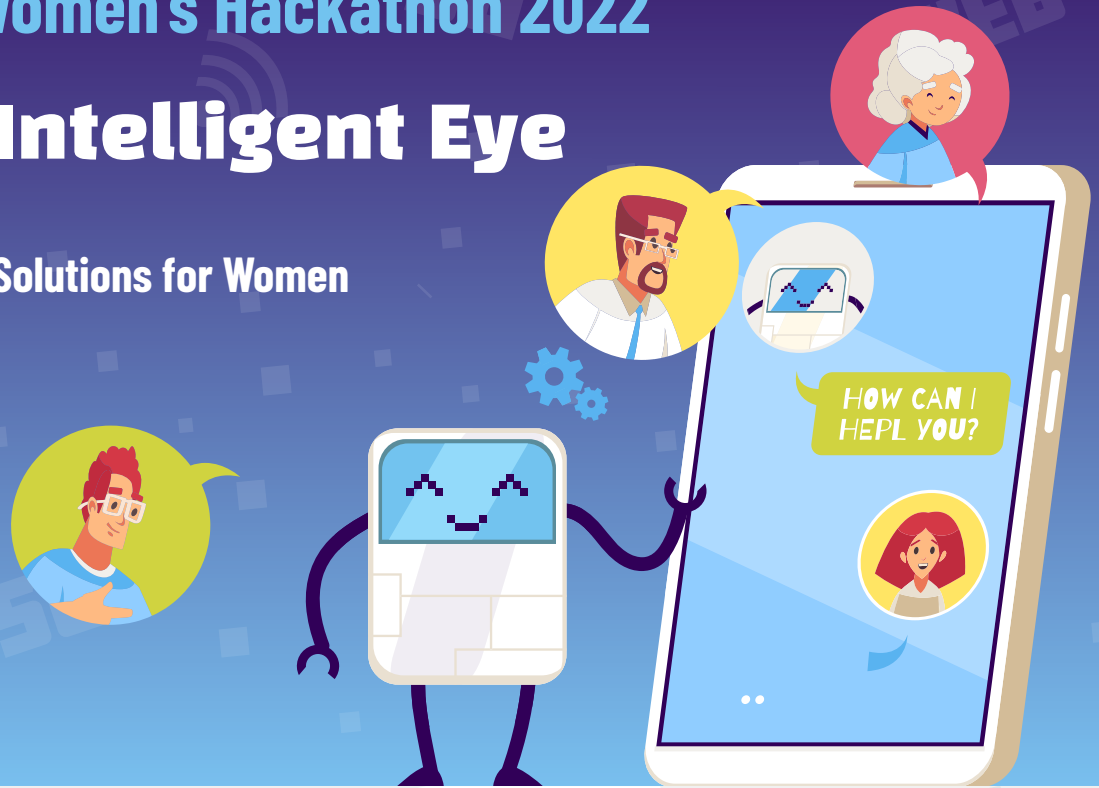
## Microsoft - Azure Women's Hackathon 2022

# Drishti - The Intelligent Eye

**THEME :** **Invent Tech-Based Solutions for Women Empowerment in India**

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# Problem Statement

It's not easy for visually impaireds to navigate around places on their own, read text, know about their surroundings and seek help from others in this busy world.

How can we help them and provide them with 24*7 assistance so that they can feel safe and content?

# Problems Faced by Visually Impaired

- Access to Information
- Societal Stigma
- Often living in isolation
- Difficulty in navigating around
- Safety Concerns

