Speakable Map

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https://github.com/EmilyOng/SpeakableMap

Problem

Mind Map

- Hard for the blind to interact with mind maps

Proposed Solution

Mind Map

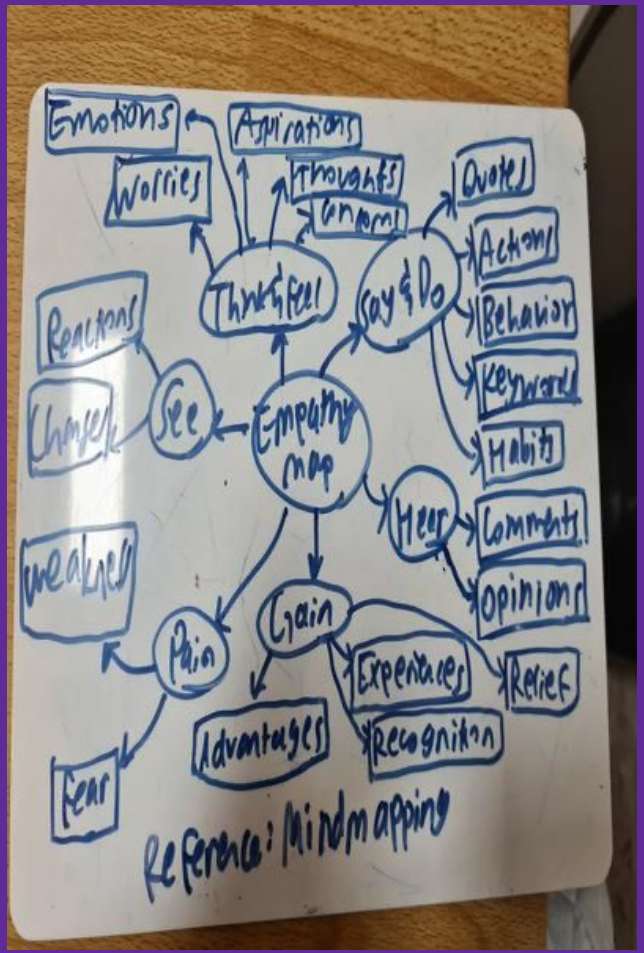
1. Ellipse (to represent a main topic/sub-topic)

