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DIGITAL ASSIGNMENT-5 Lean Start-up Management

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Introduction-

Assistive devices and technologies are the devices/technologies which can be helpful to elderly people or physically challenged persons in performing their regular tasks or daily activities. To cope up with the increasing demand, both in terms of variety and numbers, researchers keep working on newer assistive devices. One such device or support is an assistive cart. The cart is designed to carry the belongings of an elderly person to nearby places, like a shopping mall, bus stop or grocery shop. A manually assistive cart (whether pushing type or dragging type) would not be useful for the elderly because of the physical effort required by the user. Only an electric (motorized) cart with necessary arrangements to automatically follow the user (elderly person) is what is ideally required. A motorized cart with such a person-following capability would require zero effort on the part of the user and is called an assistive robot cart.

An assistive robot cart needs to be equipped with an automatic tracking system, also known as a target or person-following system in the present application. Researchers have developed tracking systems for person-following robots using (a) one or more cameras, (b) other sensors or sensing devices, like laser range finder (LRF), laser range scanner (LRS), infrared (IR) emitter and receiver, RF system, etc., or (c) by combining one or more of these sensors with one or more cameras. A survey of the research literature on these tracking systems is presented in the next section.

The tracking system of a person-following assistive robot cart (PFARC) should have the following two basic capabilities:

Direction sensing: The tracking system should be able to sense the direction of movement of the target (user) like it has to find whether the user's position is to the right of the robot cart or to the left of the cart or in front of the cart, so that locomotion of the cart can be suitably controlled to always follow the user.

Distance measurement: The tracking system should be able to measure the distance of the user from the cart so as to maintain a gap with the user within a desirable range.

So, to exchange signals between man and robots, optical, acoustic and haptic signal processing systems have been used by researchers. Especially the acoustic sensors have been used to control robots like stopping them at below safe line. Industrial robots can be a substitute to medium skill

labors but the service robots should be a substitute to high skill labors. Progress in service robots development is that they can be controlled by a user without any special training with robots [3]. In fact, the service robots should decrease mental and physical burden of elderly people. As mentioned in the reference [2], service robots can be used to handle objects also like pick, handle and keep. Most of object handle robots are fixed robots (not wheeled). If an elderly is not able to handle an object by his/her hands and he/she is using the object handling service robot (OHSR) to do that. If the user wants to take the object from place to another place in his/her premises then the user can't use the fixed OHSR. So, the OHSR should follow the user where ever he goes. Then definitely, direction cum distance tracking system should be inbuilt in the service robot.

In short, PFARC should be equipped with an appropriate direction-cum-distance sensing system (DDSS) to follow the walking user and maintain certain desirable distance from him/her. A DDSS based on the use of ultrasonic beam/pulses has been developed (to sense direction only).

1: Direction and distance sensors and sensing system for elderly people, [C.Mohan and H.K.Verma]-

Elderly people need either a caretaker or a cart to carry their belongings in and around their house or to/from nearby places, like a shopping mall, bus stop etc. This paper reports the development of a direction-cum-distance sensing system (DDSS) using ultrasonic sensors for a cart to assist elderly people. The DDSS can convert an ordinary assistive cart into a person-following assistive robot cart that would follow its user/target. Instead of using infrared or vision-based tracking systems for sensing direction and distance, as reported by other researchers, the DDSS reported here uses ultrasonic beam/pulses.

The DDSS integrates the two tasks of finding the direction and measuring the distance in a single unit. For finding the direction of the target (user), an ultrasonic transmitter is placed on the back of the target, whereas two ultrasonic sensors are placed on the front of the cart. The distance of the target from the cart is measured using the classical technique of measuring the time taken by ultrasonic pulses to travel from the cart up to the target and back from the target to the cart after its reflection from the target. Performance of the DDSS in direction mode has been evaluated experimentally, which is very gratifying. Since the DDSS works with ultrasonic beam/pulses, the assistive robot cart can work not only indoor but also outdoor (where infrared emissions from the sun and other sources may cause mal-operation of infrared-based tracking systems) and

in low-visibility areas (where camera-based tracking systems may fail to work). The new DDSS has additional advantages of simplicity, ready availability of components and low cost. Some suggestions for further work are included in the last section of the paper.

