Borneo Fungi Biodiversity Information System

This system is developed to manage information of fungi species that can be found around Borneo. This system used by mycologist and all the information stored in the system will be available to public. Currently, there is no databank available for Borneo fungi species that can be access by mycologist that not from Borneo. The mycologist in Borneo also currently using spreadsheet to store the information about fungi they have found in Borneo and this information is not available to another mycologist that is not from Borneo. This system has 3 type of user that can access the system which is the admin, mycologist and public user. There are 6 main modules that available in the system which is the user module, fungi module, community module, report module, board module and fungi genus classifier module. This application is built by using Python, Django, HTML, CSS, JavaScript, Keras and TensorFlow.

1. User module – used by admin to manage all available user that registered to the system
2. Fungi module – used by mycologist to manage all fungi that have been found around Borneo
3. Community module – Used by public user that shared information that related to fungi only for example food recipe or traditional medicine
4. Report module – Available to both admin and mycologist to generate report that available for example report for newest found fungi in Borneo
5. Board module – available only to mycologist, where mycologist can create a group and invite other mycologist to discuss about fungi information or collaborate for activity.
6. Fungi genus classifier – Available to public where the user can upload image to the system and this image will be process in server to recognize the image by using machine learning.

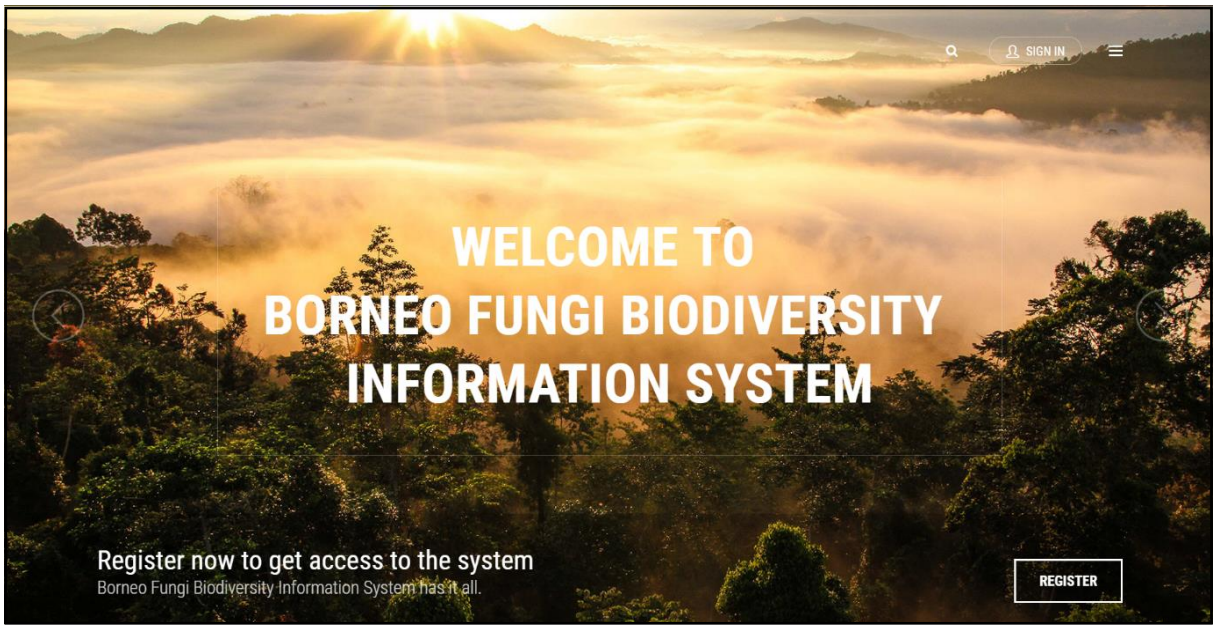

Figure 1: Homepage

Figure 2 shows the section of main page that update any new fungi information in the system where the information is available to the public.

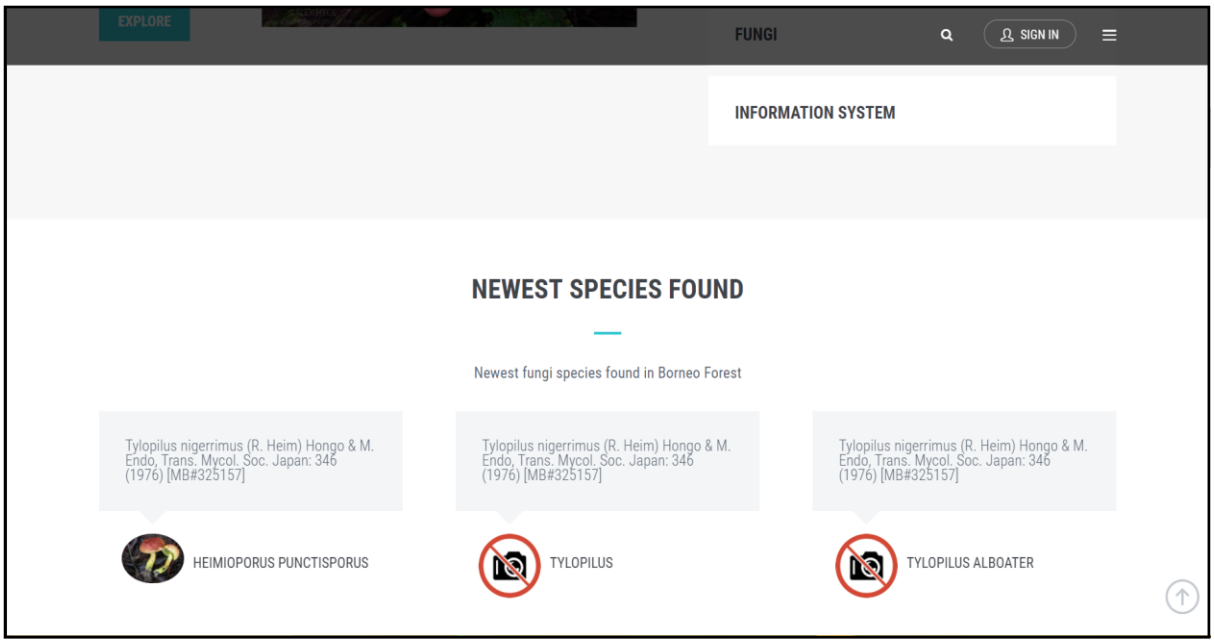

Figure 2: Newest species found

Figure 3 show the dashboard when successfully login to the system. The menu found at left side will be different for every user type.

