

RESEARCH ETHICS AND INTEGRITY

RISK ASSESSMENT FORM A

For all undergraduate Dissertations and Research Projects

FOR OFFICE USE ONLY

To be completed by module leader/supervisor [subject to confirmation by SCREP]

In the opinion of the module leader/supervisor this application falls into:

CATEGORY 1 [x]

CATEGORY 2 []

Please fill in this form, then **SAVE IT AS A PDF** and submit as instructed by your supervisor with your project proposal.

First name: Mohamed Azher **Last name:** Abdullah Aazam

Student ID: 02001832

Email address: 33118842@student.uwl.ac.uk

Name of supervisor: Mr.Mahen Jayalath

Title of project: Image Processing System to Improve Environmental Recognition and Navigation for Blind People.

Date: 04.02.2024

SECTION A: PROJECT DESCRIPTION

Please answer the following questions:

1. Do you intend to involve human participants in the conduct of your research? If no, please skip questions 1a & 1b.
☒ **Yes** ☐ **No**
- 1a. Does your research involve vulnerable adults (who are or may be for any reason unable to take care of themselves, or unable to protect themselves against significant harm or exploitation) or under-18s ?
☐ **Yes** ☒ **No**
- 1b. Could your research potentially expose you, anyone assisting you, or participants to physical, psychological and/or emotional harm? (see Section B, Question 9)
☐ **Yes** ☒ **No**
2. Will your research involve travelling to geo-politically unstable regions/countries (e.g. areas affected by war, civil unrest, natural disasters, or listed as inadvisable to travel by the UK government)?
☐ **Yes** ☒ **No**
3. Will your research involve access to security-sensitive material? (see the University's Research Ethics Code of Practice 2018 for a definition of security-sensitive materials and Section B, Question 9 of this form)
☐ **Yes** ☒ **No**

This proposal must be completed with the assistance of your supervisor.

You can change the size of the boxes (below) by typing or deleting as necessary.

It is very important to convey with clarity:

- Your research questions/the problem/the theme or topic you are investigating (what you are proposing to do and to find out or to create)
- The methodology or technical approach (for projects comprising in whole or in part of the creation of an artefact) you will adopt – methods, number of participants, who the participants (if any) will be, survey instruments used, technology and equipment employed etc.; and what questions you are planning to ask your respondents (if applicable); how you will deal with technical challenges.

SECTION B

Only complete if you answered YES to Q1 in Section A.

	WHERE APPROPRIATE TO YOUR CHOSEN TOPIC/RESEARCH:	YES	NO	N/A
1	Will you describe in writing the main procedures to participants in advance, so that they are informed about what to expect? A copy of this must be attached to this application	X		
2	Will you tell participants that their participation is voluntary?	X		
3	Will you obtain written consent for participation and include within this that they have a right to withdraw at any point? A copy of this must be attached to this application	X		
4	If the research is observational, will you ask participants for their consent to being observed?	X		
5	With questionnaires, will you give participants the option of omitting questions they do not want to answer?			X
6	Will you tell participants that their data will be treated with full confidentiality and that, if published, it will not be identifiable as theirs? This should be evidenced in the consent form and (if applicable) with a signed copy of UWL's data management form, attached to this application.			X
7	Will you debrief participants at the end of their participation (i.e. give them a brief explanation of the study)? A copy of this must be attached to this application	X		
8	Will your project involve deliberately misleading participants in any way?		X	
9	If you answered YES to Question 1b (section A) give details on a separate sheet and state what you will tell your participants to do if they should experience any problems (e.g. who they can contact for help).			X
10	Do participants fall into any of the following vulnerable groups? If they do, please and tick box 2 below. Note that you may also need to obtain satisfactory DBS clearance (or equivalent for overseas students).			
	Schoolchildren (under 18 years of age)		X	
	People with learning or communication difficulties		X	
	Patients		X	
	People in custody		X	
	People engaged in illegal activities (e.g. drug-taking)		X	
	Any other groups who could be reasonably argued as representing any form of vulnerability – please specify		X	

SECTION C

	WHERE APPROPRIATE TO YOUR CHOSEN TOPIC/RESEARCH:	YES	NO	N/A
11	Will you be accessing materials which may be considered security-sensitive under the Counter Terrorism Act (2015)?		X	
12	Does your project involve work with animals? If yes, please tick box 2 below.		X	

[Note: N/A = not applicable]

There is an obligation on the researcher to bring to the attention of the School Ethics Panel any issues with ethical implications not clearly covered by the above checklist.