2. A customizable smart shoes with location tracking function for the elderly, [WaiKit Cheng et al]-

With the aging population becoming increasingly severe, one of the outstanding problems focuses on the elderly foot care and safety. In this paper, two technologies are developed and applied for the proposed wearable electronic shoes design, which are 3D customized shoes design with data mining, location tracking function with GPS and RFID technologies respectively. The proposed technologies are integrated and applied in the prototypes with the customized shoes design. The newly developed smart shoes were successfully prototyped. It demonstrated that the proposed shoes do not only provide the elderly foot care service with customized smart design but also the elderly safety service with location tracking function effectively.

3. Lower Small-Worldness of Intrinsic Brain Networks Facilitates the Cognitive Protection of Intellectual Engagement in Elderly People Without Dementia: A Near-Infrared Spectroscopy Study, [JingWangPh.D.,[#] et al]-

Lifetime intellectual engagement may be associated with cognitive ability late in life. However, the current evidence on whether cognitive activities will improve and/or maintain cognitive function is heterogeneous.

Drawing on knowledge of the brain's intrinsic small-world organization which combines regional specialization and efficient global information transfer, we aimed to explore that whether individual differences in the small-worldness of resting-state functional connectivity (rsFC) networks would explain the variability in the strength of the association between intellectual engagement and cognitive functioning. Sixty-five elderly people without dementia were enrolled and scanned with a 52-channel near-infrared spectroscopy system.

The number, frequency, and participation hours of intellectual activities were investigated to measure intellectual engagement. Global cognition was assessed by the Montreal Cognitive Assessment. The general linear models and the simple slope analysis were employed to measure the modulatory role of network properties. The small-worldness of the brain network emerged as a moderator of the association between intellectual

engagement and cognition. Exclusively among elderly people with lower small-worldness, greater intellectual engagement, including the frequency and participation hours of activities, was associated with greater global cognitive function. Furthermore, we observed that elderly people with lower small-worldness exhibited decreased rsFC across the bilateral frontopolar areas and increased rsFC across the bilateral parietal cortex. The individual differences in the small-worldness of rsFC networks might explain the varying strength of the association between intellectual engagement and cognitive functioning. Our findings imply that the intrinsic small-worldness of the brain network might be a potential neurobiological contributor that interacts with the intellectual engagement in enhancing the cognitive ability in late life.

4: Enhance daily live and health of elderly people,

[Dimitri Konstantas et al]- As people get older, they tend to become more and more vulnerable to physical disabilities and mental illnesses. In order to prevent the deterioration of their quality of life we have created a system that helps elderly to sustain and extend their activities of daily living (ADL). Older people, especially those who may have just left the working environment, can suffer a sense of loss, particularly of value, purpose, confidence. This can lead to mood swings, isolation and possibly depression. The EDLAH2 (Enhance Daily Live And Health) project tries to combat these negative experiences of elderly people and give the opportunity for a fuller lifestyle. These older adults have a determination to live in their homes and enjoy living in their homes for as long as they can. The idea of the system presented in this paper is to bring an increased level of motivation, interest and engagement into areas that may be important but mundane. This results in a greater drive to be involved in this area of action and a positive feeling when rewards are achieved. EDLAH2 enables the continuity of motivation for elderly people. We set goals and achievements in line with realistic expectations for the older adults and importantly, we provide a guide to their well being improvement. Finally we utilize gamification in order to reinforce the elderly people to stay active and improve their well-being.

5. A novel solution for a Wireless Body Sensor Network: Telehealth elderly people monitoring:

Event-based data transfer through Wireless Body Sensor Networks (WBSN) for monitoring the health of the elderly has so far not been successfully implemented due to limitations arising from unreliable data, end-to-end delay during data transmission and the high energy consumption by sensors. This paper aims to improve reliability and

latency and to reduce energy consumption by sensors during data transmission in WBSN. The proposed system consists of an Enhanced Reliability, Energy-Efficient and Latency (EREEAL) algorithm to reduce data losses and end-to-end delay as well as improve the transmission reliability in WBSN by sending the sensor data during different time slots using Time Division Multiple Access (TDMA) analysis and by minimizing redundant sensitive data. The result shows that the new algorithm improves reliability to 98% over the data bits generated within 8 ~ 12 min and reduces latency to 0.635 compared to 0.875 ms in the 'state of the art' system. Furthermore, the reduction in latency leads to lower power consumption by sensors, reduced to 315.638×10^{-3} J/bits during patient data transmission using a tele-monitoring process. The proposed system concentrates on reducing interference with data between sensors and focuses on minimizing data loss during transmission. Thus, this study provides an acceptable range of reliability with reduced delay and lower power consumption due to which doctors at a remote site can obtain reliable data value for smooth monitoring.