2. Rectangle (to represent an idea)

3. Arrows/Lines (to represent connections between nodes)

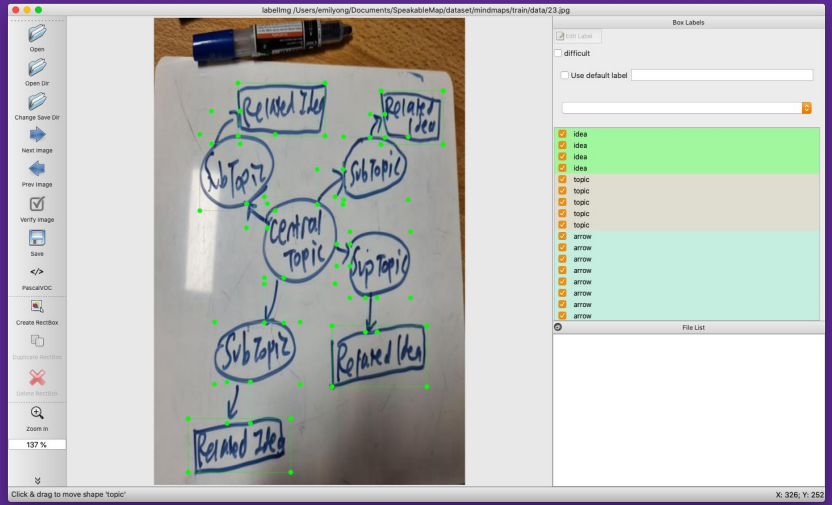
Collecting Dataset

- Hand-drawn (markers, pens)
- Web images



Data Labelling

LabelImg



Data Refinement

Image Compression

- Resize to 400 x 400 to reduce image resolution to speed up training

Tensorflow

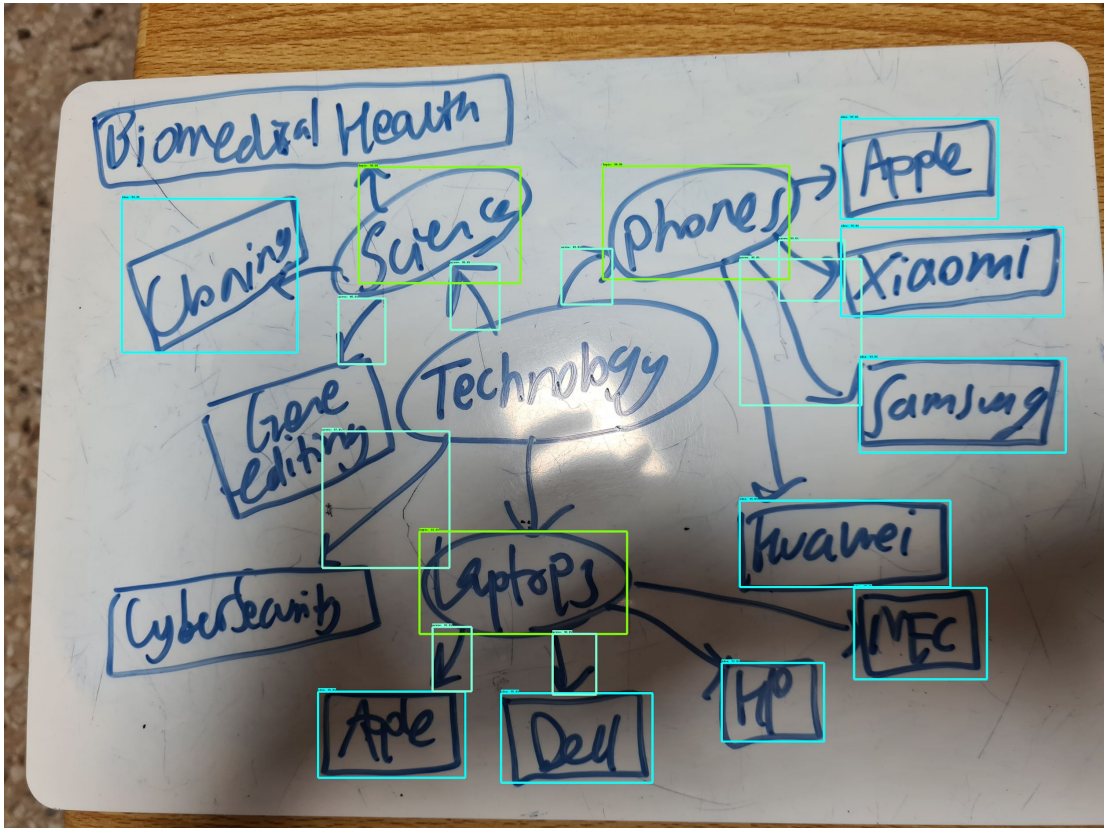
Object Detection API

Dataset

- 80%/20% split for train and test image (i.e. 24/6 images)

Training

- On local machine for 1 batch-size & ~2k steps
- Faster_rcnn_inception_resnet_v2_1024x1024_coco17_tpu-8 model from Tensorflow's model zoo