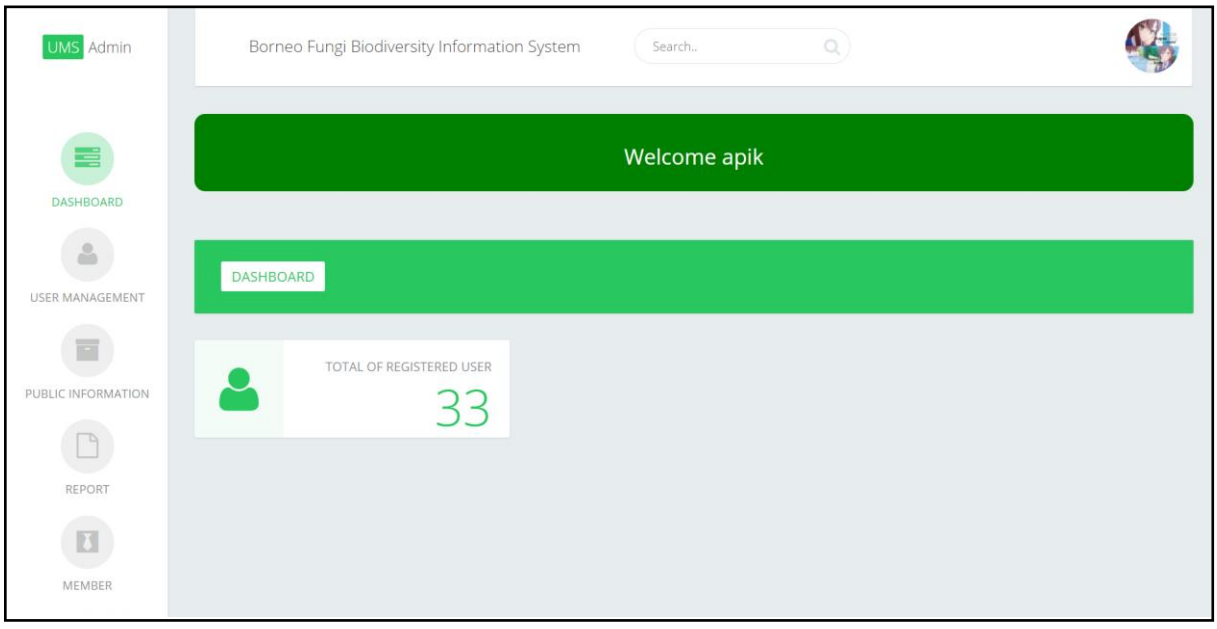

Figure 3: Homepage after login

Figure 4 shows the user management module available only for the admin. This modules allow the admin to search and view information of any registered user in the system. The admin also able to add, update or delete used in the system.

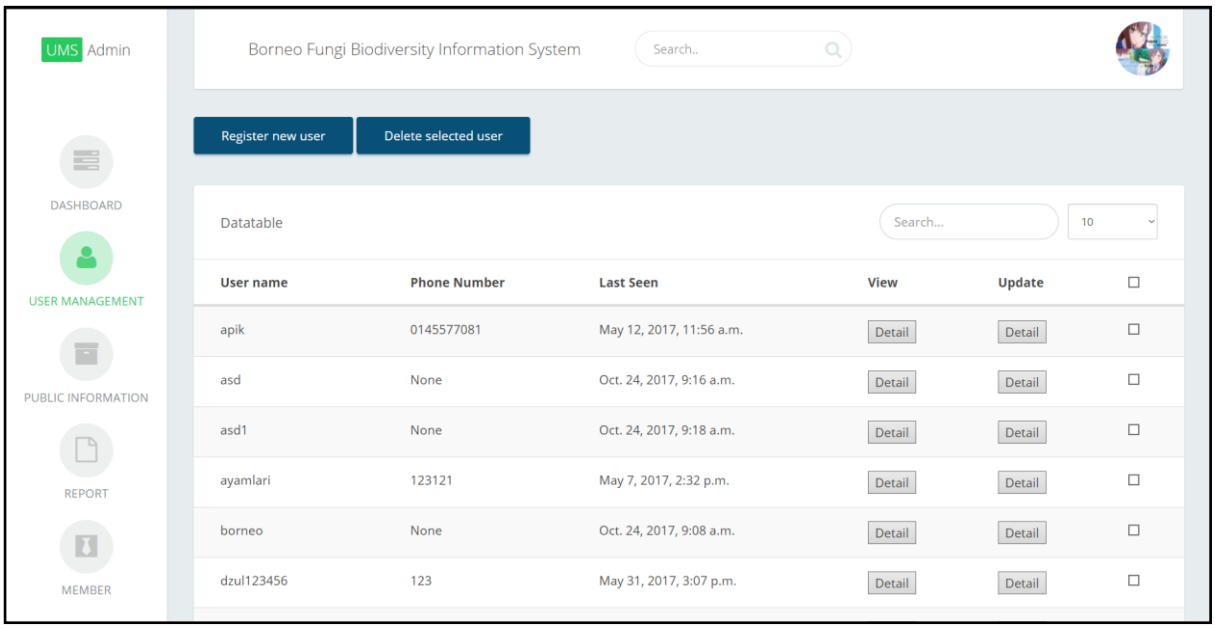

Figure 4: User Module

Figure 5 shows the report module. The report module used to print out the information of user and fungi related in a form of pdf.

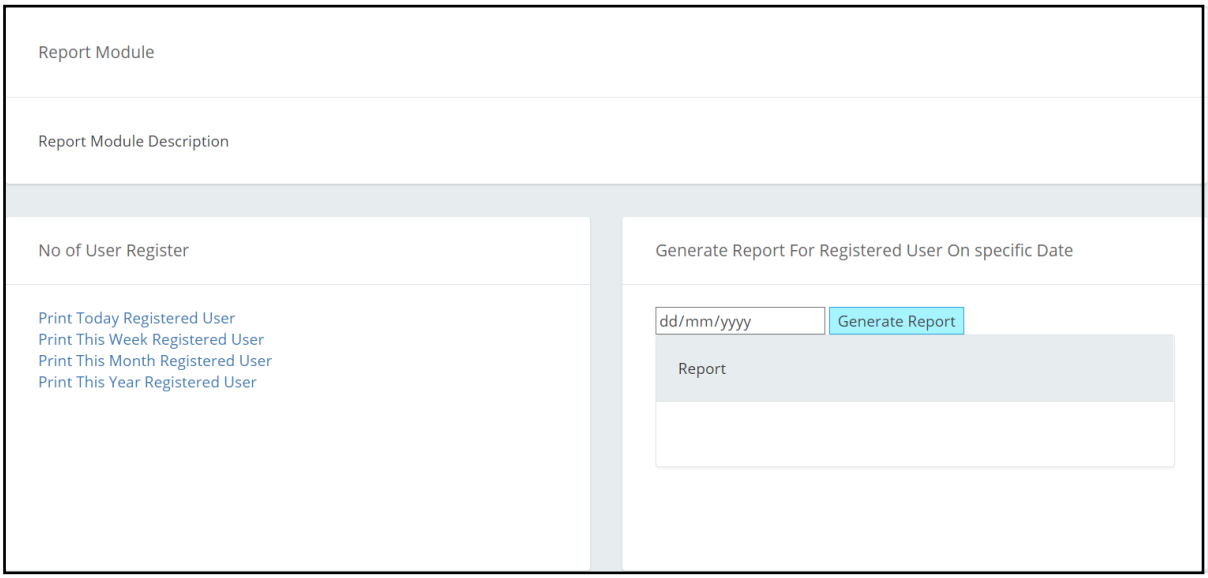

Figure 5: Report Module

Figure 6 shows the community module that available for public user to create forum discussion to share information of fungi related that goes from poison, food recipe, medical and fungi information.

