because of its deep ties with Chinese search giant Alibaba, which invested over $80 million in Quixey. According to , it was Quixey's relationship with Alibaba that contributed directly to its downfall due to dish Axios armony between the two parties.
- In October 2013, Quixey raised a $50 million Series C round led by Alibaba. At the same time, Quixey signed a separate commercial contract with Alibaba for $100 million– this meant Alibaba became both an investor and a customer. After Alibaba's IPO and corporate restructuring, Quixey found the changes disruptive, as Quixey now had to meet Alibaba's weekly deliverables (instead of quarterly) and didn't believe Alibaba was holding up its end of the monetization contract. However, Quixey raised another $60 million series C-1 funding led by Alibaba the next year.
- In early 2017, Quixey found $10 million of new equity, but did not raise enough money to pay back Alibaba's full loan.
- Alibaba reportedly exercised that veto power when Quixey worked out a $10 million funding recap in February with Atlantic Bridge Capital. Axios' sources told it that while this wasn't enough to repay its Alibaba loan, Quixey thought it would have a big new customer or new investor by November when that came due.That veto by Alibaba is reportedly the trigger that prompted Quixey to try to find a buyer and decide to shut down.

15. What we learnt from the failure of the startups:

- **Stayzilla**

- The failures of Stayzilla teach us that it is important for us to know the consumer base and the market through and through. The analysis has to be done very precisely and a risk should be taken only if the loss that would incur would be minimal.
- We should also have a strong idea about our competitors in the real market. We should come up with ways to provide better facilities at a much lesser or almost equal to our competitors.
- The risk factor should be analyzed properly and the investments made should be given a bit of margin as if any loss occurs we are able to overcome that loss within a particular period of time. The cost should be managed efficiently.
- The supply and demand for the market should be previously analysed and should be tested for a smaller region beforehand.
- The consumer base should be familiar with our project. We are supposed to familiarize the consumer base with the project and the market should have some knowledge on our concept. Feedback is a must.

Quixey

- One thing which we can take home from Quixey's deal with Alibaba is that we should always maintain good relations with our investor, no matter that person/company has given you their money and trusted us to succeed, this is a big thing for them and we should always have good grounds with the,.
- Never take debt unless absolutely necessary, a lot of other startups have closed down due to reason related to debt. Debt is something which should be considered as last resort and not something which is open everytime.
- Multiple parameters should be analyzed about the deal with the investor before signing the deal, generally the argument always happens because of the equity the investor wants.
- Never give up too much equity, equity in terms of percentage is a the amount of company the investor will own once the deal is signed.
- Funding rounds are a series of steps and we should never jump to any conclusions and assume that its going to happen our way. Always anticipate the worst and be prepared for it.