Concept used-

Smart Watch-

It will be used to make calls to doctor using voice commands and it will also call to Doctor when it will detect any abnormality in blood pressure, heart rate etc. E.g. HeartGuide

Smart watch is a wearable blood pressure monitor in the innovative form of a wristwatch. It delivers powerful new technology making tracking and managing the blood pressure easier than ever before. Proactively monitor our heart health by turning real-time heart data into heart knowledge and knowledge into action. Designed with our heart health in mind, smart watch has medical-grade blood pressure monitor that possesses the tools you need to understand it.

Some of the features of smart watch include:

- Monitor blood pressure, activity and sleep quality
- Track trends over time with color-coded health graphs
- Easy access to dashboard, health history, reminders and settings
- Get daily actionable insights based on our personalized blood pressure and activity data

- Stay Within a Healthy Range- Take clinically accurate blood pressure readings with Omron premier precision-testing technology.

- Monitor High Blood Pressure- If outside a healthy range, plan to contact our doctor if readings deviate from acceptable levels.
- Track Fitness- Set goals and monitor our daily physical activity to achieve a more active lifestyle.
- Stay Connected- Use smart watch to set personal daily reminders and get notifications when you receive calls, texts or emails on our smartphone.

The design of such smart watches involves components for traditional oscillometric measurement, using an inflatable cuff within the watch band to take a blood pressure reading. There also other wearables that rely on sensor technology, which only provide blood pressure estimates.



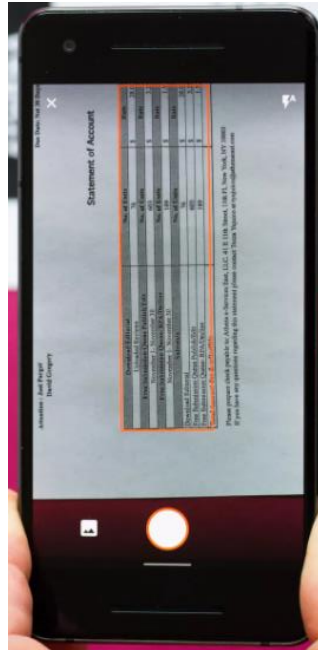
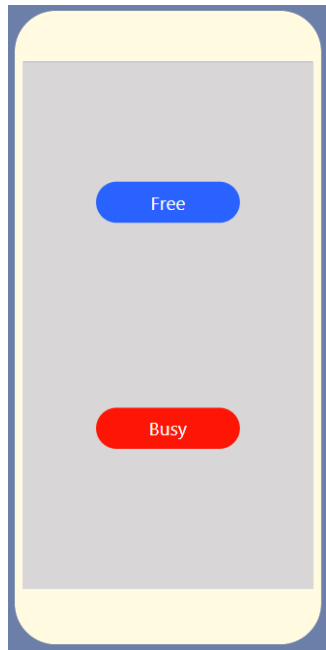
Omron Blood Pressure Monitor Smartwatch

Application-

It will be an application used by doctors to alert us whether they are busy or free. Doctors will also use this to upload prescription of patients into the database.

Free/Busy- It will be used by doctor to tell our system whether he is free or busy at the moment pick any emergency call from patient. Their will be a button to activate the status to free and to busy as required. It can be either done by doctor itself or any of its subordinates or a nurse.

Upload pic with mobile- Doctor will be uploading pic of the diagnosis report or medicine requirements in this app with mobile number who have contacted him. Some of the technologies will be used to upload on our own server we need some knowledge of backend programming. The implementation is done in node.js and PHP and frameworks like flutter.



Server-

Database- It will have information of all patients who have registered for our service. Information will contain personal information like address, contact number, relative details etc.

