COMED KARES
INNOVATION HUB

INNOVATION & DESIGN THINKING
COURSE OUTCOMES
Yelahanka

MAY 2023

IDT Course

In this course students will learn how to design and prototype their ideas. Through a series of lectures and exercises students will learn and practise different prototyping techniques. This prototyping course emphasises on rapid prototyping, using prototyping device and system user interfaces, design considerations and perspective for devices. This course has topics that include design methods, modelling and simulation, design, and customization. This course on a whole, enables student transition from ideas to prototyping.

Overall program Rating	4.8/5
Attendance	75.56%
Student Enrolled	41

Highlights of Batch @Yelahanka

This program saw the participation of 41 students from different institutes. The students partook in the program to come up with prototypes addressing various problem statements for their design challenge.
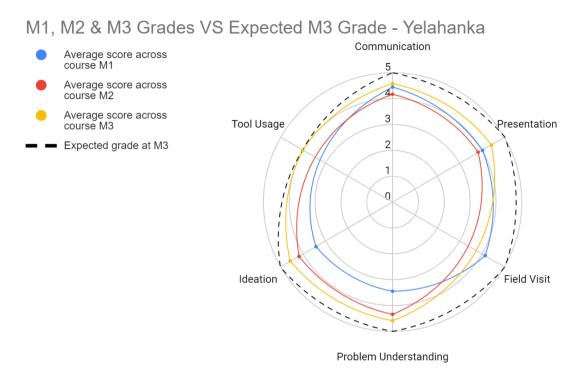
7 Projects built for the final line following design challenges

20% increase in knowledge levels and performance of students in their design challenge milestones

Post Program Findings of our Courses

IDT Course Assessment Report of Yelahanka

M1, M2 & M3 Grades VS Expected M3 Grade - Yelahanka

Legend:
- ● Average score across course M1
- ● Average score across course M2
- ● Average score across course M3
- – – Expected grade at M3

The IDT batch from Yelahanka in Bangalore, have resulted in a **significant increase in knowledge levels** Based on the course outcomes a total of 14 topic related questions were posed to the students before and after the program to see the change in their self efficacy levels. The highest score of 4 indicates complete practical expertise in the topic, and **a score of 3 means achievement of program relevant objectives**, which has been true for all the centres.

Refer the table for the tags and their relevant topics

Final Project

SMART BUS STOP

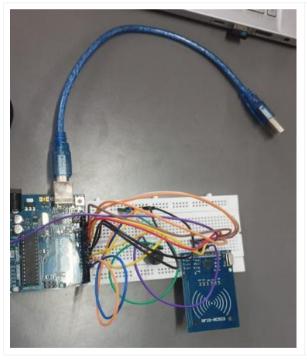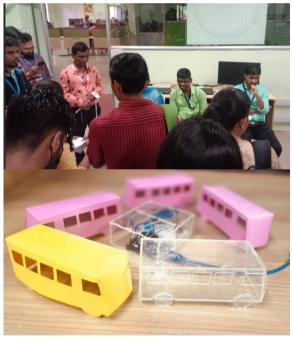| PROBLEM STATEMENT	TEAM MEMBERS
Visually impaired people find travelling to new places difficult, since they have problems identifying the bus and each time they have to ask for assistance from someone.	• K Manoj Kumar • Revanth kumar • Tasmiya Khanum H • K manjunath

IDEA

We integrate the RFID Reader/Scanner to the Arduino. A speaker is connected along with it for receiving the information according to the scanned tag. All the bus details along with their respective unique codes following all the information are preprogrammed/-stored in the IDE software of the Arduino. There will be unique tags on the bus, when brought in contact within the RFID range, the data gets announced through the speakers. This information helps the visually impaired people to know the location towards where the bus is headed.

RESULT

There will be a separate platform for the visually impaired people, and all buses will go through it. An RFID scanner will be placed on the platform and each bus will have a unique RFID tag attached to it. When the bus arrives at the bus stop there will be an audio announcement stating the bus has arrived and it is headed in a certain direction.

PROTOTYPE IMAGE

SMART CANE

PROBLEM STATEMENT	TEAM MEMBERS

How might we help visually impaired people to navigate independently using a smart cane? The current white cane helps in gauging obstacles but fails to give apt feedback unless it comes in contact with it, the current smart canes are costly and non reliant due to various technical issues.	• Manu R • Hitesh S • Pooja. N • Chandan S

IDEA

Our smart cane would help them walk with confidence and they need not carry their phones all the time because of the inbuilt vibrating system in the smart cane. Our smart cane has two ultrasonic sensors one at the bottom and one at the middle of the cane. The one at the bottom will sense obstacles on the ground. And the one in the middle will sense objects at a distance. There is a sensor at the handle which vibrates when there is any obstacle. There are two buzzers which alarms when there is any obstacle.

RESULT

With two ultrasonic sensors attached we were able to detect obstacles more accurately and after testing it out by the target user we were able to improvise our product and we got a very good review of the product from the stakeholder. This cane can reduce the accidents caused by collisions especially by objects like tables which do not have anything at the bottom and small objects on the ground which due to which a person might trip.