# Statistics

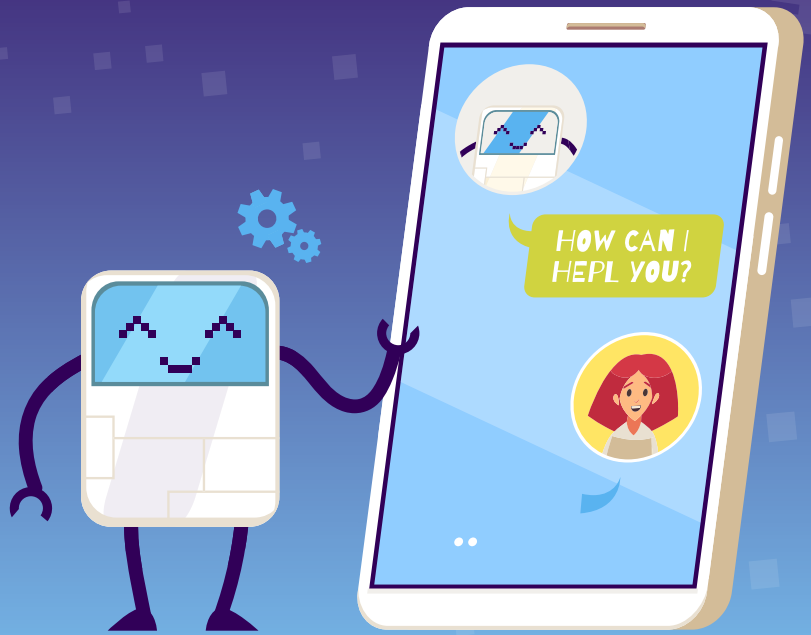
- Globally, 1.1 billion people are living with vision loss in 2020 out of which 43 million people are blind
- The numbers are said to increase three folds by 2050
- Of the 1.1 billion people with vision loss, 55% are female
- 89% of them live in low and middle income conditions, with no treatment due to ignorance and bias
- 73% people over the age 50 suffers with visual impairment and loneliness more, especially prevalent in women
- 40% people with visual impairment reported head accidents at least once a year
- 1 in 200 females are color blind

# Market Analysis

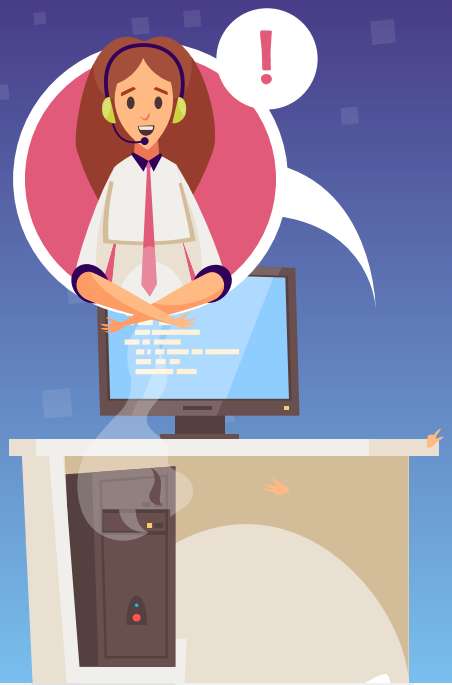
Products available in the market:

- vOICe
- IrisVision
- eSight
- Jordy
- MyEye2

**vOICe** - Expensive and not customized for Indian Market
**IrisVision** - Cannot tell about the surroundings, time or brightness outside
**eSight** - Battery operated - nedes to keep track of charging from battery, restricts movement
**Jordy** - Battery operated
**MyEye2 -** Cannot tell about the surroundings



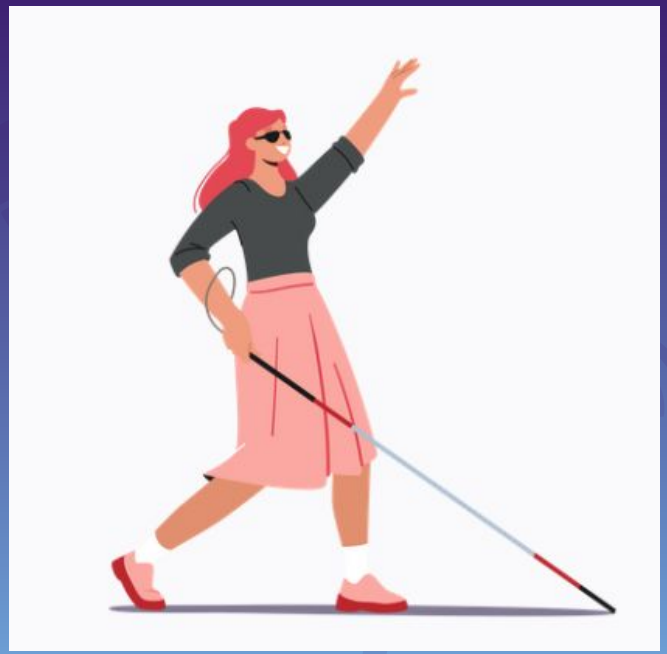

# Proposed solution



We propose a voice assistant specifically aiming towards aiding the visually impaired.

