TEAM IKSHANA

# **Team Details**

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# **Description**

| Our product consists of modified shoes which can help people with visual impairments navigate through their lives.  It will consist of the following features:   1. Long range navigation via integration of Google Maps and using vibrational and acoustic cues to relay information. 2. Short range navigation coupled with obstacle avoidance using ultrasonic sensors in the first stage product. 3. Short range navigation using LIDAR sensors and data processing in the second stage product. |
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# **Motivation**

| Sticks are usually used by visually-impaired people to navigate, and nowadays smart tech-enabled sticks are also available, but this necessitates carrying around an extra accessory which not only adds to the weight to be carried around, but also easily identifies someone as visually impaired. So, we want to build a solution that helps visually impaired people navigate while also making them self-sufficient and increasing their self-confidence and solving both the problems mentioned above, while being affordable and accessible by everyone. |
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# **Flow Sheet of Idea**

| * We plan to first start with designing the circuitry that we plan to integrate into our shoe. This involves testing and calibrating different sensors. We will need to see through design and experimentation what’s the best way to embed all the electronics involved. This should take us around two weeks. * IoT based integration with Google Maps, and writing all the code to analyse the data and convey directions to the user will be our next step. This should take another three weeks. * Next, we will test our product on real world users. * Simultaneously, we will get started with stage two. For stage two, we will need to learn data processing to process the data collected by our LiDAR to provide the user with useful information about his/her environment for safe navigation. This should take around three weeks. * Integrating that with the hearing buds and voice instructions using the phone, and completing the code will be next. This should take around two weeks. * Testing this product in different environments and use scenarios will lead to completion of stage two and the project. |
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# **Current Solutions / Market Demand (Optional)**

| * Currently, the best options available in the market for this problem are smart tech-enabled walking sticks. Our shoes will be much better and preferable than sticks since they eliminate the need to carry around an extra accessory, while also allowing the visually disabled user to integrate into society more easily by not making them stand out and making them self-sufficient with navigation. * There is no such product which integrates this functionality into the shoes available in the market, except for an Austrian company Tec-Innovation(https://www.tec-innovation.com/en/innomake-2/) which make a rudimentary version of our planned product using only ultrasonic sensors and acoustic cues. Their shoes however are priced at around 3200 euros (about three lakh rupees) which is way out of the reach of most people. Our shoes will be much cheaper with the stage one product priced at less than ₹3000 and the stage two product at less than ₹9000. |
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# **Aim for In-Sem Phase (May 2023)**

| * We will start with designing the circuitry that we plan to integrate into our shoe. This involves testing and calibrating different sensors. We will need to see through design and experimentation what’s the best way to embed all the electronics involved into the shoe. This should take us around two weeks, so will be done by 21st May. * IoT based integration with Google Maps, and writing all the code to analyse the data and convey directions to the user will be our next step. This should take another three weeks, so will be done by the time our endsems start which is 12th of June. * Next, we will test our product on real world users. This we will do after our endsems get over, when the cribs will be going on, after 19th June.   Therefore, in the in-sem phase, we plan to complete the stage 1 product. |
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# **Personal Learning**

| In the first stage, we will learn about:   * Mechanical designing and circuit designing * IoT * Microcontrollers * Ultrasonic and other sensors.   In the second stage, we will learn about:   * LiDAR * Data analysis and processing * App development   Also, teamwork and planning is something we will learn throughout the three months of the project. |
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