LEAN STARTUP MANAGEMENT

FINAL PROJECT REPORT

SAKSHAM: An AAC Device for Speech Impaired People

Team:

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Acknowledgement:

I would like to thank our professor Dr. Jose S for giving us this opportunity to perform this project and telling us about how to build and sustain a startup following the lean ideology. Also, I am very grateful to Vellore Institute of Technology for this wonderful opportunity. It was a great leaning experience and we plan to take our idea further and develop it as real world project.

Index:

Objective:

Around 466 million people worldwide have disabling hearing loss, and 34 million of these are children. In India, for speech disability, 7.5% (1,640,868) and for hearing disability, 5.8% (1,261,722) of the population faces difficulty everyday. What we did not find was a comfortable wearable technical product for such people empowering them to express there emotions to all. Lack of expression reduces life expectancy by 10-15 years Also we found out that most of the assistive tech that exists caters to the blind. It was around a decade ago that someone is trying to build something for this community.

Need:

Social communication is one of the most important pillars of our society. We believe that people with special needs are members of this society and have the right to enjoy the communication with the external environment in an easy and professional manner. To cater to the need of a segment of people who hadn't had any innovation for them for about a decade. To create a technology to give the people with limited mobility an option to convey their feelings and thoughts. People with ALS, etc. cannot move their body at their command as easily as mute people, so these people face the problem of lack of expression a lot more than a person who is just mute or deaf. It is based on the need of developing a *smart, comfortable, easy to use* device that the people with special needs can *wear daily* without feeling awkward and can communicate not only with the people around them but also take benefits of the latest technology like *google assistant, etc*.

A lot of Manual operation.

Person's actions are difficult to understand (Sign Language is not understood by all)

Complicated to use and awkward to wear daily to work or restaurant, etc.

Conveying information takes more time.

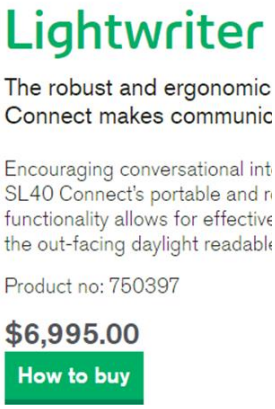
Very Expensive

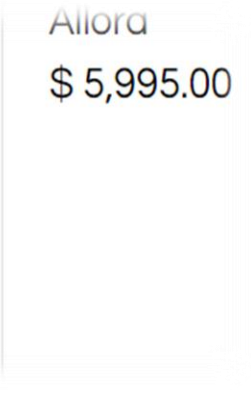
Such people are not able to make full use of the functionality provided by Google Assistant, Alexa, etc.

Competitive Analysis:

- Most people have to depend upon Sign Language which is not understood by all.
- Most people who cannot afford these devices rely on 'alphabet card'
- Yingmi Technology (glove that translates gestures developed by a Chinese VR startup); Market Price – less than $200(14.5k)

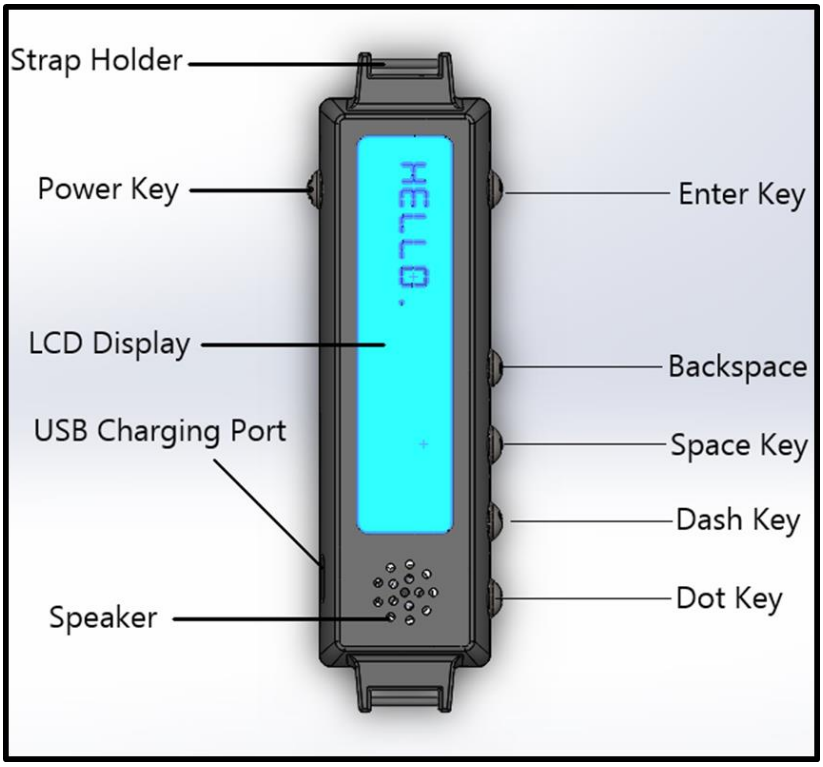
- TALK(an augmentative and alternative communication device which uses breath as the way of interaction); Market Price – $199(14k)
- SGD(Speech Generating Devices); Market Price – $400 to $800(29k to 58k)
- Allora (AAC Device developed by Talk To Me Technologies); Market Price – $5995(425k)
- Lightwriter SL40 Connect; Market Price – $ 6995
- Eye Tracker; Market Price- $ 7000