A database is an organized collection of data, generally stored and accessed electronically from a computer system. Where databases are more complex they are often developed using formal design and modeling techniques. Connolly and Begg define database management system (DBMS) as a "software system that enables users to define, create, maintain and control access to the database".

Example of databases include MySQL, PostgreSQL, MSSQL, Oracle Database, and Microsoft Access. External interaction with the database will be via an application program that interfaces with the DBMS. This

can range from a database tool that allows users to execute SQL queries textually or graphically, to a web site that happens to use a database to store and search information.



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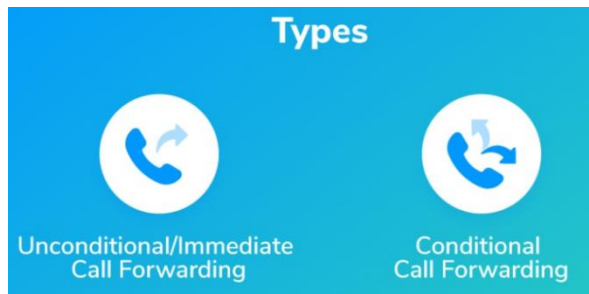
Divert calls- All patients will get a common number of hospital. This system will receive all calls from patients and it will detect which doctor is free using service of our application. After that it will transfer call to particular doctor who is free.

Apart from the aforementioned, there is another type of call forwarding feature which comes into operation under certain predefined circumstances. This is primarily known as conditional call forwarding. The situations under which it gets activated are:

- If all the phone lines are busy.
- If the phone remains unanswered.
- If the phone is out of coverage area.
- If the phone is switched off.

Conditional forwarding can prove to be an ideal solution if you prefer the call to be answered rather than directly sending it to voicemail. Unlike unconditional forwarding, conditional call forwarding does not redirect all the incoming calls. Instead, it diverts only the ones which meet the criteria mentioned above. This is precisely why conditional forwarding is considered to be a more sophisticated and dynamic system as compared to its counterparts.

With Exotel, we just need to activate the 'immediate call divert' option. This will immediately redirect all our calls to our ExoPhone. No charges would be incurred for the activation of this facility. However, the charges incurred for usage will be completely dependent on the operator.



Search address using mobile- When doctor will upload pic of medicine with contact number attached to it, this technology will be detect address of that using mobile number and address data stored in our database.

Using SQL to search for specific data in all tables and all columns of a database is far from an optimal solution. There are various SQL scripts with different approaches that can be used to obtain this information, what they have in common is that they all use cursors and system objects:

Send address, pic to any website delivering medicines-

Address of the patient which is detected using above technology along with pic of medicine requirements will be sent to any of the medicine delivering website and order will be placed based on address with cash on delivery.

Some websites offering this facility-

<https://hcah.in/medicine-delivery/>

<https://www.medlife.com/blog/medlife-express-delivery-doorstep-delivery-medicines-just-2-hours/>

STEP 1: Prescription Verification

The prescription, once uploaded, is verified for legibility by our doctors. It is analyzed on 22 parameters and medicines are dispensed according to that, right at our doorstep.

STEP 2: Medicine Availability

The availability of medicines is checked and the user is informed.

STEP 3: Packaging

The prescribed medicines undergo packaging under strict safety standards.

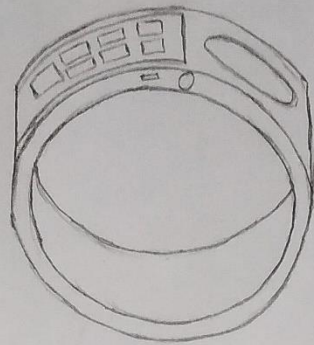
STEP 4: Delivery

Within 20 minutes of receiving the order, a delivery slot is allotted for our medicines and delivery agent is out on his way to deliver our meds at our doorstep.