PLEASE TICK EITHER BOX 1 OR BOX 2 BELOW AND PROVIDE THE DETAILS REQUIRED IN SUPPORT OF YOUR APPLICATION. THEN SIGN THE FORM.

Please tick

1.	I consider that this project has no significant ethical implications to be brought before the School Ethics Panel.	X
2.	I consider that this project may have ethical implications that should be brought before the School Ethics Panel, and/or it will be carried out with children or other vulnerable populations.	

I have received guidance on ethical research practices relevant to my subject as part of my preparation for this module.

Signed _____

Print Name

Date _____

(UG Researcher(s))

Signed _____

Print Name Mahen Jayalath

Date 04 Apr 2024

(Supervisor)

PROJECT OUTLINE

Your name: (first) Mohamed Azher (last) Abdullah Aazam

Student number: 02001832

Your email address: 33118842@student.uwl.ac.uk

Name of supervisor Mr.Mahen

Title of the Project Image Processing System to Improve Environmental Recognition and Navigation for Blind People.

Date: 04.02.2024

Introduction to the research

Technology that provides assistance for the visually impaired is a rapidly growing topic of study that tackles the urgent need for tools and systems to help persons with vision loss. With an estimated 2.2 billion individuals worldwide suffering from vision impairment, the invention of assistive technology is more than a scientific goal; it is a societal imperative. (Jumi, 2020) These technologies vary from simple tactile devices to large computer-based systems, allowing visually impaired people to explore, interact, and access information more efficiently. (Alexy, 2020).

Aims and Hypothesis: The major goal of this study is to create a navigation detection system that uses image processing to identify typical interior items and provides real-time hearing feedback for visually impaired users. The premise is that such a device would considerably improve the freedom and safety of those with visual impairments in indoor environments.

Research questions:

1. How can image processing be enhanced to recognize things such as tables and chairs in real time?
2. What are the best strategies for translating visual data into understandable aural feedback for visually impaired people?
3. How does the integration of such a system affect the independence and quality of life of the visually impaired?

This dissertation will investigate these concerns while developing a creative artifact - a smartphone application that acts as a virtual guide for the visually handicapped, altering their engagement with interior settings.

Method

This technique combines technical development and user-centered research to ensure that the system is both technologically sound and fits the demands of its intended users. The mixed-methods approach offers a thorough insight of both the system's performance and the user experience.

Design: The project will employ an iterative design approach, beginning with prototype creation and progressing via user testing and refining. This technique enables continual development based on user feedback.

Participants: will be visually impaired persons who are potential system users. However, they will not be questioned, and the system will not be delivered to them for testing. I will conduct the testing procedure, making accurate predictions about what and how the system should behave to visually impaired persons. But without really engaging visually impaired persons (I may mimic this by blindfolding or using another method).

Data will be collected using a variety of methods:

Quantitative: System usage statistics, such as item and price identification accuracy rates, as well as the time it takes the system to voice information.

Qualitative: User feedback sessions in which participants hear the outcomes of image processing in the environment and provide voice output throughout the system.

Technology:

YOLOv5 From TensorFlow: Will be used for real-time item identification, calculating the chance of product presence in the picture grid. This will not be developed from scratch, Tensorflow is a free open-soure Website were we can download pre-trained Models for this project.