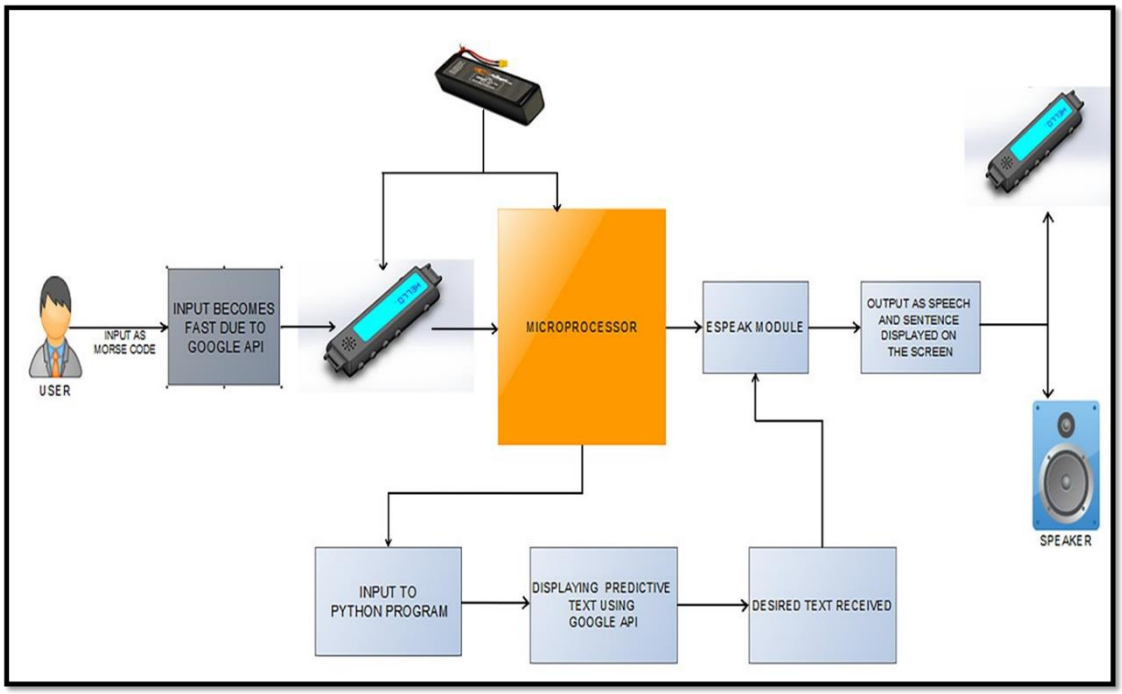




Concept of Innovation:

The aim is to create a useful and fully functional real-world product that efficiently translates the movement of the fingers into onscreen text and voice for better communication for the deaf and mute (dumb) community.
Every user of "Saksham" gets a small device, which sits, in the palm and comes with five customize-able buttons, namely, dot key, dash key, space key, enter key and backspace for Morse input. The user starts typing his thoughts using just 5 buttons, the next word and the current word being typed are suggested on the LCD display via our predictive text algorithm. Then the input is processed and given to our code. The code converts the Morse into readable text and displays it on the screen when you press enter and reads the text aloud. The output given by the code is sent to the screen and speaker via the micro-controller. This process is extremely fast. Even the input is made faster via the "Next word prediction model" making the conversation smoother.
Our device only involves two main buttons to replace a whole keyboard for the same purpose, having a full-fledged keyboard on a small daily wearable device does not make sense. Moreover, it is easier and faster for a single-handed use.


Strap Holder
Power Key
LCD Display
USB Charging Port
Speaker
Enter Key
Backspace
Space Key
Dash Key
Dot Key
HELLO.


USER
INPUT AS MORSE CODE
INPUT BECOMES FAST DUE TO GOOGLE API
MICROPROCESSOR
ESPEAK MODULE
OUTPUT AS SPEECH AND SENTENCE DISPLAYED ON THE SCREEN
SPEAKER
INPUT TO PYTHON PROGRAM
DISPLAYING PREDICTIVE TEXT USING GOOGLE API
DESIRED TEXT RECEIVED

Advantages of #being Saksham:

Effective and fluent communication

Low cost

Compact device (daily use)

Flexible to users (customize)

A lot faster (comparably)

Less power consumption

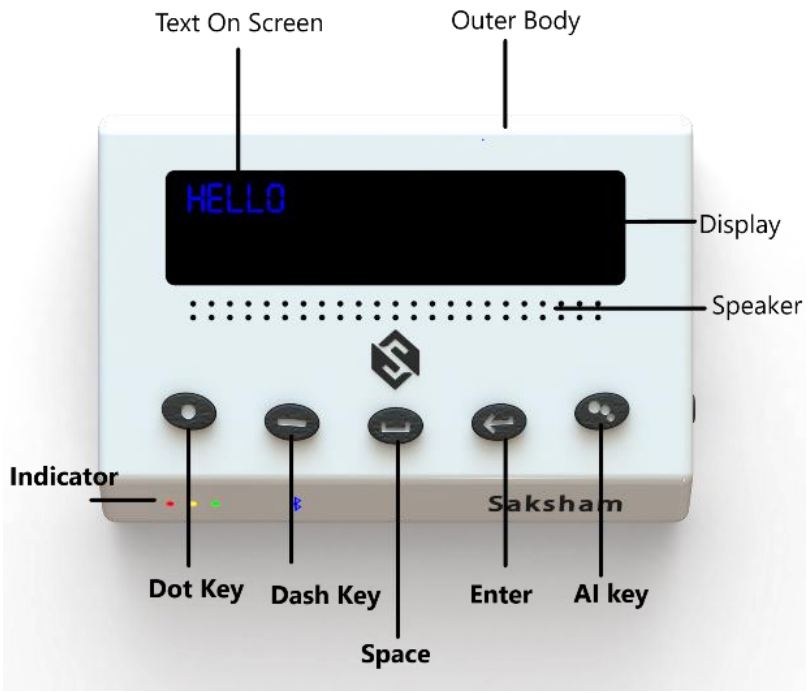
Lightweight

Proof of Concept:

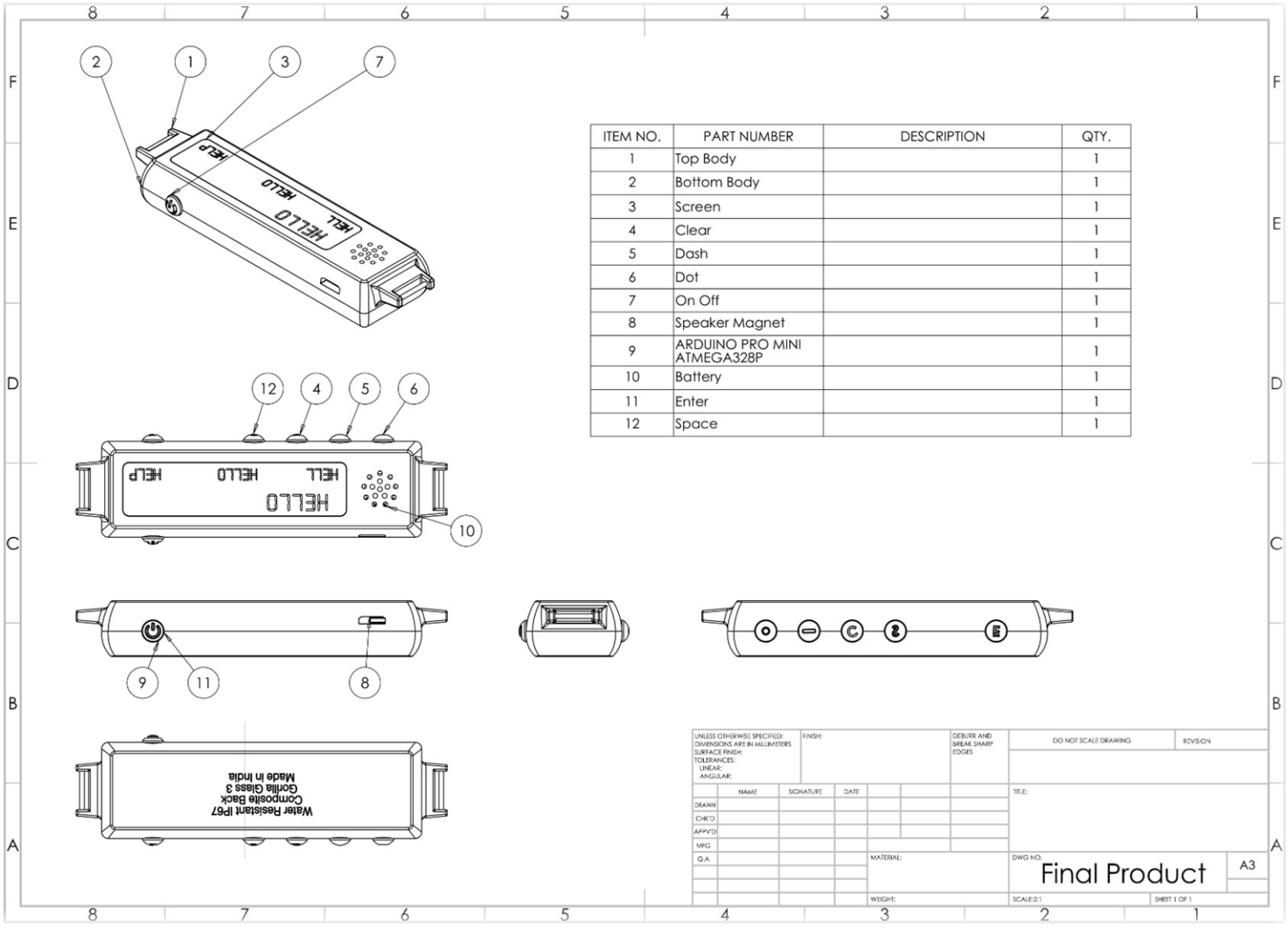
We have made the industrially designed 3D model of the device in Solidworks Software. The casing is analyzed on ANSYS Software for weight reduction and ergonomic design and is 3D printed. PCB fabrication to be done for downsizing the circuit. The hardware is easily available and we have assembled the components is done into the casing. The software is booted with the help of a computer onto to the micro-controller with our code and the chip is installed in the device. 3D printing and PCB fabrication helps us reduce the cost to a minimum.

Hardware and Software:

- Microcontroller
- RF modules
- Voice Module (ISD1820)
- LCD Display (16*2 LCD)
- Speaker
- USB charging port
- Power Supply
- Arduino
- Python
- OS Module

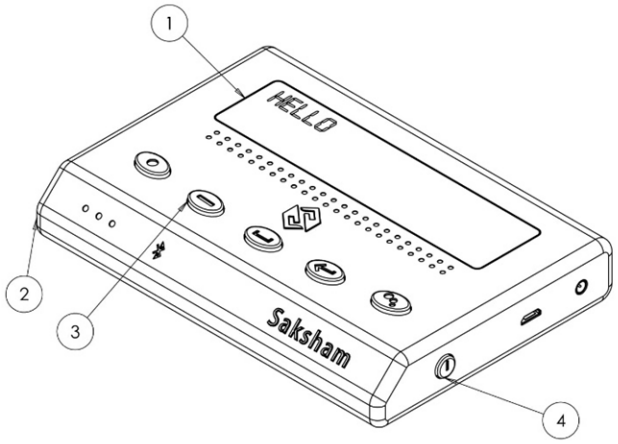


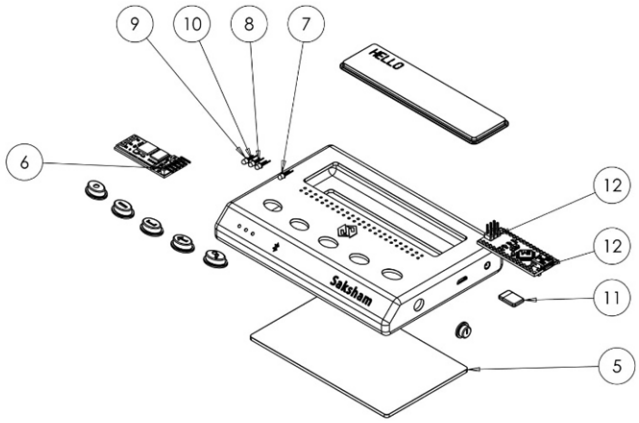
Design for Manufacturing:

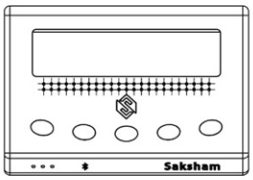


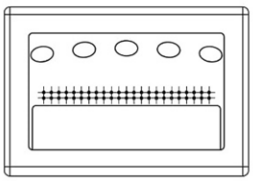
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	Top Body		1
2	Bottom Body		1
3	Screen		1
4	Clear		1
5	Dash		1
6	Dot		1
7	On Off		1
8	Speaker Magnet		1
9	ARDUINO PRO MINI ATMEGA328P		1
10	Battery		1
11	Enter		1
12	Space		1

Final Product









ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	Screen 1		1
2	Main Body		1
3	Buttons		1
4	On_Off		1
5	Back Cover		1
6	Bluetooth Module		1
7	LED Blue		1
8	LED Green		1
9	LED Red		1
10	LED Yellow		1
11	Battery		1
12	arduino nano		1

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN MILLIMETERS
SURFACE FINISH:
TOLERANCES:
LINEAR:
ANGULAR:

FINISH:

DEBURR AND BREAK SHARP EDGES

DO NOT SCALE DRAWING

REVISION

	NAME	SIGNATURE	DATE
DRAWN			
CHK'D			
APPV'D			
MFG			
Q.A			

TITLE:

MATERIAL:

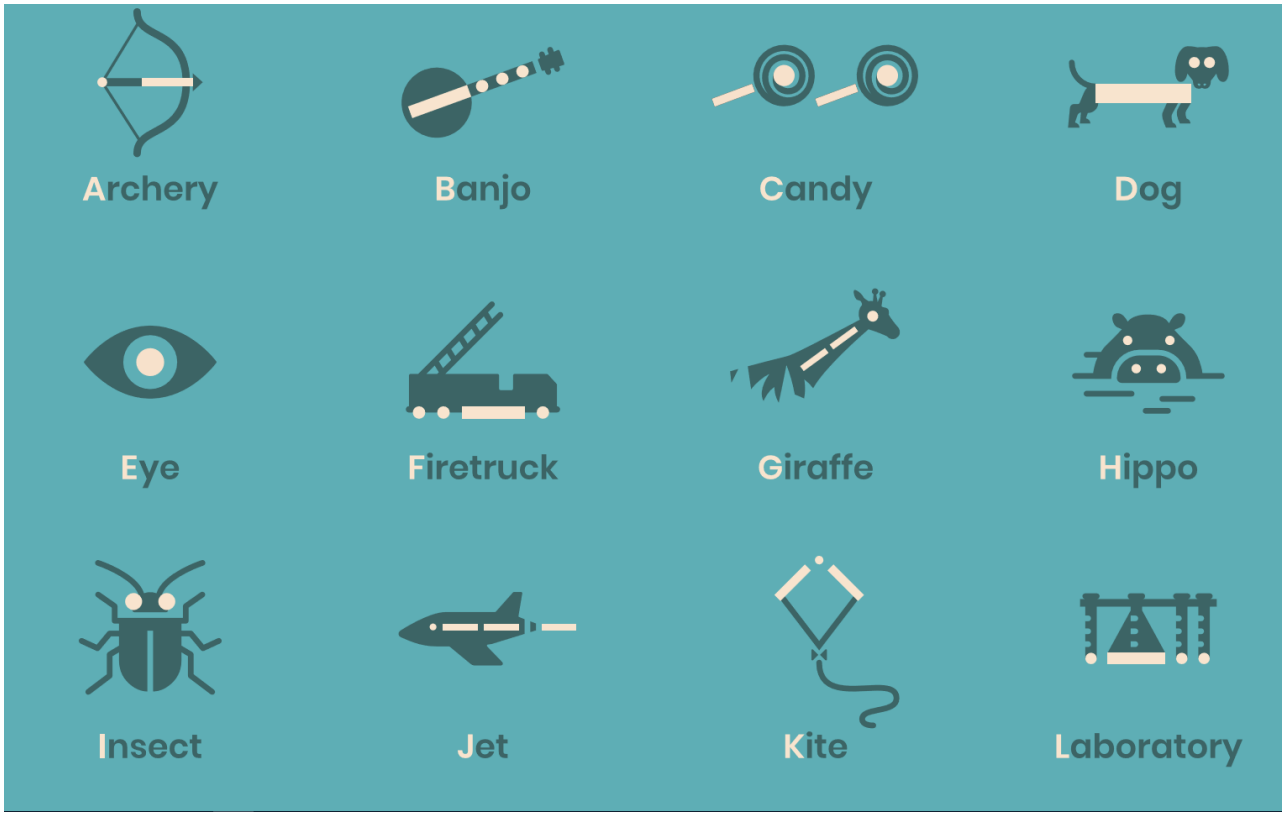
DWG NO. Final

A3

WEIGHT:

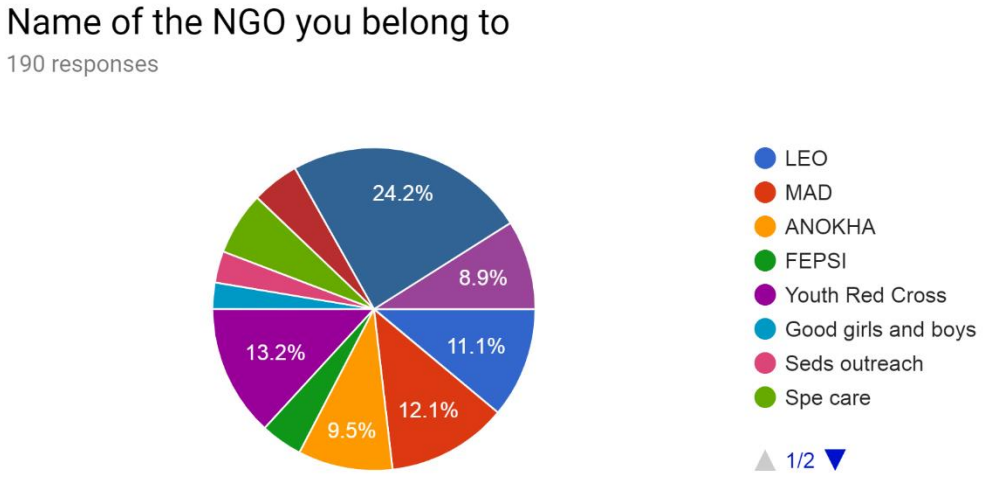
SCALE:1:1

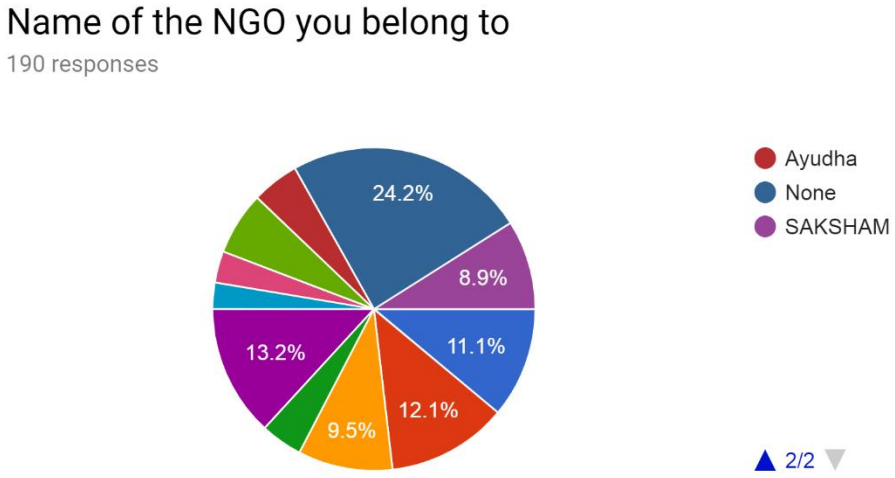
SHEET 1 OF 1



Customer Response Analysis:

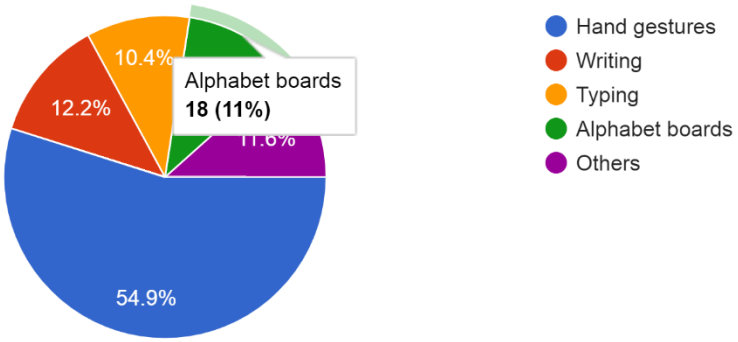
Since our customer can't give us review, suggestion, improvement which needs to be done, so we went other way to find out all these stuffs. So, we made google form and circulate it to all the NGO as well as Non-NGO members and put some question to them which we thought will help our ideas to grow. The other reason for circulating or taking reviews from NGO members is the need of funding which we must have for our startup to grow. Since our product will help poor people and NGO is doing the same, so we thought of showing our ideas to them and get funds. We got a huge response from them and most of them appreciate our ideas. We got around 200 reviews. Listed below are the reviews given by them





