vision-spatial-sound

Tell us what your idea is.

People with visual impairment most of the time having difficulties navigating around in their day to day life. Therefore I came up with an idea to help people with a vision disability to navigate their surroundings. It is done via a smartphone puts in their shirt pocket (as long as the camera is facing to their front) or strapped to their chest and an earphone (preferably with microphone) attached to the ear. The camera on the phone will capture the surroundings and then using machine learning to detect an object/obstacle and calculate the estimated distance and location then translate it to spatial audio feedback. Therefore the user can know if there are any object or obstacle in front of them and with spatial audio they can estimate is it in the front left or right and how far is it to them.

Machine learning will play a critical role in making this idea to fruition. Machine learning can help to detect an object from a camera feed, and then based on the sensor capture (gyroscope and accelerometer) and the camera feed, and the estimated location we can use machine learning again to get the estimated distance and location of the object.

Afterward, we need to translate the object's estimated distance and location to spatial audio feedback. Another thing to be considered is since using earphones while navigating could be dangerous so we also need to implement a HearThrough mechanism similar to Jabra headset have. So they still can hear sound in their surroundings..

Tell us how you plan on bringing it to life.

The project currently is still in the early ideation stage. No developments are done yet, some PoC might need to be conducted before starting this project as of 22 Nov 2019 no POCs are performed yet. The PoCs schedule are as below:
PoC for spatial audio using GVR Audio Engine 30th Nov 2019 & 1st Dec 2019
PoC for Vision calculate the distance (TBD since it will require some amount of time)

After the PoCs are performed the sample code for PoC will be maintained in the repository

The overall project planned schedule is as below:
1st Dec 2019 – 15th Jan 2020: PoC Phase for Spatial audio, Vision Calculate Distance and HearThrough mechanism
16th Jan 2020 – 28 Feb 2020: Development
1st March 2020 – 1st April 2020: Testing and getting feedback from the users
1st April 2020 – 1st May 2020: Enhancement & finalization

And in making this project to fruition I will need google's help and expertise in these areas below:
Vision Calculation Distance (with machine learning/ deep learning)
Feedback, Insight and Best Practice from Google's Accessibility team in how to make this idea more usable and ensure this idea can be used by people with visual impairment
Google's help in facilitating testing this idea to end-user (people with visual impairment)
Google's suggestion and technical best practice in the development part.

Tell us about you.

I am a mobile engineer with a total of 7 years of experience in software engineering. Currently, I am working in Cermati as an Engineering Manager. Prior to that, I worked in Boston Consulting Group as a Technical Consultant and Tokopedia as Mobile Engineer. In one of my past projects, I used to develop an application for VR which I think will help a lot in developing the spatial audio experience. While in machine learning I'm still very new. I took a machine learning basic training in Udacity but haven't got any real-life projects that are using machine learning.

Next steps.

- Be sure to include this cover letter in your GitHub repository
- Your GitHub repository should be tagged #AndroidDevChallenge
- Don't forget to include other items in your GitHub repository to help us evaluate your submission; you can include prior projects you've worked on, sample code you've already built for this project, or anything else you think could be helpful in evaluating your concept and your ability to build it
- **The final step is to fill out this form to officially submit your proposal.**