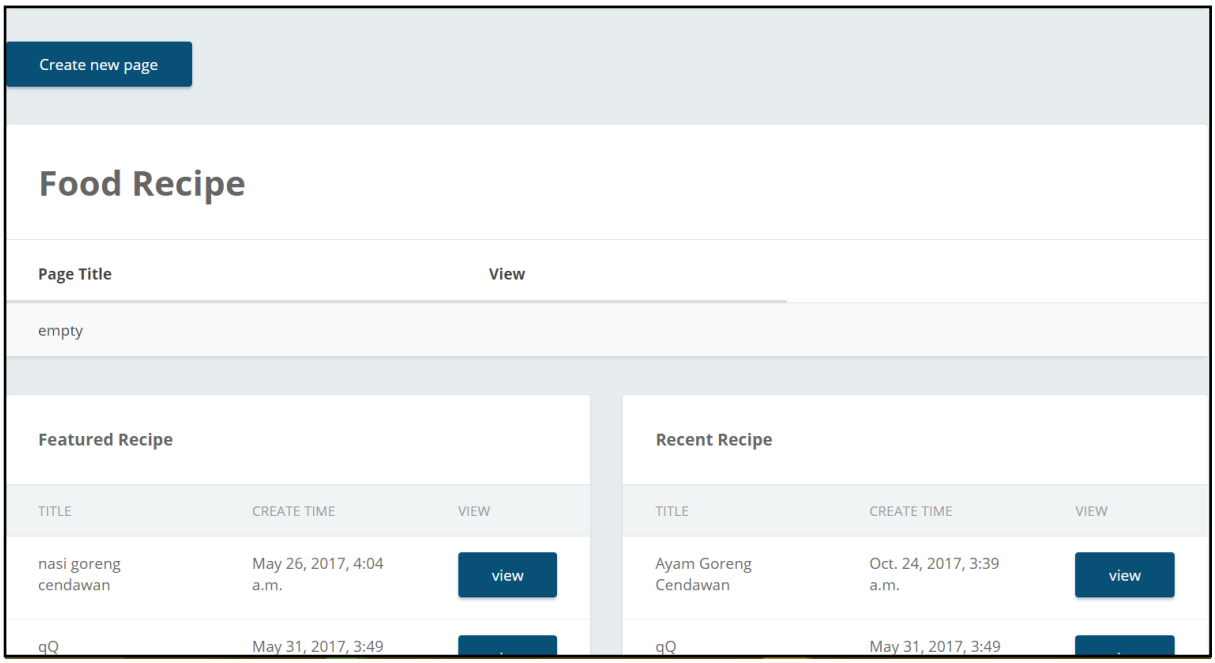

Figure 6: Community Module

Figure 7 shows the fungi module that available to public user and mycologist. This module used to show the fungi category that available in the system.

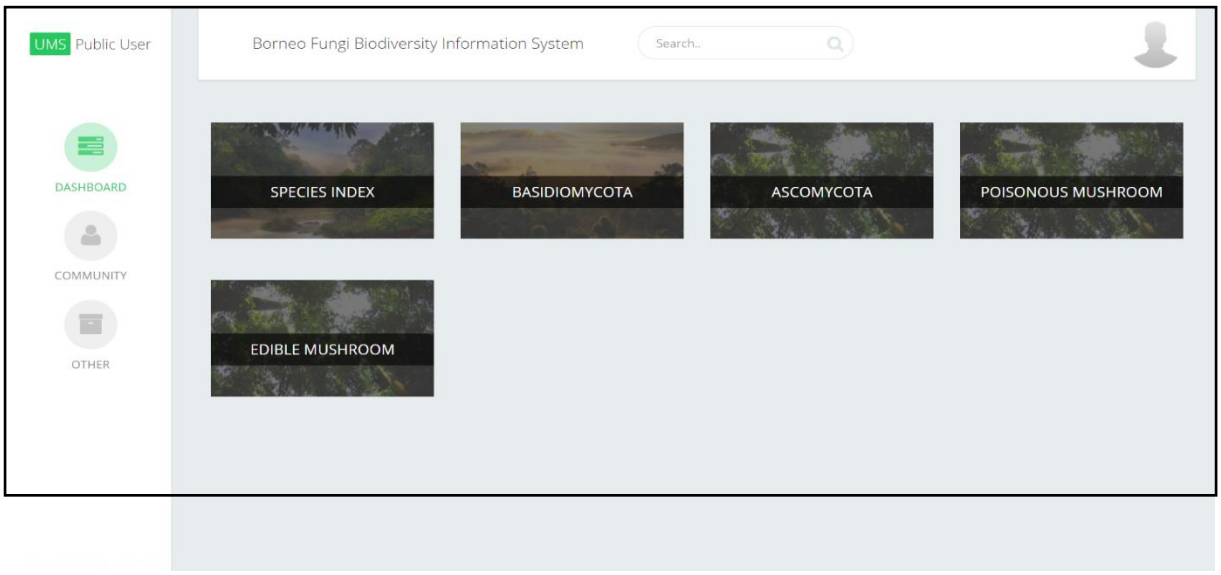

Figure 7: Fungi Phylum available in the system

Figure 8 shows the index for all fungi species registered in the system. Mycologist and public user can find the fungi species through browsing the index or used the search function.