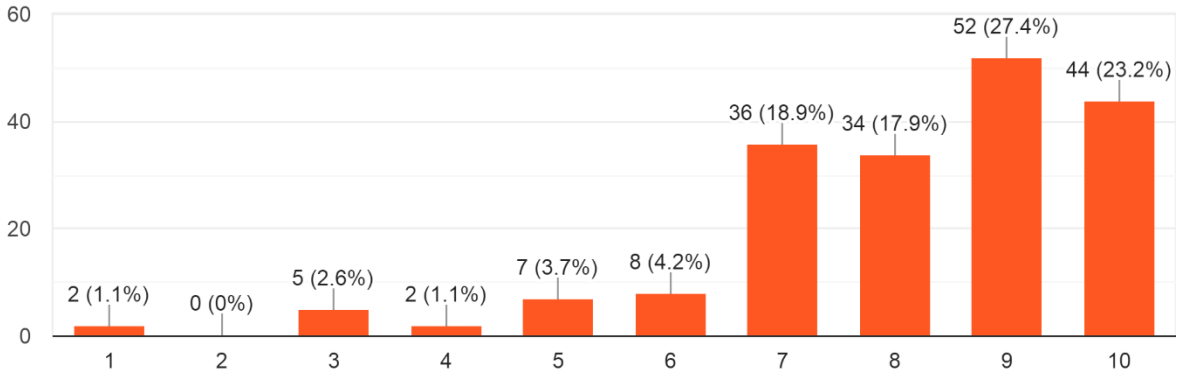
If yes for previous one,then what methods do they use to communicate?

164 responses



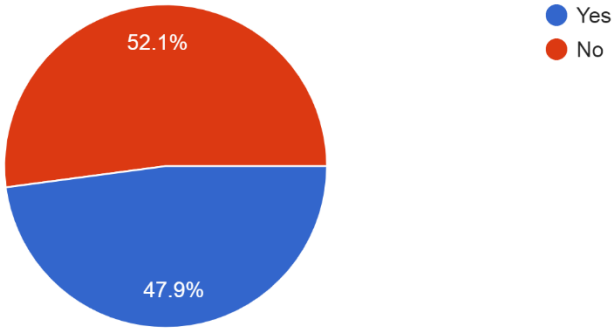
Will you recommend "Saksham" our device to those of yours?

190 responses



Have you heard of a device like this before?

190 responses



- The most important things coming out of the reviews are that most of these speech impaired people don't know about the device, so they are just using Hand gesture as medium to talk which is where our product will help
- Also, our product cost is approx. 2650 which was fixed keeping in mind about the poor people
- Our goal is to provide this device to everyone
- And when asking about our device reviews most of them have given 9 or 10 reviews to us which clearly means that they like our device

And the saddest part is that most of them doesn't even know that this device exists in the market and the reason behind it which we found is the money constraint. As the cost of device is too huge, so none of the poor people are capable of paying that cost, so they don't want to talk about it. That's why most of them are unaware.

Founders' Collaboration Agreement:

The undersigned (each a "Founder" and together the "Founders") are collaborating with the purpose of developing together a Business Concept.

A Business Concept is an idea for a business that includes the service, product, or invention, the target demographic, and a unique selling proposition that gives a company an advantage over competitors. The Business Concept also includes the related technology and intellectual property that is used to create, implement, develop, or perfect the idea. A Business Concept may involve a new product or service or different approach to marketing or delivering an existing product or service.

The following Business Concept is the subject of this agreement: Project Saksham is a project to develop and provide speech aid devices for the mute citizens.

In connection with creating the Business Concept, and in consideration for a mutually agreeable framework which will serve as the foundation for the Founders to successfully develop the Business Concept, the undersigned hereby agree as follows:

1. Transfer of Ownership to Company Upon Formation

1.1 Ownership. The Founders own the Business Concept pursuant to this Founders' Collaboration Agreement. Founders will transfer the Business Concept to Project Saksham that will be formed by the Founders upon the earliest of company formation

1.2 Transfer. Each Founder will grant and assign to the Company immediately upon its formation all of his or her right, title, and interest in and to the Business Concept, including all ideas (however formed or unformed) and labor and work product that results from any task or work performed by the Founder that relates to the Business Concept for the full term of such rights Each Founder will also perform any and all acts and execute all documents and instruments as may be required by the Company at its sole discretion to perfect title in the Business Concept.

1.3 Consent to Future Transfers. Any future agreement that requires an ownership interest in the Business Concept to be transferred to a third party before the formation of the Company must be agreed upon by each founder. In the event of such an agreement, the obligations of this Founders' Collaboration Agreement must be disclosed to that third part.

Business Structure and Ownership

2.1 Ownership Structure. Upon formation of the Company, the ownership interests in the Company will reflect the following:

Person name	Percentage interest (%)
ABHINAV SHRIVASTAVA	10
SIDDHARTH JAIN	10
ADHYAN SAXENA	10
SHUBHAM MISHRA	10
SUMAN RAJ	10
VIVIEK PANDEY	10
SHAKTI PRATAP SINGH RAJAWAT	10
RISHABH SARAVGI	10

2.2 Future Employee Interest. Should the Founders wish to reserve any Percentage Interest for future employees, any such Percentage Interest reserved will dilute all Founders equally.

Percentage Interest Reserved for Future Employees10 % (PER PERSON)

2.3 Founders as Managers. Upon formation of the Company, each Founder will be appointed to serve as a MANAGER of the Company.

2.4 Vesting. The Percentage Interest issued to each Founder will vest accordingly:

(A) ABHINAV SHRIVASTAVA (10 %) in the Company will vest pursuant to a four (4) year vesting schedule beginning [Founder 1 vesting starting date], which will vest 1/48th per month in exchange for continuous and consecutive service to the Business Concept.

(B) Additionally, ABHINAV SHRIVASTAVA vesting schedule will be subject to a one (1) year cliff.

(C) If a Founder who is subject to a vesting schedule departs the Company prior to full vesting of his or her Percentage Interest, the remaining portion of any unvested Percentage Interest will be returned to the Company in accordance with that vesting schedule.

Founders' Rights. Each Founder will have the same rights (including but not limited to voting and distribution rights) accorded to the Percentage Interest issued to each Founder.

Sale of the company. Sale of the Company to an interested third party will take place if the sale is authorized by the Managers and otherwise conforms to all applicable state and federal laws.