Biomedical Health
Cloning
Science
Phones
Apple
Xiaomi
Technology
Gene editing
Samsung
Huawei
Cybersecurity
Laptops
MEC
Apple
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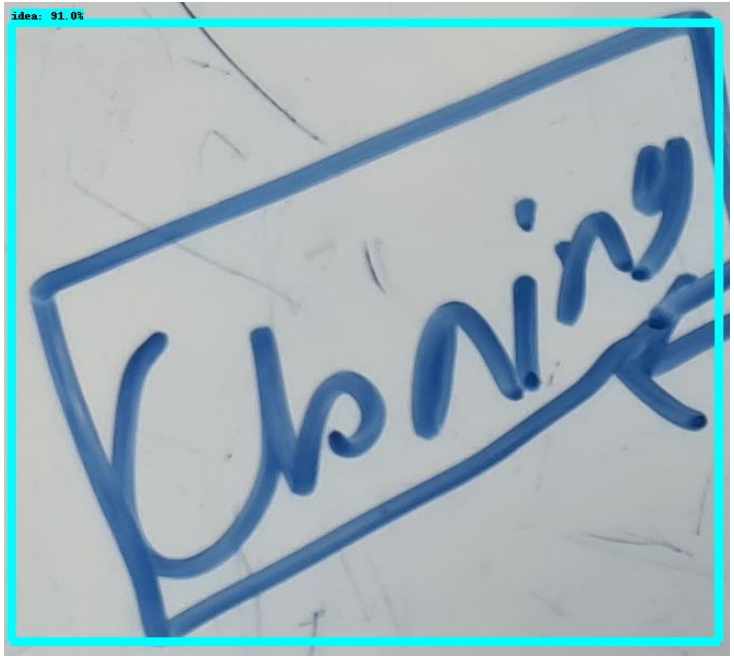
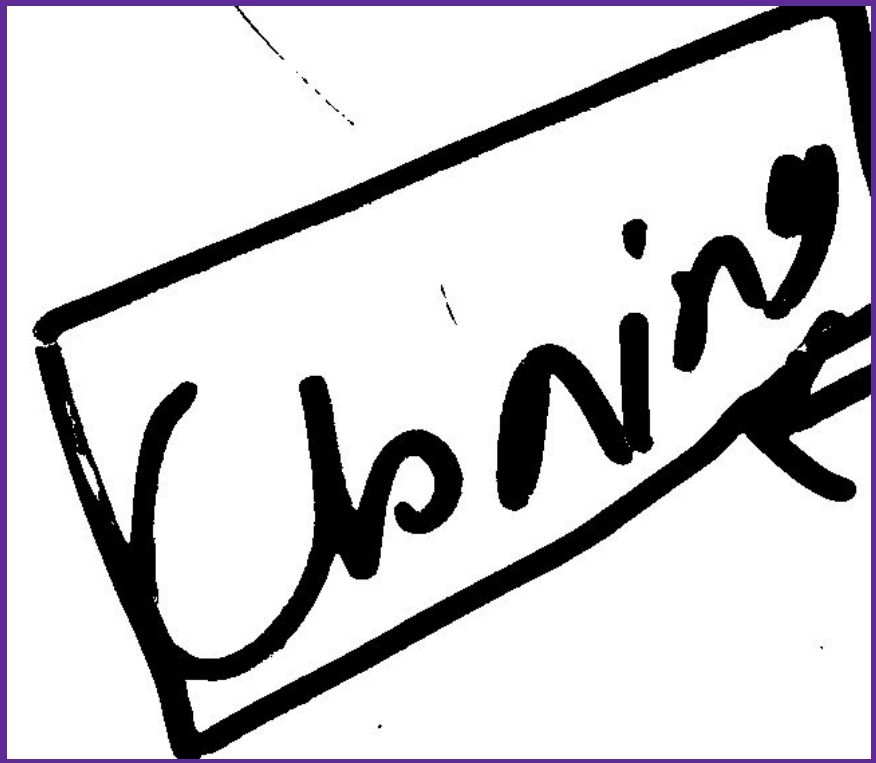
HP