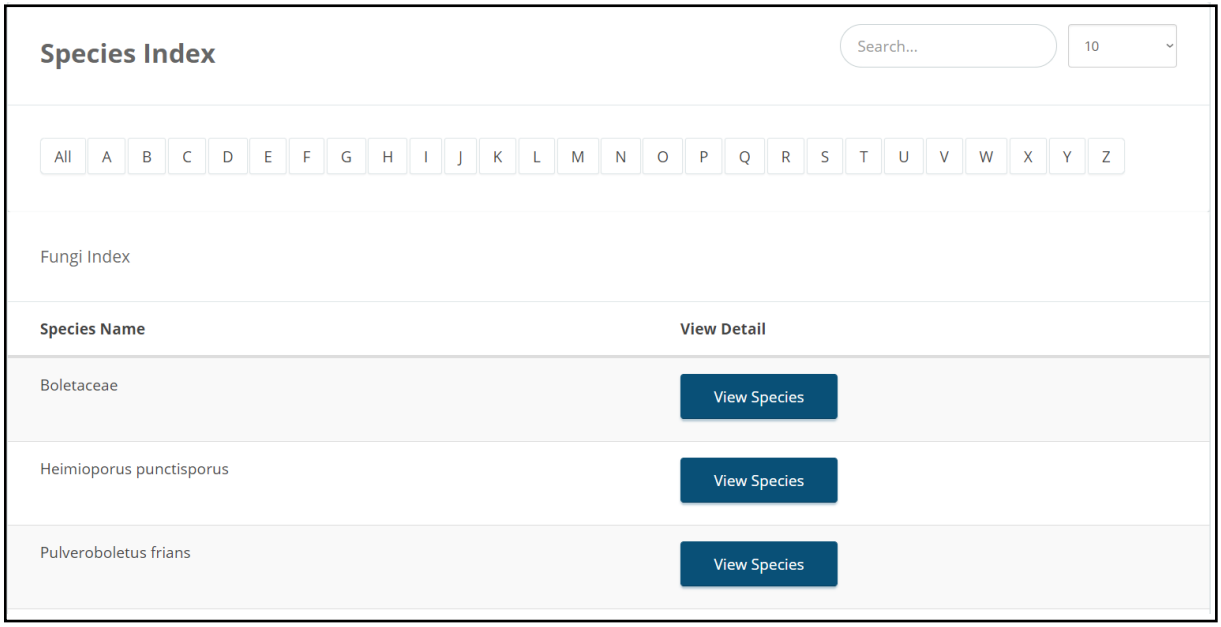

Figure 8: Fungi Index

Figure 9, 10, 11, 12, and 13 show the information of fungi species in detail that available to be seen by the user