Confidentiality

The Founders will keep the Business Concept confidential; Founders may disclose the Business Concept only on an as-needed basis and only upon agreement of all Founders. Upon the formation of the Company, the Founders may further detail and define any additional confidentiality obligation.

Contractual Communication and Dispute Resolution

Schedule. If the Founders have not yet formed a Company within twelve (12) months of executing this Agreement, the Founders will have 30 additional days to take substantial steps toward forming the Company. If the Company has still not been formed after 30 days, the Founders will execute a separation agreement which divides rights to the Business Concept and any other assets accumulated by the Founders in pursuit of developing the business concept. The Founders will further define any and all confidentiality obligations related to the Business Concept within the separation agreement.

2.5 Mediation. In the event that the Founders are not able to agree on a separation agreement, the Founders will submit to a binding confidential mediation to be held in court and conducted by a mutually agreed to mediator. All provisions of this Agreement, including confidentiality provisions, will be binding up through the end of this mediation process. Costs of the mediation will be borne equally by all Founders.

2.6 *Note: It is recommended that the Founders insert a deadlock provision under newly created Section 4.3 that defines how the Company will proceed in the event of a major disagreement between the Founders (other than not forming the Company). This agreement does not contain this type of deadlock provision (a provision that prescribes how the Founders will proceed if there is a disagreement about a major decision). However, different deadlock provisions are detailed in endnote 19. Delete this note and consult a lawyer before executing this agreement.

3 Representations and Warranties

Each Founder represents and warrants that he or she is not a party to any other agreement that would restrict such Founder's ability to perform its obligations as set forth in this Founders' Collaboration Agreement. Each Founder represents and warrants that no third party can claim any rights to any intellectual property or other proprietary right possessed by that Founder as it relates to the Business Concept.

Here are some factors to consider when deciding how to split the percentage interests in a company:

- Consider whether equity should be split equally among Founders, but:
- Do not automatically assume that an equal split is the best option.
- If the Founders settle on an even split, memorialize a decision-making deadlock provision that will clearly state who gets to make a decision when there is a disagreement; otherwise, the company could easily grind to a halt during a disagreement (such provisions are detailed in endnote 19).
- Consider alternatives such as unequal distributions based on each Founder's contributions to the business.
- who came up with the idea that is the key to the Business Concept;
- who has the greatest stake in the IP in the Business Concept;
- who developed the technology necessary to run the Business Concept;
- who owns the patents on which the Business Concept or its products will be based;

- whether any Founder brings existing copyrights or trademarks into the Company;
- which Founders are providing the start-up capital for the Business Concept and in what percentage contribution;
- how much time has each Founder invested in the development of the Business Concept;
- whether all Founders are full-time contributors to the development of the Business Concept;
- what was the opportunity cost for each Founder to help create the Business Concept? Those who sacrificed more lucrative, high-power positions at established businesses are often compensated more for their risk than those who were not actively employed when the venture began; and

By signing below, the Founders submit that they agree to all of the above terms and conditions.

ABHINAV SHRIVASTAVA Date: 6/03/2019

SIDDHARTH JAIN Date 06/03/2019

ADHYAN SAXENA Date 06-03-2019

SHUBHAM MISHRA Date 6/03/2019

SUMAN RAJ Date 06/03/2019

VIVEK PANDEY Date 06/03/2019

SHAKTI PRATAP SINGH RAJAWAT Date 6/03/2019

RISHABH SARAWGI Date 06-03-2019

Marketing and Social Media:

Defining the target population

As the device is for the people with speech disability to communicate with the world just like normal people, thus our customer segment is unique and limited.

For this purpose, we coordinated with various NGOs in VIT like

- LEO
- MAD
- ANOKHA
- FEPSI
- Youth Red Cross
- Good girls and boys
- Seds outreach
- Spe care
- Ayudha

These NGOs helped us to connect with the speech impaired people and understanding their problem better. We also conducted an online survey in which we asked people weather they know any speech impaired person and if yes then what current method they use to communicate.

This helps us to understand the situation in more depth and better which helped us in better design and ease of our device.

Social Media

As for Social Media segment, we uses platforms like **Instagram** with username "sakshamyouraid" and in **Facebook** with username "Project Saksham".

We started a social media campaign to increase the awareness about this issue and letting people know about our solution. To reach a bigger audience we started the #SakshamChallenge where people have to make a video of them trying to convey something without speaking and only through gestures. Similar to the game called dumb charades. Many people did the challenge and nominated their friends to do the same and It increased our social media reach.

Videos showing our audiences that sometimes a small conversation like asking for a formal shoe or guessing the name of a restaurant becomes too difficult between a speech impaired person and a normal person.

Here is the link of our Instagram account on which we posted the videos:-

https://instagram.com/sakshamyouraid?utm_source=ig_profile_share&igshid=1uei51y2ztjiy

And below is link for videos in Facebook: -

https://www.facebook.com/pg/Project-Saksham-342492339939033/videos/?ref=page_internal

The idea behind these videos is to show our audiences the importance and need for a device like SAKSHAM for the speech impaired person in order to communicate with normal as well as another disabled person.

Workshops

Our device utilizes **Morse code** which is easy to learn and effective medium of communication. For this purpose, in order to educate people with the Morse code we consider to organize Workshops. We have portals and website as well as we launched an App with name “SAKSHAM” for 24/7 support. If not enough than our Group members are always there for further help and solution.

Business Model:

Key Partners	Key Activities	Value Propositions	Customer Relationships	Customer Segments
NGOs AND GOVERNMENT WILL PLAY AN IMPORTANT ROLE FOR MAKING THE PEOPLE IN NEED OF THE PRODUCT TO GET IT IN AN AFFORDABLE PRICE.	DEVELOPMENT OF THE TECHNOLOGY MARKETTING. COORDINATING WITH NGOs AND THE THE GOVERNMENT FOR MAKING IT AFORDABLE AND MAKING IT REACH THE NEEDY WORKSHOPS FOR MAKING THE USERS FAMILIAR WITH USAGE AND MORSE CODE	THE DEVICE WILL MAKE PEOPLE WITH SPEECH DISABILITY TO COMMUNICATE WITH THE WORLD JUST LIKE NORMAL PEOPLE. THE DEVICE UTILIZES MORSE CODE WHICH IS EASY TO LEARN AND EFFECTIVE WHEN IT COMES TO COMMUNICATION	WORKSHOPS FOR EDUCATING PEOPLE WITH THE MORSE CODE. PORTALS AND WEBSITE FOR 24 HOURS SUPPORT. HELPLINES AND ASSISTANTS FOR HELP	THE CUSTOMERS WILL BE THE ONES WITH SPEECH IMPAIRMENT WHO WANT/NEED TO COMMUNICATE WITH THE NORMAL WORLD.
	Key Resources A PRODUCTION FACILITY SALES AND MARKETING DEPARTMENTS WEBSITE / MOBILE APP CUSTOMER SUPPORT DEPARTMENTS OUT REACH DEPARTMENT		Channels DEVICE MOBILE APP AWARENESS BY NGOs AND GOVERNMENT AWARENESS BY WORKSHOPS	
Cost Structure DEVICE MANUFACTURING AND SERVICING ADVERTISING WEBSITE/ APP MAINTENANCE HUMAN RESOURCE SALARIES			Revenue Streams PROFIT MARGIN ON DEVICE SALES VALUE ADDITION ON DIFFERENT DEVICES SUPPORT FROM NGOs AND GOVERNMENT	