This system is used to help visually impaired people access the most important resources that improve their living conditions, using various custom layouts and using speech synthesis.

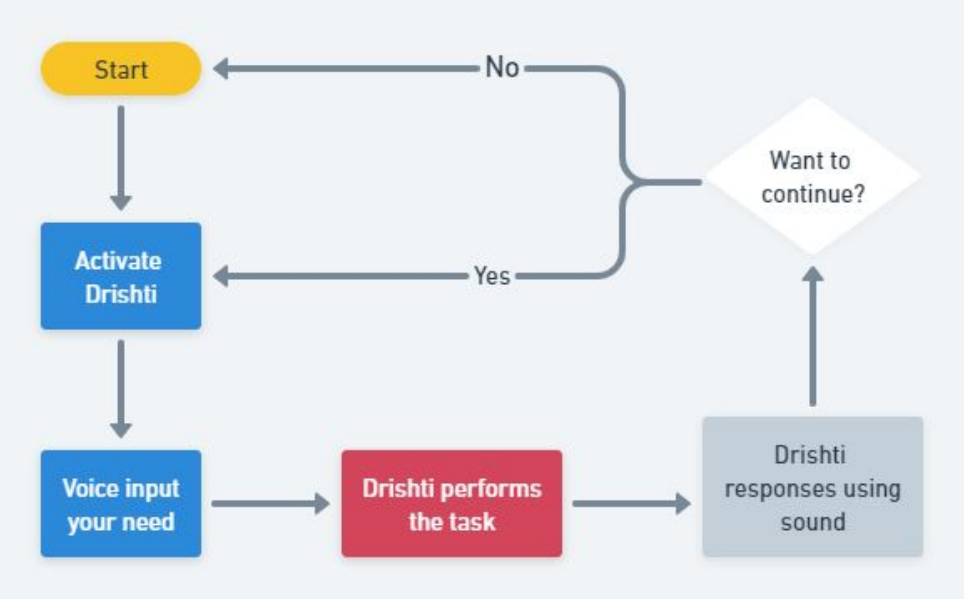
The system performs tasks based on the input (in form of speech) given by the user and responds back as speech.



**Intelligent Eye aims to make visually impaireds happy and independent**

# Methodology used

# Overview of Drishti: Voice Assistant



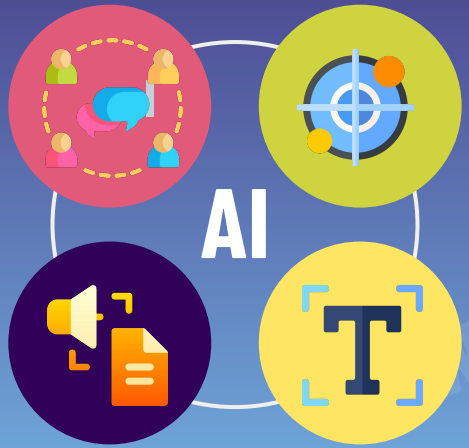
# Our process

## Identify intents

Detect intention through the user's voice input

## Text to Speech

Intelligence that makes the texts audible




## Object detection

Detect objects to help users visualize the scene

## Speech to Text

To convert speech into text

# Identify Intents

To get the most out of this helpful voice assistant, it was critical to establish a good conversational flow. The following elements are included:

- Greetings
- Understanding the user's requirements
- Providing pertinent information
- Concluding the talk

The most significant aspect of all of them is accurately identifying the user's needs. We utilized **LUIS** (Language Understanding) - cloud based AI service owned by **Azure** to extract valuable information in conversations and interpret the user's purpose (intents).

# Speech - to - Text

As the user's input will be in the form of speech, it must be transformed to text so that the functionalities may be simply handled.

We used **Speech-to-text** from the **Speech service,** which is part of **Azure Cognitive Services**, to convert speech to text.
Speech-to-text, also known as speech recognition, enables the transcription of audio streams into text in real time and in batches.

# Object Detection

Our project's main goal is to assist vision impaired people in visualising the world. Any scene that is captured can be visualised as a collection of objects. These are objects that we perceive in our daily lives, such as people, vehicles, trees, glasses, etc.