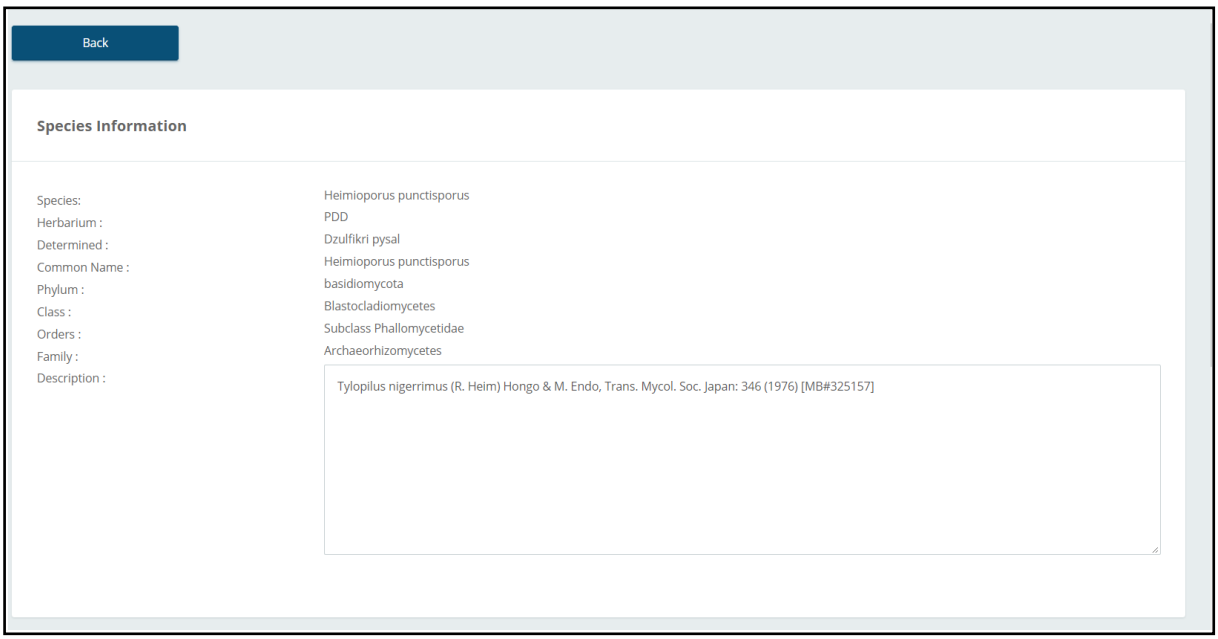

Figure 9: species information

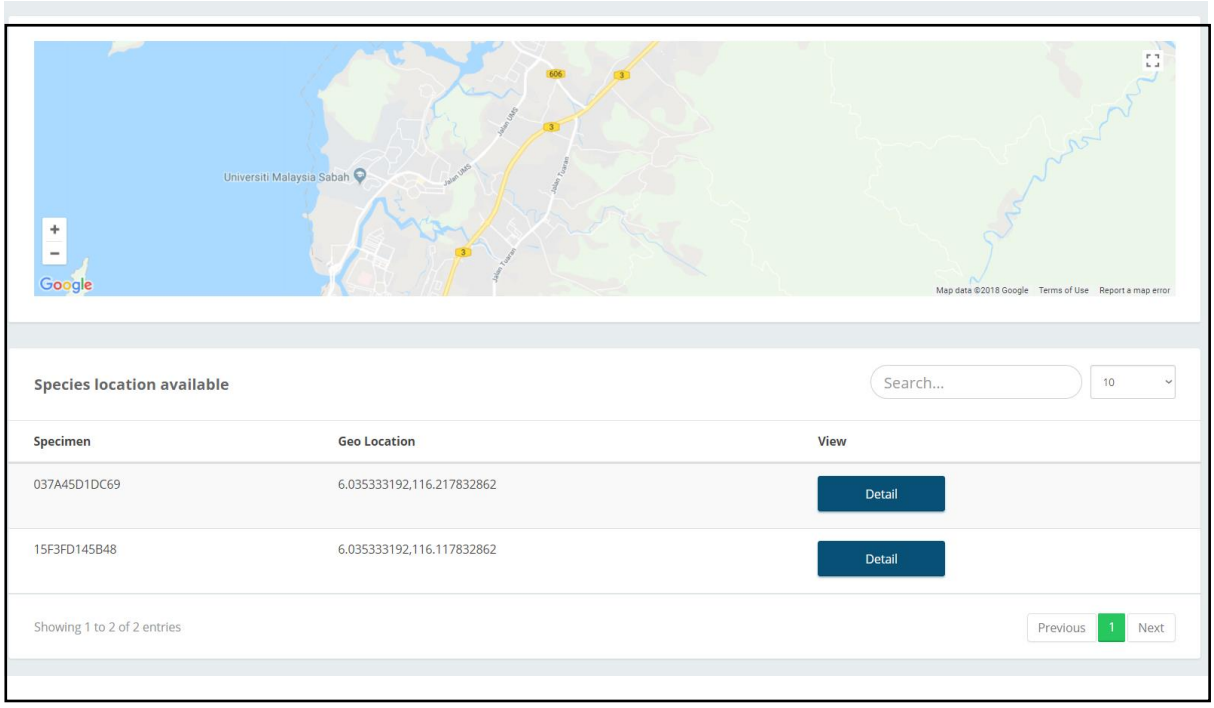

Figure 10: Location available

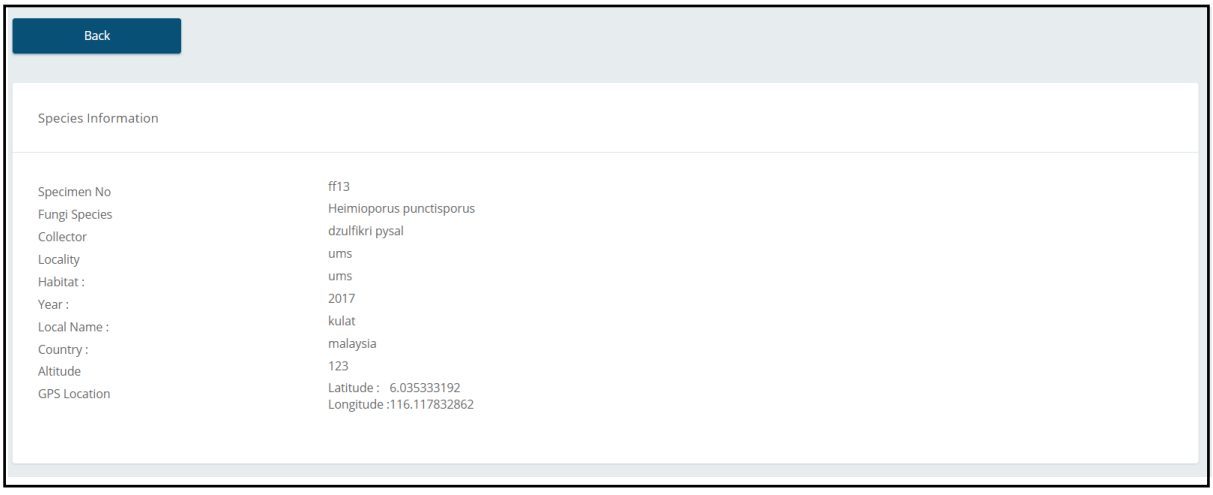

Figure 11: Species detail information

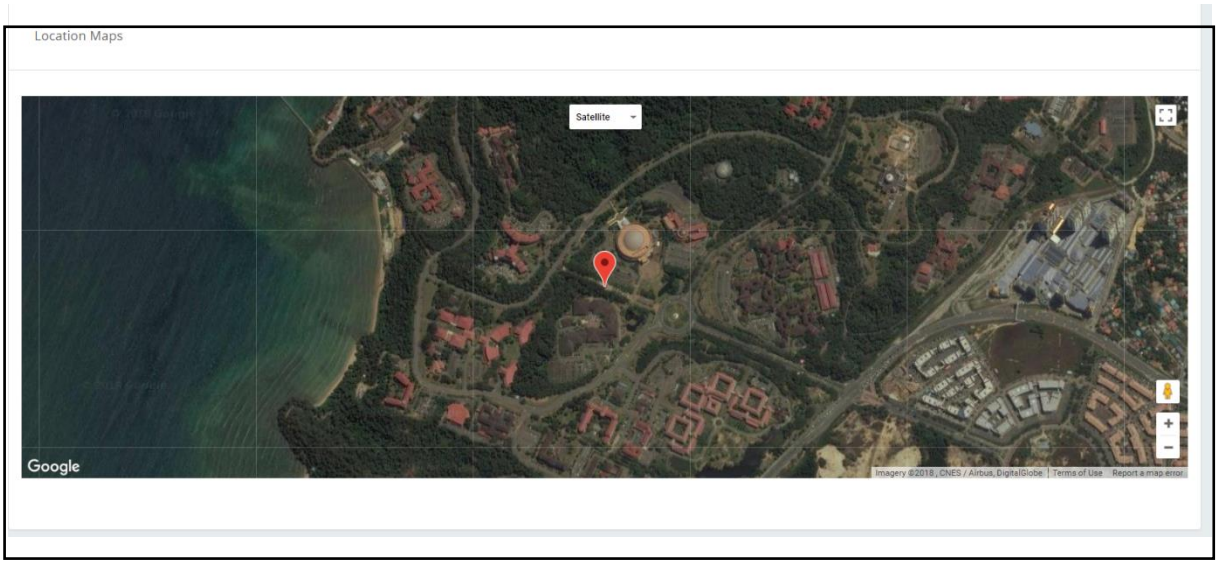

Figure 12: detail location available

Figure 13: Fungi gallery

Fungi genus classification

This is one of main feature for the system that been developed. This modules are used to identify the genus and the information of fungi found in the image when user upload to the server. The genus fungi data that have been used to train the model is shown in figure 14 by using supervised learning and the algorithm used in this is Convolutional Neural Network (CNN). Figure 15 and 16 is the example of image in each genus.