Funding:

The numbers in the start-up and the start-up funding tables are meant to reflect these estimates. The company capital will be INR. The co-owners, will provide the bulk of start-up financing in the amount of INR 4000 (INR 500 ownership each). Approximately INR 6000 additional funding is needed. The purpose of this business plan is to secure financing for that amount. The investor and co-owner are welcome to participate in the company's capital for the amount, and could be offered a portion of ownership of the company capital. The funds provided by the investor will be used to buy equipment, and to cover part of the start-up expenses. For the remaining additional financing needed to cover the start-up costs, the company plans to receive a five-year term commercial loan facility which will meet the cash flow requirements. The borrowed funds will be used exclusively to buy equipment, based on the list that will be made available to the lending institution. We will be highlighting the uniqueness of our product and advertising out product in terms of its automation and cheap price and how it can benefit farmers by folds and bounds to attract more sponsors to invest in our venture. We will also be trying to establish ventures between the farmers

and government on the basis of our product that will result in better returns and help reduce our project costs.

Financial Plan:

According to our conservative estimates, Project "SAKSHAM" is expected to maintain a healthy financial position over the next 5 years. The following plan outlines the financial development of our company. The business will be initially financed by the board members (team members). The source to repay the loan will be the cash flow generated from operations. The company will also finance growth through cash flow. After an initial period of five years, the company will be able to make a further expansion. At that time, it is envisioned that a bank loan or equity funding will be sought to finance the new development, in addition to retained earnings. The projected financial statements have been prepared in accordance with the general accounting principles, and necessarily include some amounts that are based on reasonable estimates and judgement. For accounting purposes, the long-term assets are expensed using the straight-line depreciation method, and inventory is accounted for based on the First-In, First-Out (FIFO) method.

Cash Flow Assumptions

1. Initially 500 pieces to be sold per month is assumed which is increased by 50 per

month in successive years.

2. The cost price is increased after 2 years with selling price to be increased by (to be decided amount) in successive years.

3. The salary of 8 board members will be raised by percentage ownership after calculating the margin in profit and company requirement per month after every 2 years.

4. No labour will be billed to the business except company labour.

5. Office supplies consist of other costs except salary such as rent, transport and other

bills.

6. Office supplies also has been assumed to be increased after every 2 years.

7. The break-even analysis is performed for the five-year period instead of for one-year.

8. Insurance is assumed to be paid yearly.

Break Even Analysis:

In simple words, the break-even point can be defined as a point where total costs (expenses) and total sales (revenue) are equal. Break-even point can be described as a point where there is no net profit or loss. The firm just "breaks even." Any company which wants to make abnormal profit, desires to have a break-even point. Graphically, it is the point where the total cost and the total revenue curves meet.

Calculation (formula) Break-even point is the number of units (N) produced which make zero profit. Revenue – Total costs = 0

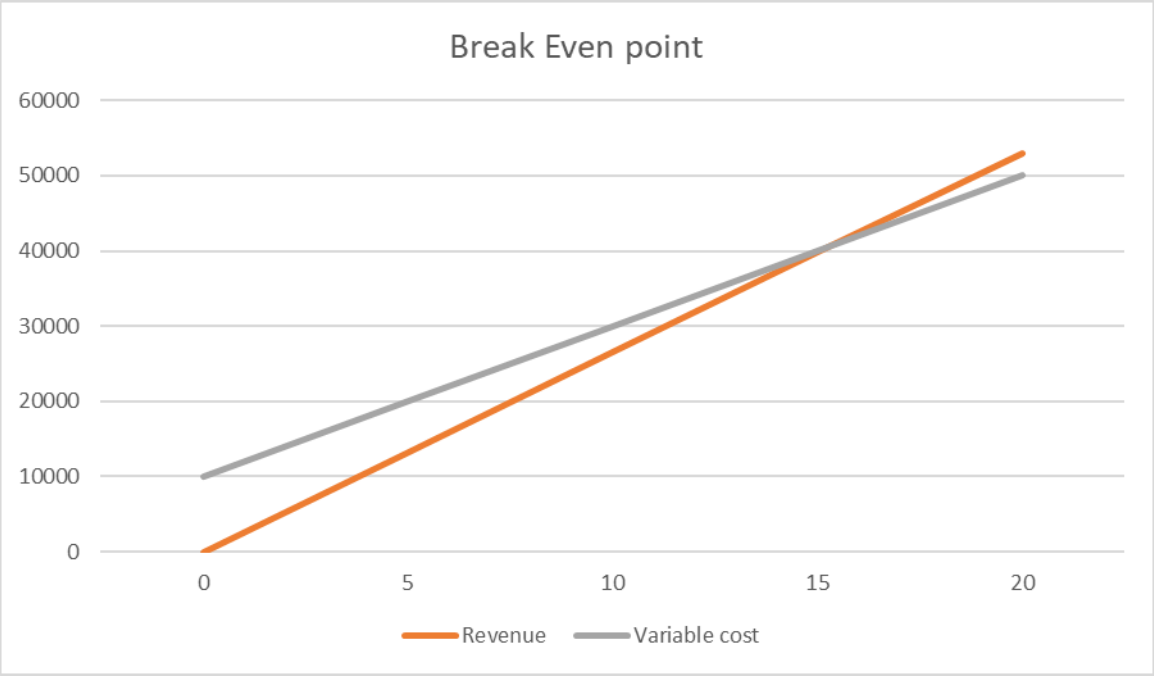
Total costs = Variable costs * N + Fixed costs