Our project makes use of the **Microsoft Azure** owned **Computer Vision Image Analysis** service to correctly recognise and name objects in the surrounding. The **OCR** capability of this service is also utilised to extract text from images.

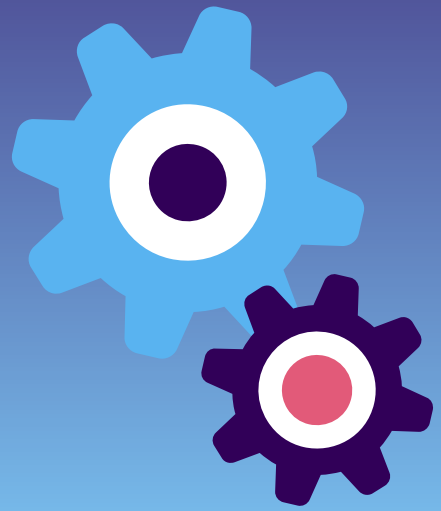
# Text - to - Speech

Chat bots are designed for text-based interactions, but in our project, we want to build a bot that can assist visually impaired individuals verbally and receive their inputs through speech, exactly like a regular human conversation.

To transform text into humanlike synthesised speech, we used the **Text-to-Speech** capability of the **Speech service**, which is part of **Azure Cognitive Services.** The text-to-speech capability is also known as speech synthesis.

# Technologies Used

1) Python 3
2) Open CV
3) Microsoft Cloud Services:
    a. Azure Speech services
    b. Azure LUIS
    c. Azure Computer Vision services
    d. Azure Form Recognizer
4) mpg123