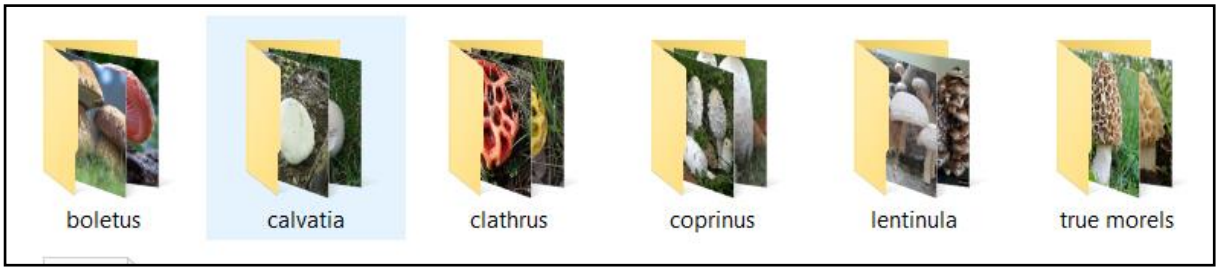

Figure 14: Example of genus used to train the model

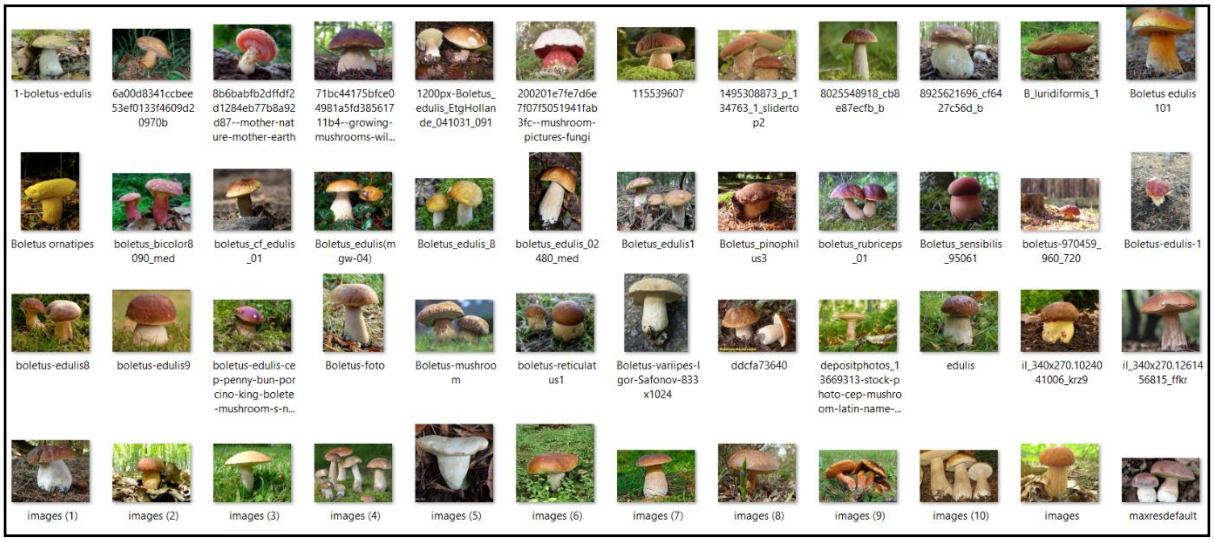

Figure 15: Boletus genus image

Figure 16: Calvatia genus image

Image 4 show the image upload to the server by the user and the model process it as a Boletus fungus and give accuracy based on the model that have been trained to show the model predict the image as 96% as a boletus. Image 5 show the unrecognized image upload by the user and the model still give the predicted result but with a lower accuracy due to the model didn't train to recognize the type of the image upload.

Figure 17: recognizable image

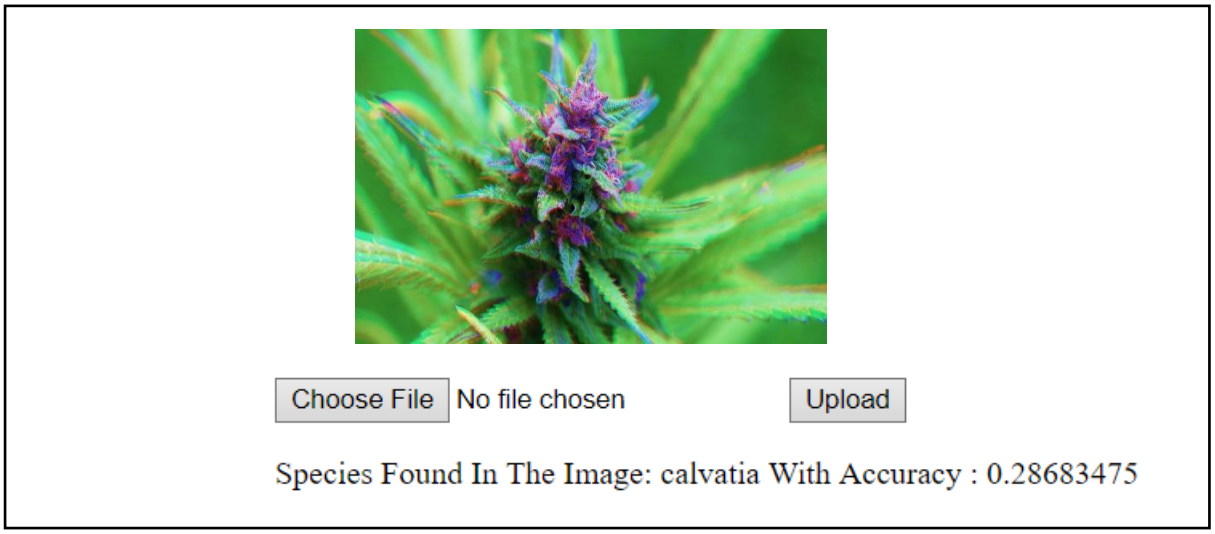

Figure 18: unrecognizable image

Drawing strategy classification

This work is a part of research for my master at Universiti Teknologi Petronas. This work is to learn about children motor and cognitive skill development. There is three application that been develop for this research. The first application is used to collect drawing data from children where it will be used to understand more about children development. This application is specifically built to be run on 5.1-inch touch application such as iPads. To view this application in laptop browser, you will need to change into mobile view in the browser. The second application is used to view the drawing data and simulate how the children draw on the application. The last application is machine learning application that been developed to learn the data gather from children drawing and try to classify the data. The first and second application are built by using HTML, CSS and JavaScript. While the third application are built by using Python, Keras, TensorFlow and Django. To view the application live, click the link provided. For the third application, the algorithm implement to the application can be view in online jupyter notebook from the link provided.

1. Drawing application
   https://abc-gg-com.000webhostapp.com/system2/index.html
   https://abc-gg-com.000webhostapp.com/system2/index_2.html
2. Drawing simulator
   https://children-drawing-1.000webhostapp.com/drawing-simulation/index.html
3. Drawing strategy classifier
   https://nbviewer.jupyter.org/github/DzulfikriPysal/Children-Drawing-Strategy-Classification-Using-CNN/blob/master/Untitled1.ipynb
   https://nbviewer.jupyter.org/github/DzulfikriPysal/Children-Drawing-Strategy-Classification-Using-LSTM/blob/master/Untitled.ipynb

