REPORT

An Assistive Technology Keyboard – KEASY

# Introduction

Keasy is a keyboard app that is build with the goal to provide a similar natural experience to people who have difficulties in carrying a conversation using ears and mouth. Using many of the features present in the app, people with one or multiple disabilities can feel more included in a society, at least in the aspect of interaction with people.

# Technology

### Language:

* Python 3.7.9
* HTML/CSS

### User requirements:

* Windows/Linux/Mac PC with minimum 500MB Disk space, 1GB RAM
* Python 3.7.9 64bit. libraries: playsound, pywebview,   
  fast-autocomplete, nltk, pandas, numpy, pandas.
* Active Internet Connection
* Microphone
* Speakers
* Touch Display (Optional)
* Physical AAT input devices (Optional)

### Structures / Algorithms used:

* Python Tkinter GUI
* Directed Word Graph (Trie based)
* N-grams Word Model

### Corpus Used:

* Ubuntu Dialogue dataset (16million English conversation entries)

# Strengths

Some noticeable key points:

1. Software is based on simple python model and uses basic libraries to make it more compatible to most PC versions.
2. Small app (7MB) with great functionality and minimum requirements
3. All basic features along with innovative new features for a keyboard
4. Very similar to a normal keyboard for maximum compatibility
5. Highly efficient Data structure and code for very fast prediction
6. Comprehensive Dataset of 2.4 million words, 1.6 million dialogue lines taken from actual conversations making highly accurate predictions.
7. Accumulation of several features to tackle multi-disability cases
8. Special New feature that makes keys more recognizable
9. Symbols (PECS) Keyboard to communicate using symbols

# Features

### Standard Keyboard:

Standard Keyboard with all basic features like arrows, enter, backspace, clear, tab, etc.

### Text to Speech and Speech to Text:

Instant Speaking of Input and Recognition of voice with press of a button

### Predictions:

Predicting Next Words and also Completing half written words. Personalized prediction based on record of previous inputs.

### Predictive Lettering:

This feature predicts the next letter and highlights it on the keyboard to make it easier to find.

### Symbols:

Wide collection of symbols for various common words that instantly speak out when pressed, for quicker and easier conversation.

# How to Run

### Method-1

1. Install python 3.7.9 64bit
2. Unzip The package Keasy(Full) and open command prompt in that folder
3. Use pip to install the libraries mentioned in ‘requirements.txt’ using the terminal command

“pip install <modulename”.

1. Run ‘main.py’ using “python main.py”

### Method-2

1. Unzip Keasy(NWC)
2. Click on ‘Main.py’ Application (not python file).

\*This method doesn’t support Word Completion.

### Model Training

1. Load Text Datafiles in ‘Dataset’ folder
2. Run ‘corpus.py’ : Creates a combined word corpus
3. Run ‘train\_ng.py’ : Trains the Ngrams model and stores as pickle file
4. Run ‘model3.py’ : Writes ‘count.json’ for words

# Next Things

1. This software can be converted to apps for Android and IOS to run on handheld devices.
2. Vernacular Language support can be added for Indian Languages on the similar keyboard.
3. Sentiment analysis and Context analysis can be added for more immersive interaction.
4. Symbols Library can be expanded to have more symbols.
5. UI can be made more faster using multiprocessing and more efficient DNN models.