idea: 91.0%
Cloning

Results

Image Processing

Crop out individual images in bounding box and convert to grayscale



Text Processing

Run text processing on cropped image to obtain text

PyTessaract

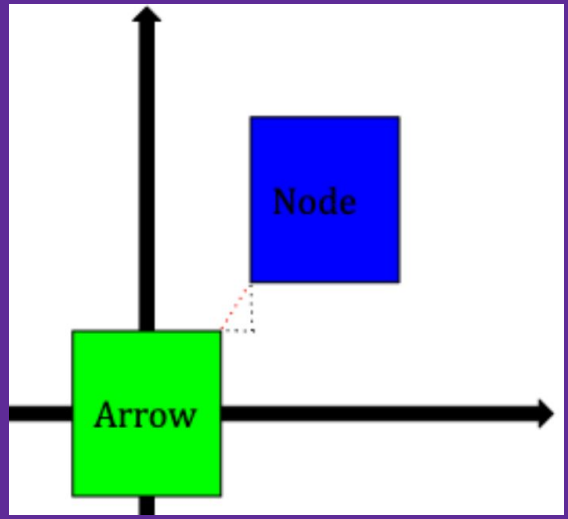
Google Cloud Vision API

Speech Synthesis

Shift + Hover over canvas

- Reads out the value of the node and that of connecting nodes

Mind Map

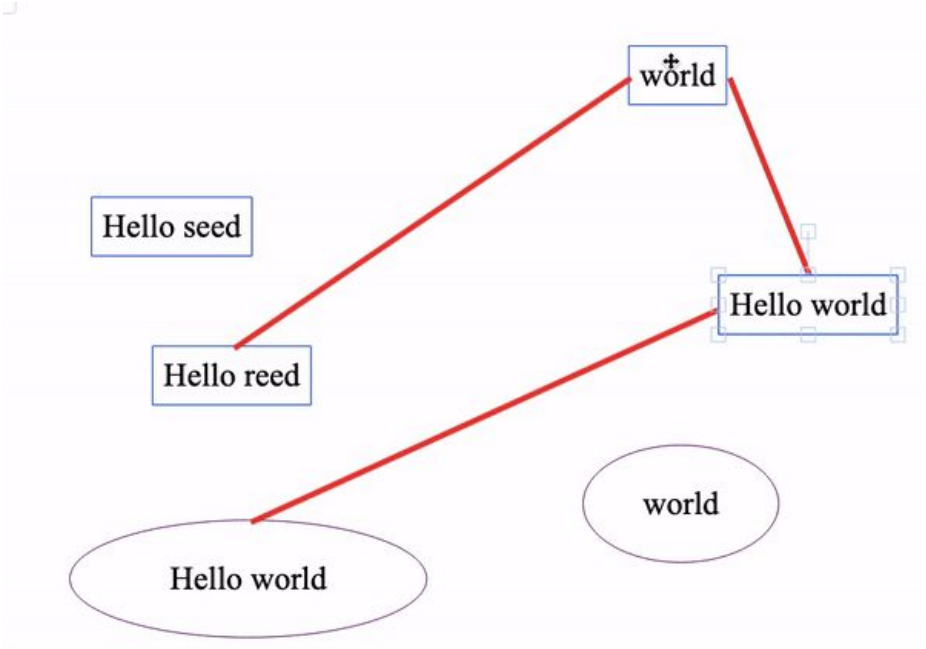


Front End

Website

Libraries

- Python Flask for web server
- Fabric.JS for creating shapes
- Bulma CSS for design