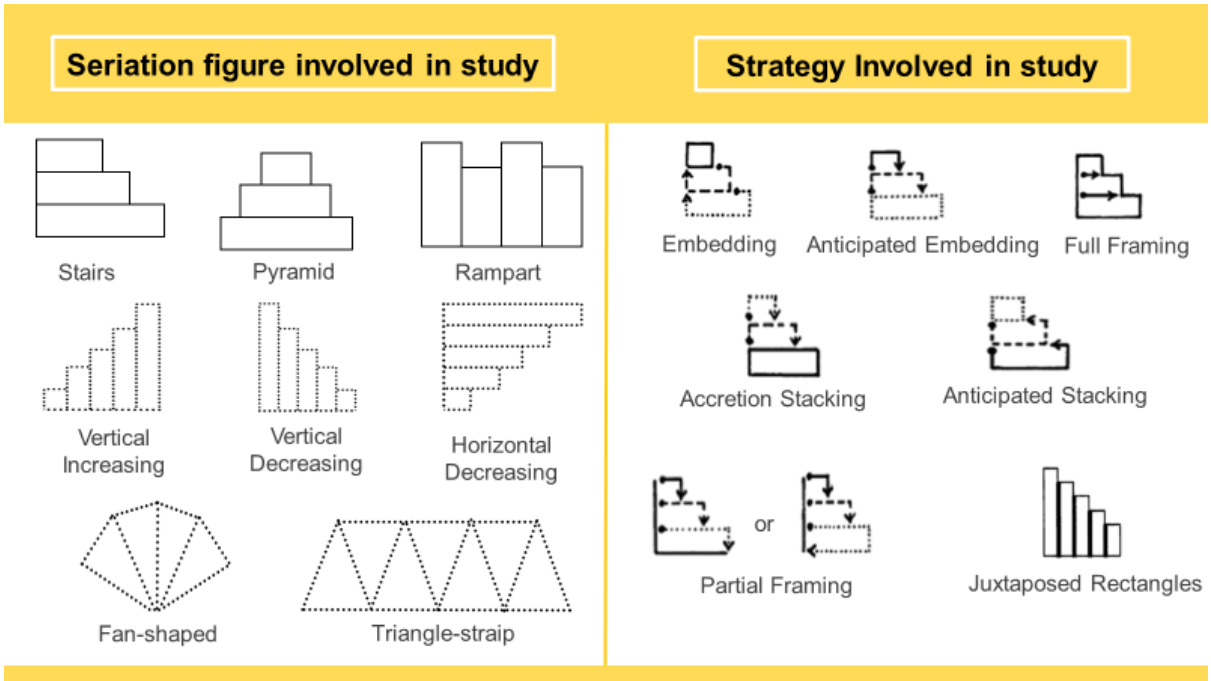

Figure 19: All possible drawing used in the drawing application

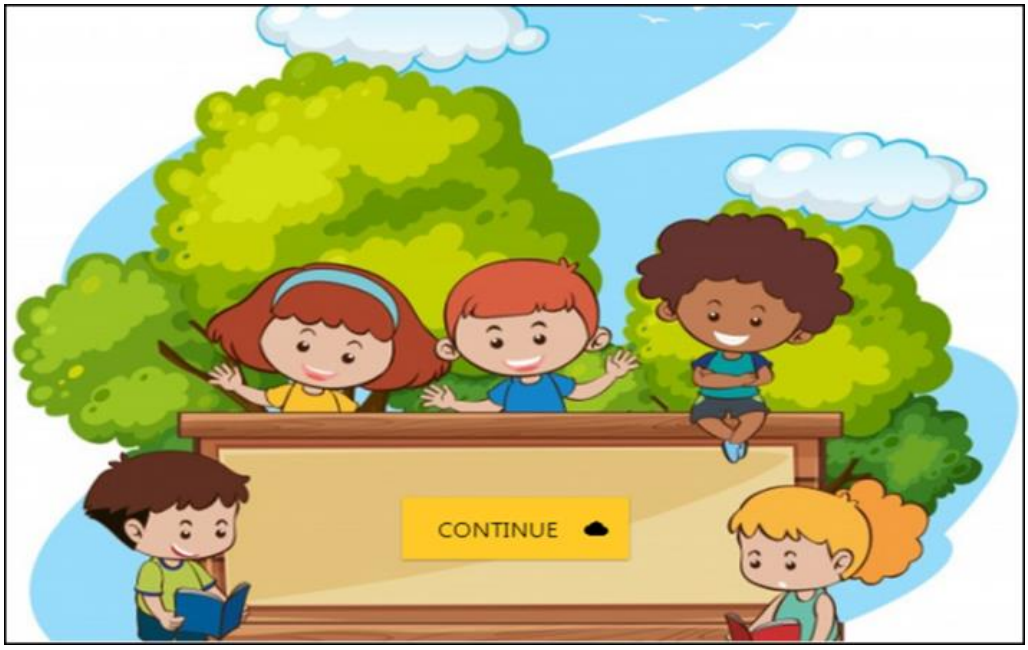

Figure 20: The main first page of the application

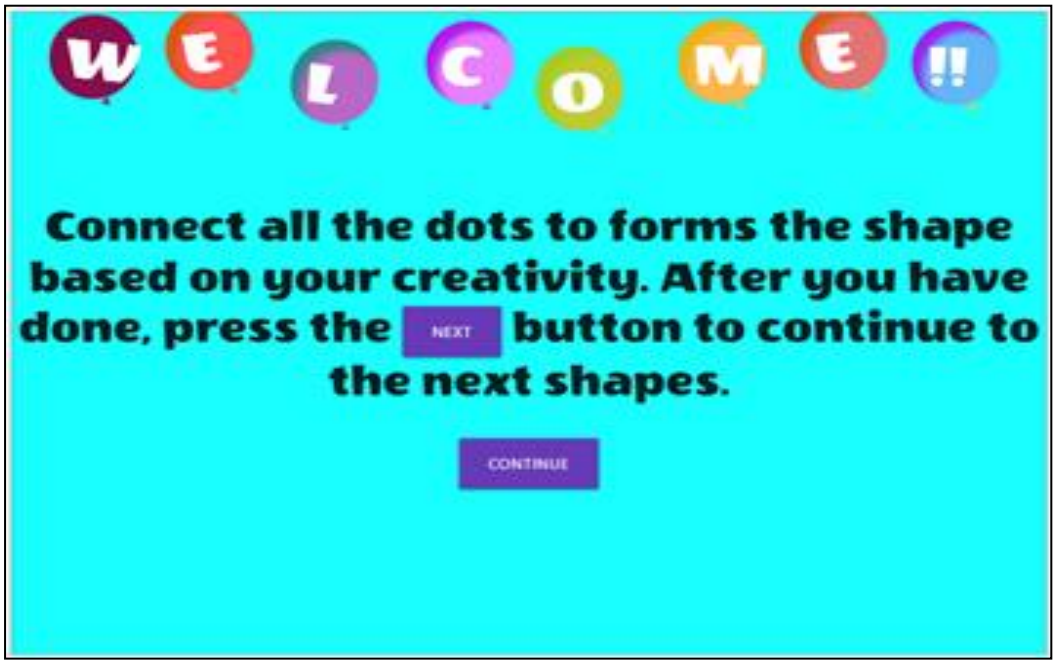

Figure 21: Instruction page