# Key Features

Describe real time scene

Play requested audio/song

Analyse and read receipt

Read non-braille text

Tell current time on user's request

Lightening condition of the user's surrounding

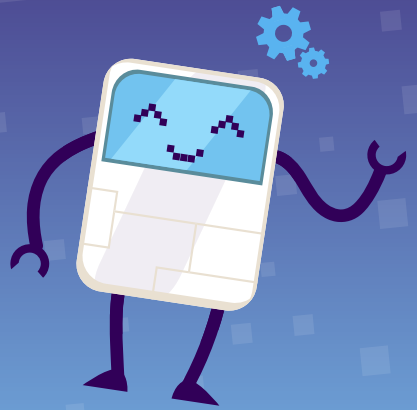
Get weather update

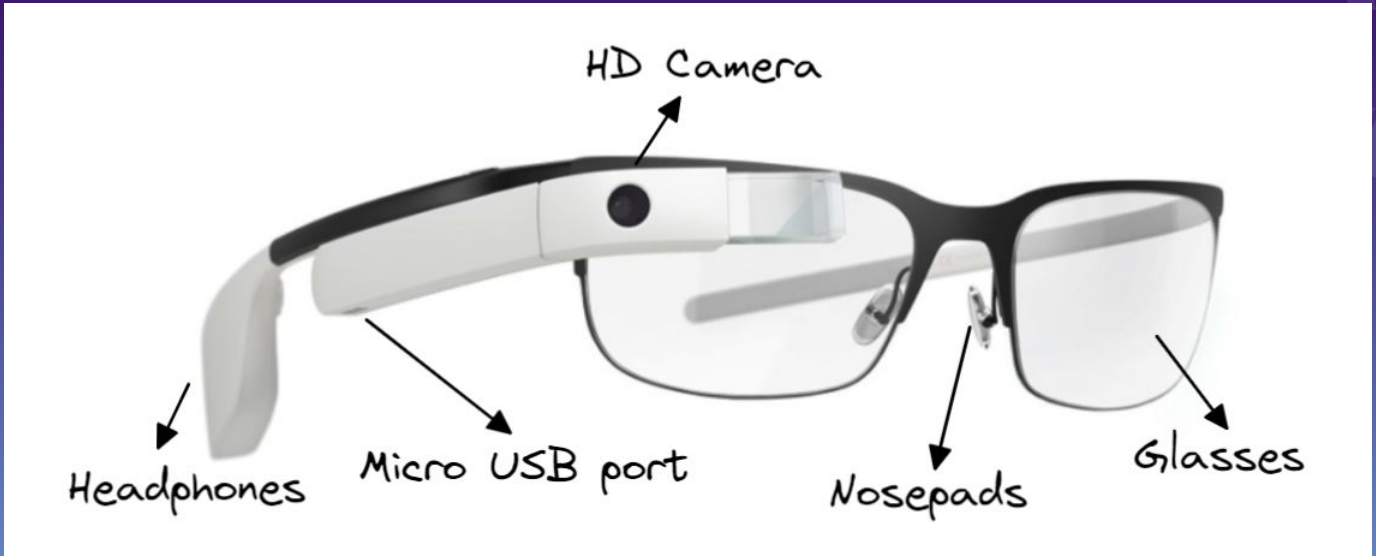
Detect color of the intended object

# Microsoft Azure

- Our entire project is built on Microsoft Azure's incredible services.
- We are grateful for Microsoft Azure's 200 services in all sectors, including AI, machine learning, and cloud computing.
- Object detection, speech services, cognitive services, and language understanding capabilities provided by Microsoft Azure aided our innovation.
- We used it for artificial intelligence, containerization, and computing, and the results were impressive.
- Azure, unlike other cloud services, has a large number of locations.
- Azure provides numerous free tools like quickstart guide and the Azure SDK in all the major programming languages.
- It was easy to find solutions when we got stuck as it is used by a wide number of people all around the world.

# Hardware Implementation






Smart glasses which is lightweight & equipped with camera for capturing images, headphones, usb port for charging and WiFi or 4G for internet connection. There will be a microprocessor to handle computations.

# Scalability

- The device is quite scalable as it is a global problem
- Most of people have visual impairment which cannot be rectified
- Our device would be a boon for such basic necessity devoid people
- Will be made in India and will be cost effective
- Although, women need this device more but can definitely be used by anyone
- Huge market and is currently less competitive in India and globally as well
- To adapt IT resources to shifting demand, cloud scalability could be used.
- No such device is currently being used by large masses globally
- Visually impaired can live independently and happily

# Sustainability

- No large physical infrastructure needed
- Everything is adjusted in the glasses already used by visually impaired
- High profit market in India and world if made rightfully accessible
- Need of the time to make people aware of its benefit and inspire them to use if for their ease of life
- No disturbance to ecology
- Will be made under environment betterment conscience

# Why women need this device more?

- Of the 1.1 billion people with vision loss, 609 million are female, compared to 497 million males.
- Women are at greater risk for certain eye conditions such as cataract, especially in low and middle income countries.
- Women have less access to eye health services due to socio-economic and cultural bias.
- Women often have less access to family financial services to pay for eye care or transportation to reach services.
- Older women may require assistance, which poor families cannot provide, also due to ignorance for a women.
- A decline in vision is often viewed as an inevitable consequence of ageing.
- Female literacy is lower than males, especially among the elderly. Hence, women can be less likely to know about the possibility of treatment for eye disease or where to go to recieve it.

# Business Relevance

- Microsoft highly focuses on AI, cloud, innovation and diversity & inclusion
- Drishti-the-Intelligent-Eye will align well with the vision of Microsoft
- Not a competitive market of the product currently, especially in India
- The population suffering from visual impairment is likely to increase three folds by 2050
- Market of the product is huge
- When talking about Diversity & Inclusion, visually impaireds will now feel included in the workplace, especially women.
- Women lives can be improved
- Noble approach

# Novelty

- Different Products currently in the market perform different activities
- The existing products lack one or the other feature
- If we talk about one stop, Drishti-the-Intelligent-Eye comes into picture
- The novelty of the project is that it includes all essential functionalities needed for visually impaireds
- Diversity & Inclusion from this aspect has never been in a discussion, this project talks about it and revolutionize the inclusion, giving it a new meaning.
- Also, there is hardly any cost friendly product in the market that can talk about surroundings and objects nearby that Intelligent Eye does
- Intelligent Eye will be Made in India and will support all major regional languages for listening and answering

# Social Impact

- Can live independently
- Promotes Diversity & Inclusion
- Feel safe and aware
- Happy and Content
- Eliminates loneliness
- Reduces self doubt and anxiety

# Future Scope

- Detecting and remembering the faces
- Can chat with the user
- Add all major regional languages of India
- Find the intended objects in its frame
- The device should work offline

# Thank you!