### **Speech Relief**

### **Concept introduction and user-needs**

My project will be based on an application called Speech Relief. It will enable users to locate their phone through speech recognition. Suppose for instance an individual must rush to work and is unable to find their phone, but knows it’s located somewhere inside their room. Speech Relief can speed up the search time just by an utterance of a specific word from the individual. Once the phone detects the utterance, it will begin vibrating more than once and will then output the word in speech at maximum sound level, which will help the individual locate their phone. This app can be of use to a great number of people as it is common for individuals nowadays to lose sight of their phone and to search everywhere for it.

**Platform**

* I intend to create the app solely on Android, and the reason behind this is because I have experience from my second year project in creating a complex application within this operating-system
* I also intend to use MYSQL as my backend database for storing user accounts within the application

**How my project will be different**

* My concept idea is something that no one has implemented to a near-perfect level. The apps I’ve reviewed on the Google PlayStore which are similar to my concept idea either contains bugs, have major flaws or don’t work properly. I aim to implement my concept idea to a near-perfect level so that it works majority of the times and is a tool that users can rely on. The apps I reviewed can be found in **references 3,4 and 5**
* Users will interact with the speech recognition I implement in the same manner as other speech recognitions which are commonly used (e.g. OK Google, Siri etc.) But what runs in the background, is that will make it different. I will attempt to improve the speech recognitions accuracy in detecting speech and outputting it correctly as text, without the App having to run slow. Indeed, this is something I must prioritise as this is the main part of my application and it needs to work well for my project to be successful

**Problems I intend to tackle**

* What would be the easiest and most effective way to implement a speech recognition model using deep neural networks?
* **Definite solution:** Deploying our model in Keras is probably the best option as it enables quick experimentation with deep neural networks and thus easing our implementation
* From what I know so far, what could be some of the technical and non-technical issues of my project?
* **Possible issues:** Here are the issues that I think I may come under when developing the project:
  + Technical issues:
    - How would the app detect a quiet/muffled voice?
    - How would the app detect certain accents i.e. Indian, Chinese etc.?
    - how would we ensure that the speech recognition is always working in the background?
  + Non-technical issues:
    - Would I be causing users to feel unsafe or frustrated for requiring them to register an account in the app just to gain analytical data? Could I take another approach to collect this kind of data?
    - How would I maintain user’s privacy and keep their accounts safe?
* How would I go about testing my project?
* **Definite solution:**Methods such as**functional, non-functional, static, dynamic** and **usability** testing are ways I could test my application
* What would help me to improve and track my time-management?
* **Definite solution:** Using a Gantt chart could help schedule all my tasks and highlight the ones that have more priority. I could also consider using a time-management chart to review my daily progress

**How I will develop the application**

* I will build the speech recognition model on **Keras**
* I will then train the dataset on a device that can handle large amount of computation. Most likely device I will use is my laptop. I learnt this from the **second reference**
* The Keras model will then be deployed on the Android operating system using the **Android Studio** software. I learnt this from the **first reference**
* Using Android Studio, I will create a UI that enables the user to register their code word using speech recognition. I will also add the output of the model’s prediction as text, so the user can compare whether it matches with what they uttered
* After the above steps are complete, I should be using Android Studio for the remainder of my project to add other functions to my app that are less technical

**Privacy implications**

* Code word can be altered: let's say for example an unauthorised individual gained access to someone’s phone, he/she can alter the code word within the Speech Relief app. I can address this privacy implication by making it compulsory for users to create a pin or a password that they will need to use to make any alterations within the app
* Passwords can be discovered: let’s say worst case scenario attackers were to gain access to my MYSQL database that stores all user accounts. They will be able to easily discover the passwords of all our users. One way I can address this privacy implication is by hashing the passwords

**Why its achievable**

* I have recent knowledge and skills to understand and create a deep neural network in Keras, which I obtained through my Artificial Intelligence module
* I have the skills to use Android Studio as I have created various applications in the past for my personal projects
* I have experience in creating a login system with a backend database as I worked on this part for the group project I did last year

**References**

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