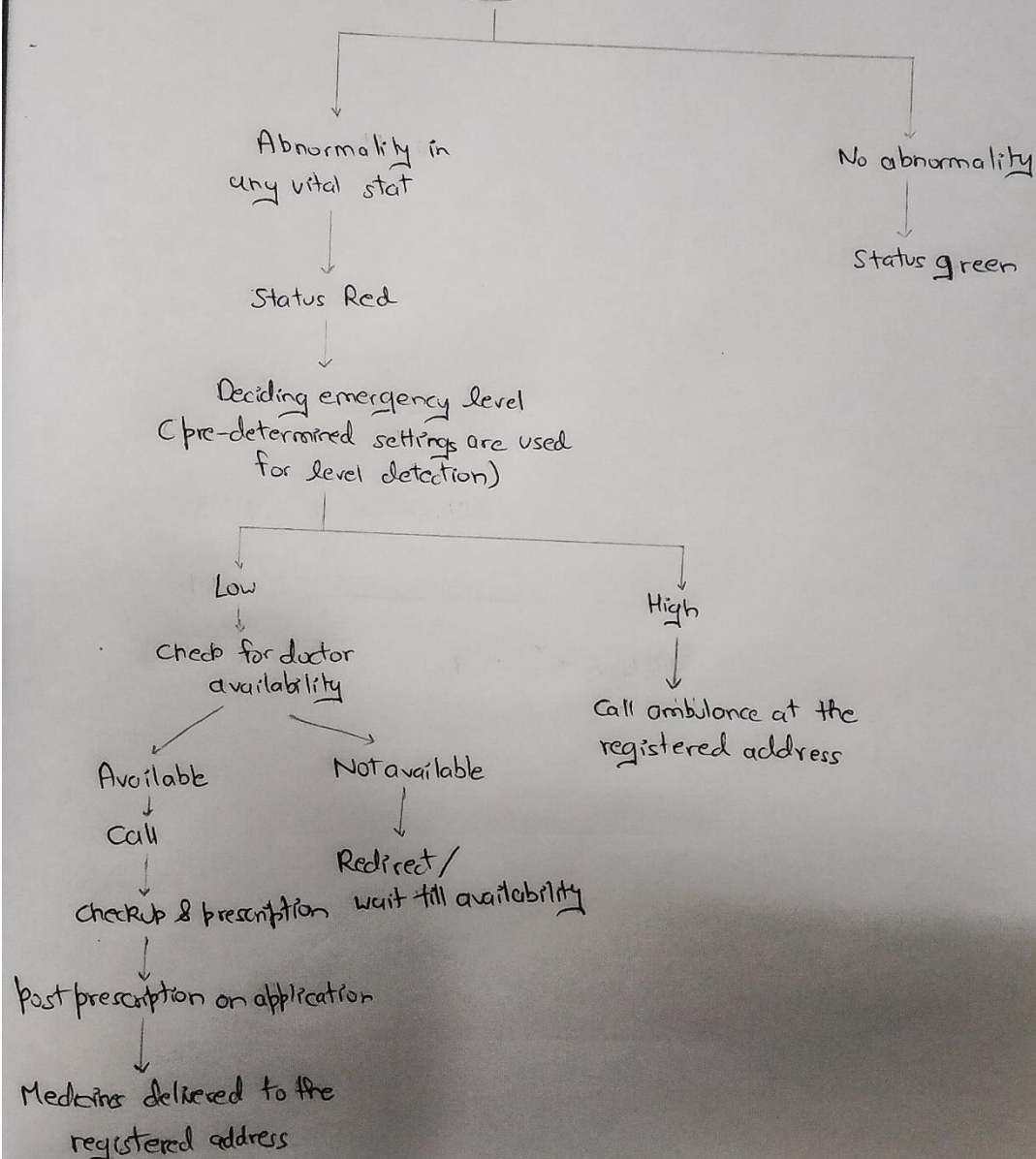
(Source: Website of medlife)



The Process flow chart



Smartwatch
Band like,
waterproof so
that it can be worn
all the time



Cost of Materials-

1:Smart watch : 10000rs.

2:Node Mcu : 2500rs

3: Microcontrollers: 1500rs.

4: app development: 1000rs

5: server hosting and dbms: 2000rs

Total cost: 17000net

Business generation-

Business would be generated by using the subscription model. The patients or elderly people would have to pay a limited amount of money something between a range(500- 1000rs) .There would be profit margin on doctors side as well as pharmacy side. Since all the services are provided from our side we have tie-ups with doctors for providing prescription and the pharmacy shops for providing medicines.