Revenue = Price per unit * N

Price per unit * N – (Variable costs * N + Fixed costs) = 0

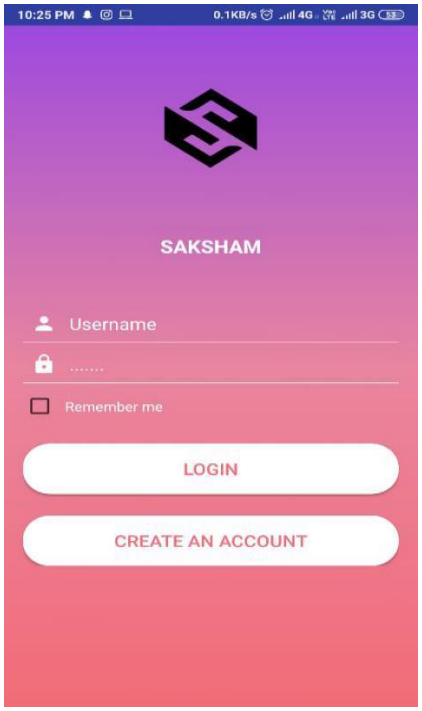
Fixed costs= 2000

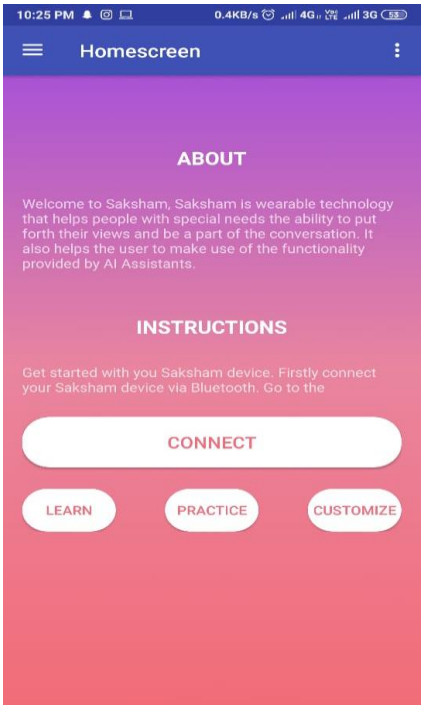
Price per unit=2650

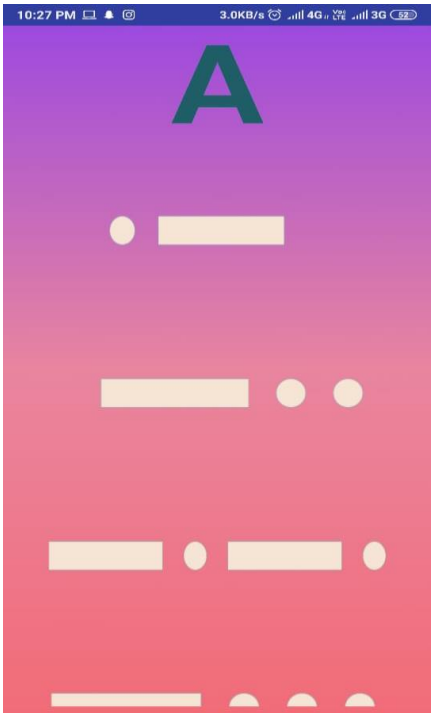


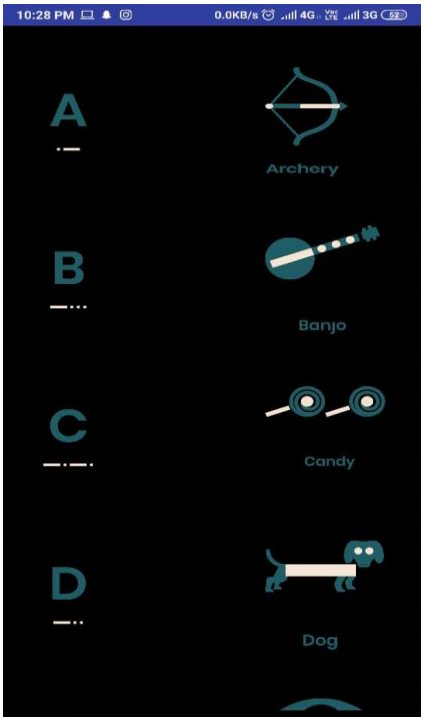
App:

Saksham app is an android based app to help users to learn and use Morse code in an interactive and easy way. It is an interactive and learning app designed to address multipurpose device solutions. This app is built on android platform using Java as main programming language.









The app provides the following features which will be useful to our customers:

- An interactive environment to connect with the device and perform various tasks.
- A great and easy platform to learn and master Morse code using object symbols.
- Practice tests in order to evaluate how much accurate are you.
- Unique login id and password for each user and device.
- Easy customization is available so that one can use this app according to his/her convenience.
- Additional setting to make the app more interactive to users.
- Customer feedback, complaints and suggestions are heartily welcomed.

We expect following outcomes from the Saksham app regarding our start-up.

- It will generate a huge convenience for our users who want to learn morse code. Instead of searching for other sources they will directly learn from this app and keep learning while using our product. Thus making people more aware this app will create an ease to use our product.
- This app will serve as platform to quickly and directly connect and interact to our users and make them aware of the new development in the device and other customer services.
- All update notifications and messages will be directly sent through this app.
- Apart from customer services, this app will also be a tool to advertise our product in the social media.
- A network will be created using this app to join all people who use our product so that they can connect to each other and share their experience and knowledge.

We have developed this app making as as user friendly as possible. We examined technical bugs with help of experts .User interactiveness and graphics was well received by people in general. We hope that this app will serve its objective in best possible way and will help our project Saksham to grow.

Exit Strategy:

Acquihires (acquisition + hiring). In this case the buyer is not so much interested in the product as it is in the team, the talent. Acquihires often lead to the closure of the products and services that have been acquired and employees end up being transferred to a company usually receive significant hiring bonuses.

IPO stands for ‘initial public offering’ and it basically means that a company starts floating on a stock market, selling a significant number of their shares in the process to institutional and non-institutional investors. These large companies are that VCs dream of, as they often provide large sums of capital to all parts involved (founders, early employees and investors).

Sell the business to a friendly Individual.

Future Work:

First step will be making the alpha prototype, by 3D printing the device body and assembling the hardware (after purchase) and booting the software. We are ready to go with the first step and it will be the first use of the funding obtained. We are confident to be able to produce the alpha within the next 4 months after funding. We want to give it to focus groups and analyse the feedback for beta.

We are making an app as well which will help the people to learn ‘morse’ with the help of interactive exercises.

The app will also allow the user to customize his/her Saksham device according to his/her own preference.
(You just have to connect your Saksham device via Bluetooth and you can customize not only the physical appearance of the device but also the buttons depending on your comfort.)

Beta app for the same is ready for demonstration. We are confident that the final versions can be made within 3 months after the funding.

We are working on adding gestures to it. As gestures are the future. *It will be implemented to add quick replies as speed dials in the device*. We can add or define our own gestures (can be done via the app). For this, we are working with another Start-Up, which makes human augmentation devices and tech based prosthetics. As one of our member works with that start-up we are confident in achieving this milestone within a year.

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