PROTOTYPE IMAGE
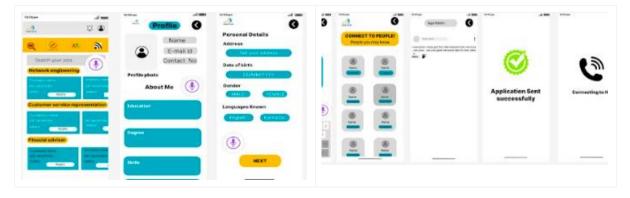
JOB HUNTING APP FOR THE VISUALLY IMPAIRED

PROBLEM STATEMENT	TEAM MEMBERS
Most visually challenged people find difficulty in finding suitable jobs based on their merit. This not only brings down the morale of the person but also instills a sense of insecurity within the person. The current solutions are specialized training centers, job finding apps and social media, this requires a third person to mediate and is mostly cumbersome. Due to the involvement of multiple individuals the visually impaired person is affected psychologically as well.	• Chetan A • Pragathi B R • Kusuma S • Chandrashekar K R

IDEA

We are trying to create a job offer app where they can find a job easily through our app by one click. They can access their account by filling their resume using voice assistance. After the resume is filled, the jobs related to their resume will be notified through audio messaging. This makes it a lot easier to navigate through job offers and can contact the job provider of their choice.

RESULT

The team has built a high fidelity prototype of an app using Figma. This app acts as a bridge between recruiter and the visually challenged person. Our app uses voice assistance and talk back features to fill in all the login credentials as well.

PROTOTYPE IMAGE

SMART CHESS BOARD

PROBLEM STATEMENT	TEAM MEMBERS
Visually impaired people confront a number of visual challenges every day while playing games which is a natural stress buster. Some of the games available in braille versions include chess ,playing cards , monopoly, ludo etc. They always need a visual assistance guide to help them navigate through these games.	• Pavankumar HN • Lekhan P Simha • Karthik.D • Amulya M G

IDEA
We created a working prototype of a smart chess board for the visually challenged. The outer body was designed, cut and engraved using a laser cutting machine. Push buttons were inserted under the checkboxes of the board to maneuver the moves of the players. The push buttons were connected to an arduino which is further coupled to a speaker. The moment a pawn is placed the speaker will give an output, this output is unique for each cell.

RESULT
Our chess board is an advanced version of the basic braille chess board. We have push buttons underneath every block and it is linked to an Arduino. When the visually impaired player keeps the pawn they will get to know the location and placement of the pawn by audio format and the player can read the position of the chess piece without another person's help.

PROTOTYPE IMAGE

BIONIC EYE

PROBLEM STATEMENT	TEAM MEMBERS
Visually impaired people face a lot of issues leading their day to day lives,and they mostly depend on others. Our team spoke with two of the stakeholders, that is Mrs. Lakshmi Mam and Mr. Naresh Sir and Miss Lakshmi Mam. On our field visit, we met and understood our stakeholders (visually impaired) what problems they face in their daily lives. There were many. Our team chose one of them. Having no vision is one of the major ones.	• Jahnavi Raj • Mithil • Ganesh. D p • Shivakaran A • SAnirudh M R

IDEA

Using bionic technology to build a prototype,wherein it enables our stakeholders to have a normal vision. Our ikshana 2.0 project helps the visually impaired to have their vision similar to normal people. A project that is focused on providing vision using some electronic devices which help them to lead a new life with vision. The proposed design of this study can be produced to solved, by building a new artificial vision for them. The team was able to successfully build a prototype of a bionic eye using an ESP 32 camera module, and ultra sonic sensors. The prototype is mounted on the frame of the spectacles, this gives us the visual input. Ultra sonic sensors are fitted on either side of the frame to check if there are any obstacles on the side.

RESULT

Now its just in the concept stage and requires some technical and medical guidance for its completion. The current prototype helps to detect obstacles from side and let let the person know. And it has a camera attached to it with which the person will be able to see.

PROTOTYPE IMAGE

COLOR DETECTOR

PROBLEM STATEMENT	TEAM MEMBERS
If a person is visually impaired they find it almost impossible to identify colors and have a feel about it. Perception of color is not just an aesthetic attribute but also a necessity in certain areas of day to day life. As our stakeholder is devoid of vision it becomes all the more difficult for them in understanding the same.	• Shashank .T.M • Varshini.s • LAVEENA P • Vikas Gowda V N

IDEA

Our color detector helps the visually impaired to learn about colors and identify them. A project that is focused on designing a Color detector device with voice output is then conducted to support them to live independently. The proposed design of this study can be produced to solve problem of color identification for the visually impaired people
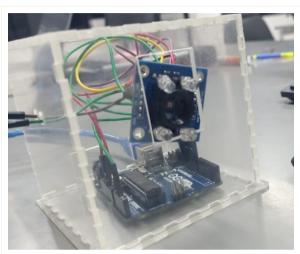
RESULT

Our color detector helps the visually impaired to learn about colors and identify them. A project that is focused on designing a Color detector device with voice

output is then conducted to support them to live independently. The proposed design of this study can be produced to solve problem of color identification for the visually impaired people