References-

- 1: Direction and distance sensors and sensing system for elderly people, C.Mohan H.K.Verma 2009
2. A customizable smart shoes with location tracking function for the elderly, WaiKit ChengHoLok LamFeiLin MingGe 2020
3. Lower Small-Worldness of Intrinsic Brain Networks Facilitates the Cognitive Protection of Intellectual Engagement in Elderly People Without Dementia: A Near-Infrared Spectroscopy Study JingWangPh.D. YueGuPh.D.d WentianDongM.D. MeiZhaoM.Sc.abceJuTianB.Sc. TingtingSunB.Sc XinYuM.D. GaoxiangOuyangPh.D. HualiWangM.D 2020
- 4:Enhance daily live and health of elderly people Panagiotis Kostopoulos Athanasios KyritsisVincent RicardMichelDeriaz DimitriKonstantas May 2019
5. A novel solution for a Wireless Body Sensor Network: Telehealth elderly people monitoring: Singh and Shah May 2017

Start-up Analysis-

EatFresh-

Founder: Rajiv Subramanian and Ashrujit Mohanty

Founded: 2015

Location: Chennai and Bengaluru.

Bengaluru-based foodtech startup EatFresh has shut down its food delivery service. EatFresh was a marketplace offering Indian and international cuisine on a daily rotating menu prepared by top chefs. Operated by Chennai-based Ubiquitous Foods, EatFresh was operating almost 50 outlets in Chennai and Bengaluru.

The idea behind Eatfresh was to control all stacks of a food delivery process, from order-taking to food preparation to delivery. “Managing the full-stack gives high margins of around 40 percent, but it also requires a lot of funds to manage processes from top to bottom. This could have hurt Eatfresh,” says an analyst who didn’t want to be named, because the startup hasn’t released an official statement on the rollback. Eatfresh claimed to have raised nearly US\$4 million in total after Kalaari Capital put in additional funds in the company in December 2015.

The message on their website said, “Dear Customer, We no longer operate our on-demand meal delivery service, and will only cater to party or bulk orders in the future. We strived to create a differentiated offering, and hope that we leave you with some happy memories.”

Rajiv Subramanian spoke with Inc42 and said, “As a company, we operate two brands Ovenfresh and Eatfresh, focussed on bakery products and meals, respectively. While both businesses have profitable unit economics, Ovenfresh generates units generate 40% EBITDA compared to 20% EBITDA at Eatfresh units. As a result, we have decided to focus our capital allocation towards the Ovenfresh brand which currently generates 90% of our revenues.”

While most food delivery services are shutting shop for good, this decision to stop the home delivery service and focus on party orders is a new and interesting change. In 2016 alone, there were multiple home delivery services that did not make it past the one year mark. The market is very competitive and when standing against the likes of Swiggy and Foodpanda and even Zomato’s online delivery service, it’s a tough market to break into.

Karma Recycling

Founders - Akshat Ghiya and Aamir Jariwala

Founded – 2014

Location – New Delhi

The idea behind Karma recycling is to address the concern related to growing E-waste in India.

With millions of devices currently in use, India has become the third largest mobile device market in the world, but due to lack of awareness and access to convenient services that allow the appropriate disposal of these devices, electronics that could be refurbished, resold or recycled are either lying in people's houses, being wasted, or disposed of in landfills.

The philosophy of Karma Recycling is “a useless device for someone can turn into a useful device for someone else”. They provides an e-platform, on which people and retailers can sell their devices, which are then repaired and re-sold or if un-reparable are recovered for parts and then recycled.

They have a very unique pricing algorithm, which delivers instant quotes for devices and offers free shipping. After answering the questionnaire, it gives an exact in-store value of the gadget to be sold and within 48 hours, the company contacts the customer. The service allows customers to trade-in over 700 models of working and non-working smartphones, tablets or laptops. It is also a government-authorized electronic waste collector and segregator and it advices corporates nationwide on the operational impacts of the recent electronic waste legislation passed recently by the Ministry of Environment and Forests.

WORK DISTRIBUTION-

1:Shashank Shukla(18BCE2522): Introduction ,Literature Survey, Conclusion and start-up analysis

2:Harsh Vardhan Singh(18BME0030): Methodology and Technology used. Cost Estimate and Start-up analysis.

3:Lakshya Mishra(18BME0096): Complete Design of the system, Sketch of the design.