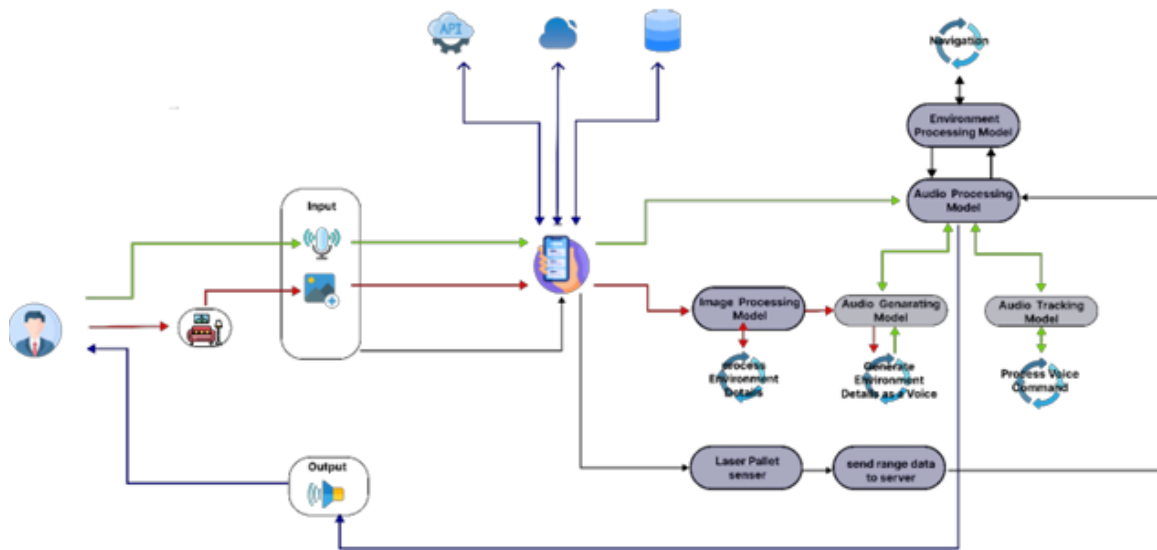
The TTS Engine: converts recognized text into voice, allowing visually challenged users to hear product names

Front-End and Back-End Development: The project will use Flutter, a flexible UI framework created by Google, for both front-end and back-end development. Flutter's ability to give a consistent experience across many platforms makes it an excellent choice for developing a unified system that is responsive and performant. (teamcubate, 2024)

Libraries and Tools: The project will make use of Flutter libraries that are simple but powerful, reducing development time and improving functionality. These libraries offer a variety of pre-built components and utilities, which can considerably decrease development time and effort.

Ethical Considerations: The project will follow ethical guidelines, including informed consent, confidentiality, and the freedom to withdraw without repercussions.

Research design or schedule (for creative artefacts)



Materials (to include locations and objects/resources)

Physical resources: Cameras, PCs, mobile devices, and particular software for image processing, such as YOLOv5 from TensorFlow.

Locations: include particular markets where the system will be tested, as well as an internal environment such as a bedroom with a variety of goods.

Objects/Resources: This might include items at a shop that the system recognizes and describes to the user, as well as products in a bedroom.

Analysis

This project will be analyzed using a mixed-approaches approach, which combines qualitative and quantitative research methods. This strategy is selected to capitalize on the characteristics of both methodologies and give a more complete grasp of the study issue.

Quantitative Analysis: is the collecting and statistical analysis of numerical data. The goal is to assess the performance of the navigation detecting system in the areas of accuracy, speed, and user satisfaction with it. Quantifiable data will be collected by surveys with closed-ended questions and controlled trials with before and after testing. (Raimo, 2023)

Qualitative analysis: will be conducted to better understand the experiences and perspectives of those with visual impairments that engage with the navigation detecting system. In-depth research on internet, observations, and diary studies will be used to gather rich, descriptive data. The investigation will employ thematic coding to uncover trends and insights into how people adapt to and use technology. (Mcleod, 2023)

By combining qualitative and quantitative data, the study will not only examine the system's functional performance but also gain insight into the users' subjective experiences, which is critical for user-centered design. This mixed-methods approach is consistent with what was learnt in the study's Research Methods component, resulting in a strong and ethical research process.

References

Alexy, 2020. *link.springer.com*. [Online]

Available at: <https://link.springer.com/article/10.1007/s12193-016-0235-6>

[Accessed 02 04 2024].

Google Colab, 2024. *www.colab.research.google.com*. [Online]

Available at:

https://colab.research.google.com/github/tensorflow/swift/blob/main/docs/site/tutorials/model_training_walkthrough.ipynb

[Accessed 03 04 2024].

Jumi, 2020. *www.mdpi.com*. [Online]

Available at: <https://www.mdpi.com/2071-1050/12/20/8689>

[Accessed 02 04 2024].

Mcleod, S., 2023. *www.simplypsychology.org*. [Online]

Available at: <https://www.simplypsychology.org/qualitative-quantitative.html>

[Accessed 02 04 2024].

Raimo, 2023. *www.scribbr.com*. [Online]

Available at: <https://www.scribbr.com/methodology/qualitative-quantitative-research/>

[Accessed 02 04 2024].

teamcubate, 2024. *www.teamcubate.com*. [Online]

Available at: <https://teamcubate.com/blogs/full-stack-flutter-developer>

[Accessed 03 04 2024].