PROTOTYPE IMAGE

BRAILLE TAB

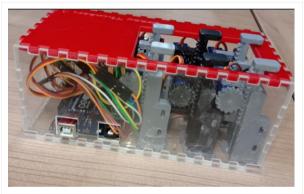| PROBLEM STATEMENT	TEAM MEMBERS
The braille code is one of the most efficient codes which any visually impaired person can read and communicate amongst themselves. It not only helps in communication but also is one of the primary sources by which they attain knowledge. The physical translation of a book completely to braille is cumbersome, time-consuming and costly. The lack of availability in braille text has people shifting to audio books, also audiobooks and podcasts become boring after some time, and they do not give the feel of a physical book. The stakeholder wanted a device which converts English text to braille and is accessible by all.	• Sangeetha A • Jayanth N B • Tharun R • Anubhav s

IDEA
The team created a braille converter using servo motors and actuators which were 3D printed. The current prototype is using Arduino as the processing unit which converts English alphabets into braille code. This code is given as output to the actuators which move the dots high or low depending on the input alphabet.

RESULT
The braille tab converts English text to braille text code. So they can read any kind of books and acquire knowledge. Unlike regular screen readers, a person with hearing and visual impairment will also be able to use it.

PROTOTYPE IMAGE

TEXT TO SPEECH CONVERTER

PROBLEM STATEMENT	TEAM MEMBERS
How might we help visually impaired person to communicate effectively with people who are speech impaired. Our goal is to develop a hassle free communication channel bridging the gap across disabilities. Currently they usually involve a third person for translation and cross communication, this is mostly a long and cumbersome and most of the essence of	• Tharun.g • Meghana • Rahul Kumar Jha • Varun M V • Yuvaraj.A

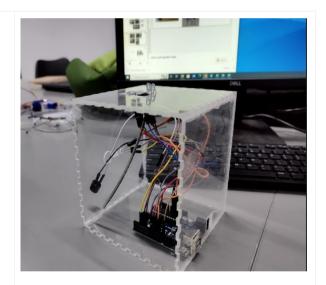|	
communication is lost via translation.	

IDEA
Our prototype consists of voice recognition which will convert voice into text, which will then be sent to an LCD screen, this helps the hearing impaired person read the message. It also consists of a Text-to-speech module which will take text from the keyboard and convert it into voice, so the visually impaired person can hear it.

RESULT
Now a visually impaired person and a person with hearing disability can communicate without any barriers. Now the device is bulky but with proper technical support we will be able to make this device compact enough to carry it around or integrate it with existing devices.

PROTOTYPE IMAGE

White Fly Infection

PROBLEM STATEMENT	TEAM MEMBERS
White fly infection is a serious problem farmers face especially in tall trees like coconut trees where its difficult to reach below the leaves. This is a major issue because even with the existing solution its difficult to	• Nawab Mehak • N Roopashree • Radhika M

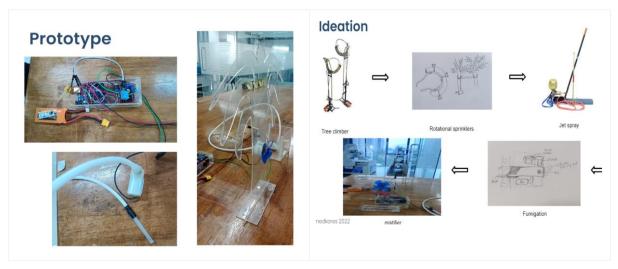| completely prevent white fly infection. So how might we help them reduce	

IDEA

As the white fly infection in trees and plants usually occurs in warm regions and mostly during summers, we developed a prototype that maintains the humidity of the environment around the trees so we are able to directly prevent white fly infection. Our idea basically is preventing the infection on the whole by using the appropriate tools and software by monitoring the temperature and humidity and when it crosses the threshold then spraying water to maintain it. This tool will be attached to the trees around the farm based on the wind direction so that the sprayed water reaches all over the farm.

RESULT

We built a low fidelity prototype of a sprayer that detects temperature and humidity using dht 11 and when the temperature or humidity crosses the threshold it sprays water into the air till the temperature or humidity comes back to normal.

PROTOTYPE IMAGE

Re-Use of Coconut Rachis Waste

PROBLEM STATEMENT	TEAM MEMBERS

Coconut rachis, even with a lot of uses are being wasted in farms due to it quantity. And due to its fibrous and hard nature it doesn't decompose easily. And burning it results in a huge carbon emission. So How can we manage coconut rachis waste in a sustainable way.	• Rakshitha R • Anushree • Bhuvan Krishna K • Ajay A

IDEA

Cutting the rachis into small pieces and then drying it for two weeks. Then crushing it and grinding it to powder, separating the fibers . Then we mix this with organic fertilizers and manure and using it with soil to plant sapling.

RESULT

We crushed the rachis into different sizes and tested our concept with various types of seeds like green-gram, mustard, chili etc. And we found shocking results from medium sized pieces by the 6th day the plant has given flower.

PROTOTYPE IMAGE