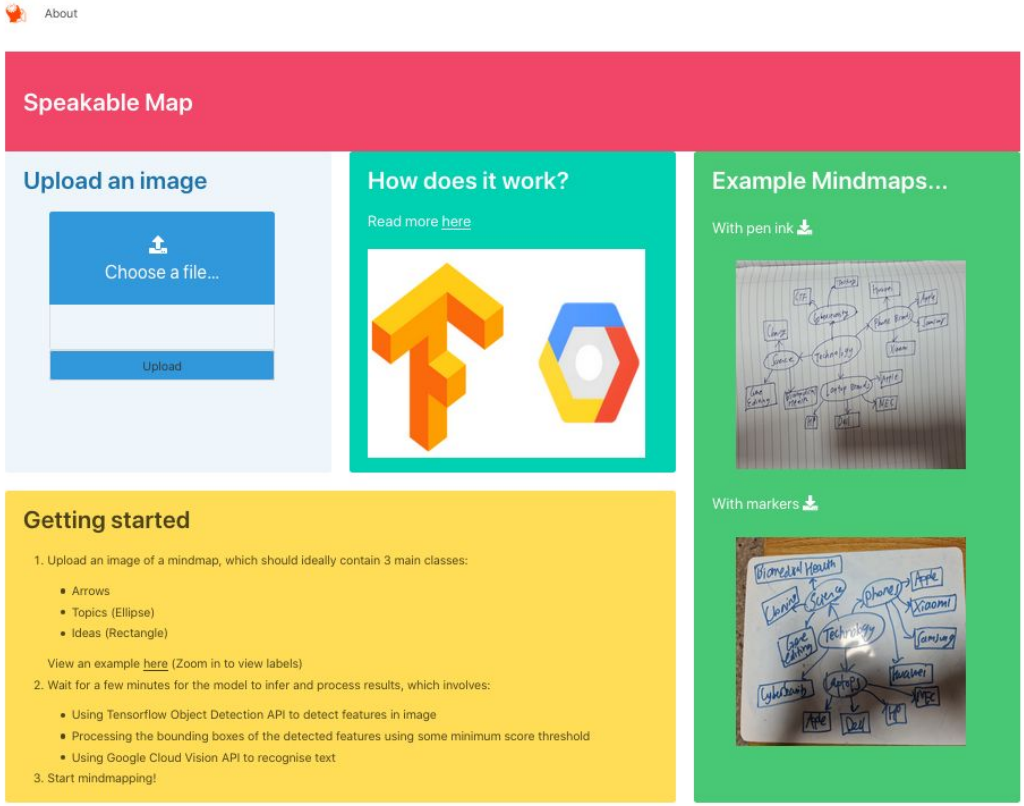


- Created my own visualisation library for mind maps

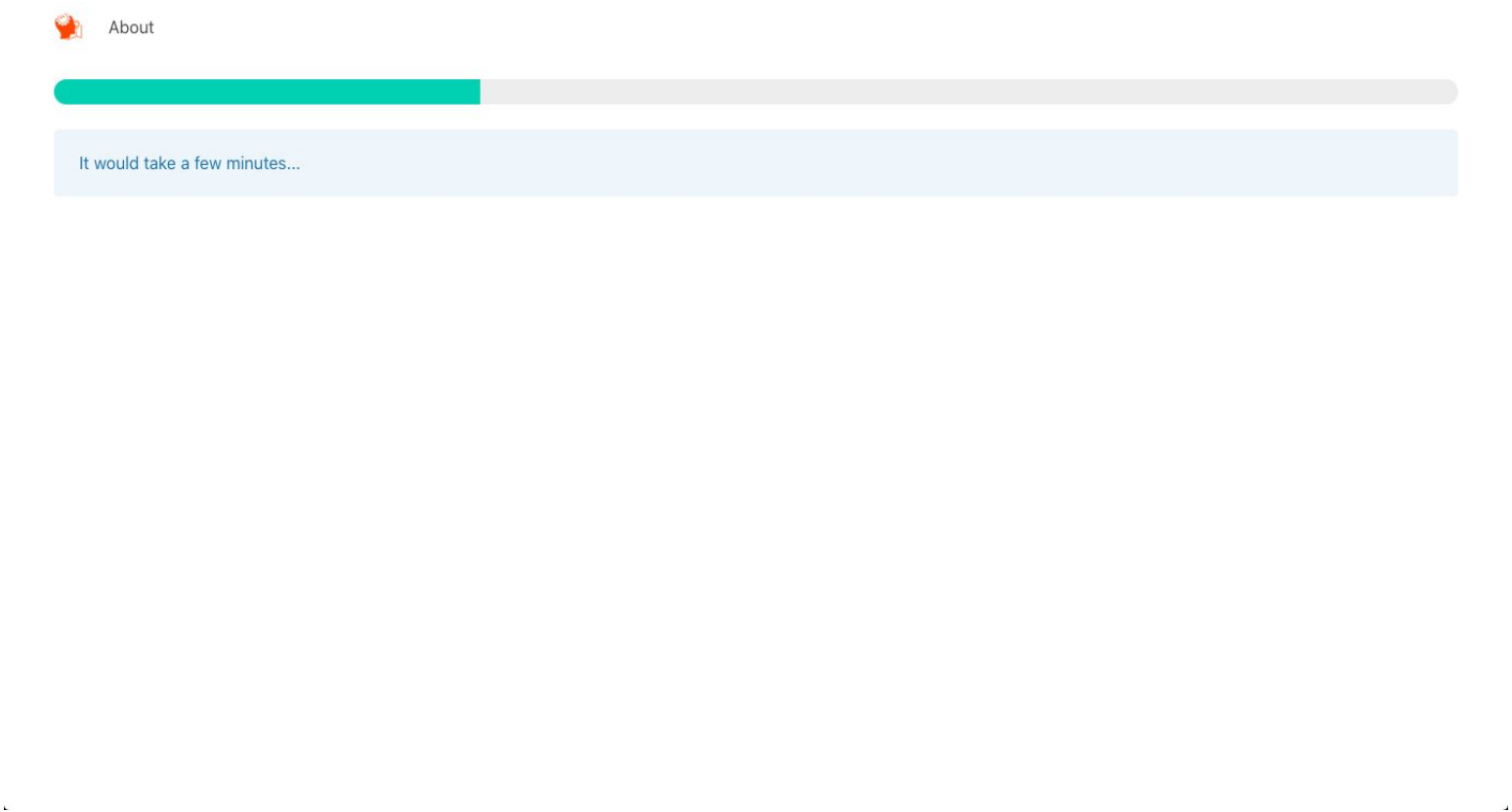
Links

Click on it

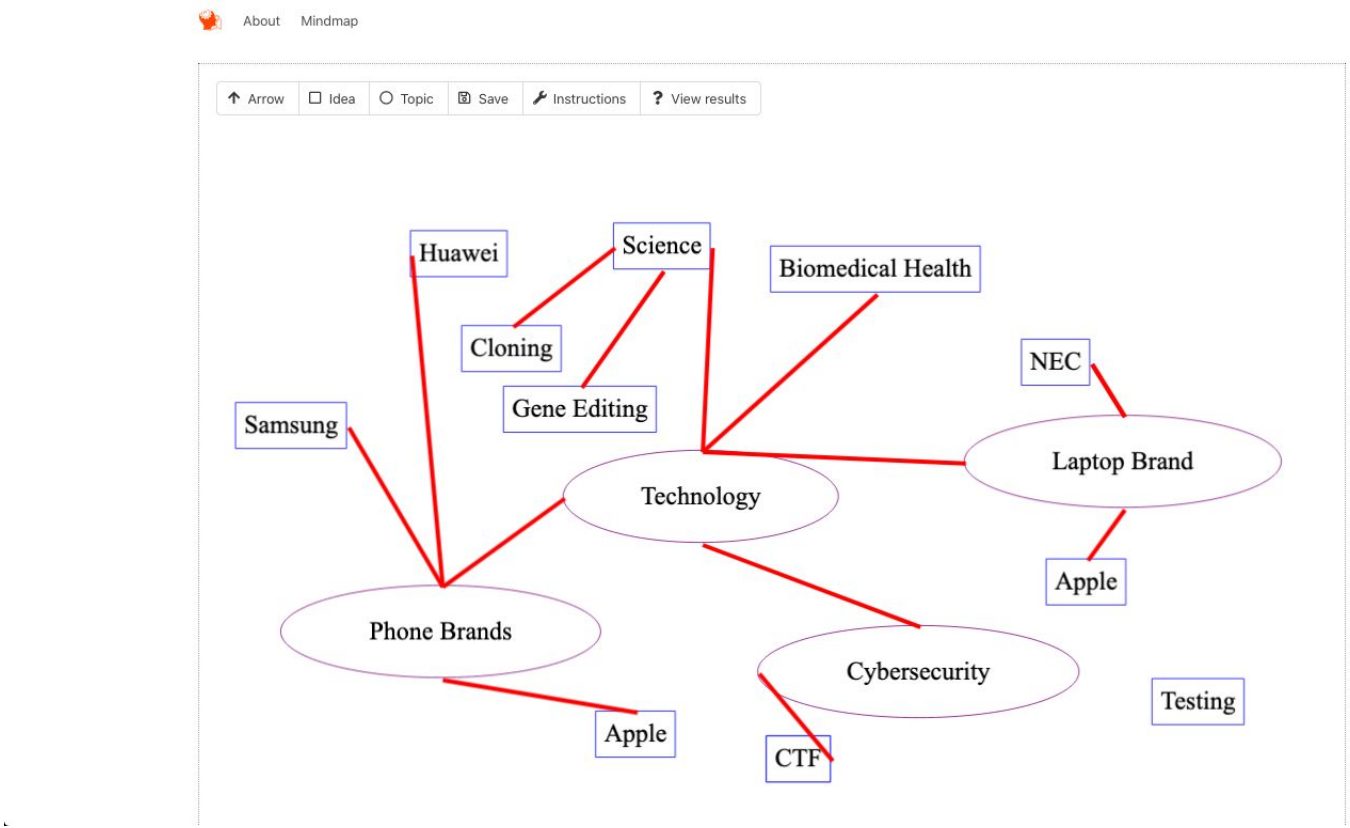
- Github
- Project Report


About
Speakable Map
Upload an image
Choose a file...
Upload
How does it work?
Read more here
Example Mindmaps...
With pen ink
With markers
Getting started
1. Upload an image of a mindmap, which should ideally contain 3 main classes:
• Arrows
• Topics (Ellipse)
• Ideas (Rectangle)
View an example here (Zoom in to view labels)
2. Wait for a few minutes for the model to infer and process results, which involves:
• Using Tensorflow Object Detection API to detect features in image
• Processing the bounding boxes of the detected features using some minimum score threshold
• Using Google Cloud Vision API to recognise text
3. Start mindmapping!

Main Screen



Loading Screen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