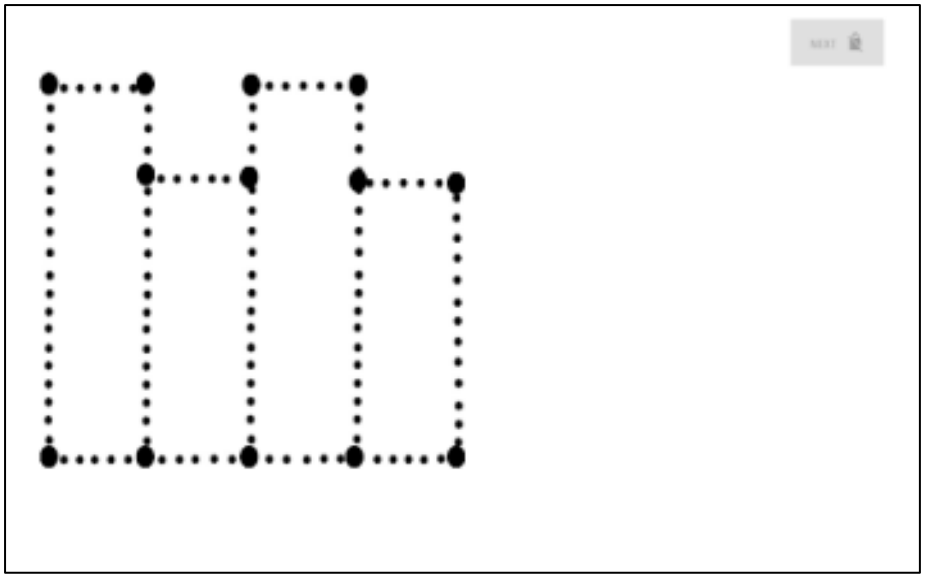

Figure 22: Example of drawing in the application

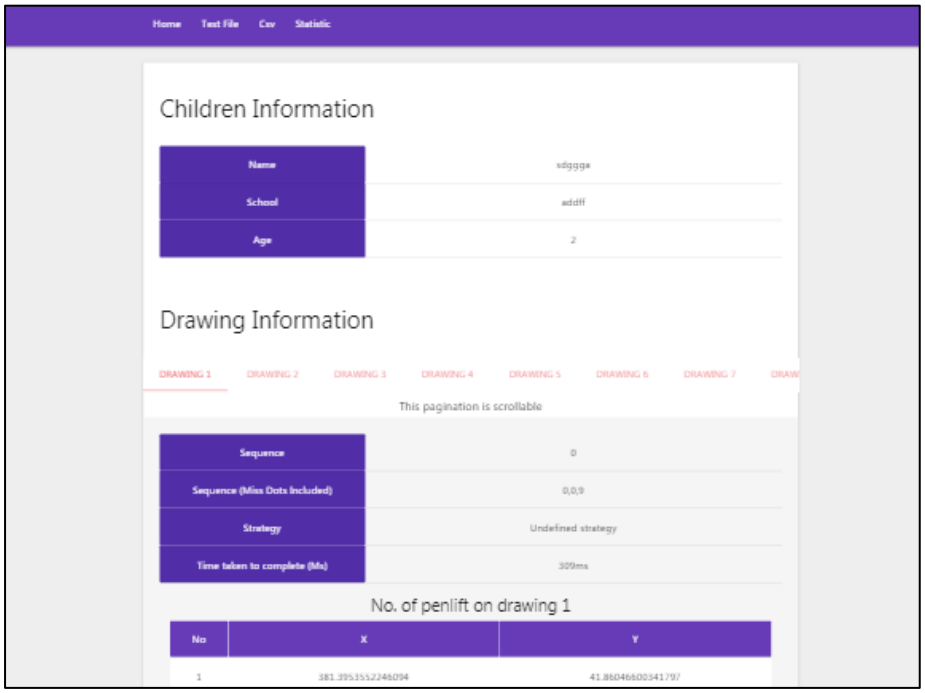

Figure 23: result after finishing the drawing task

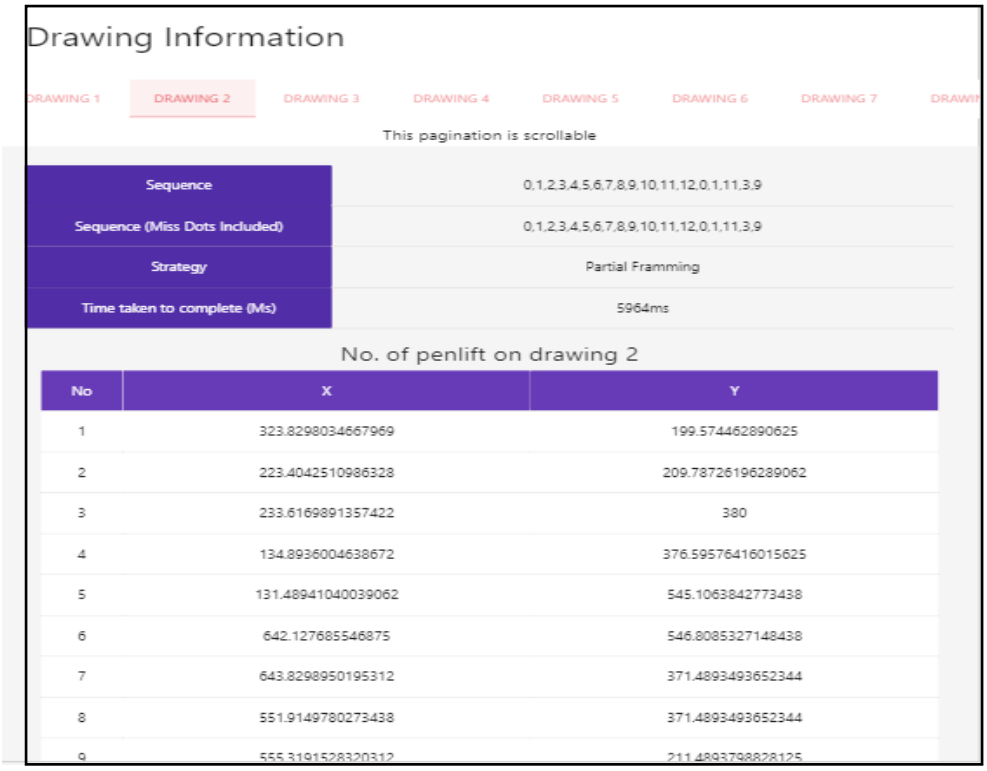

Figure 24: Drawing detail stored on database

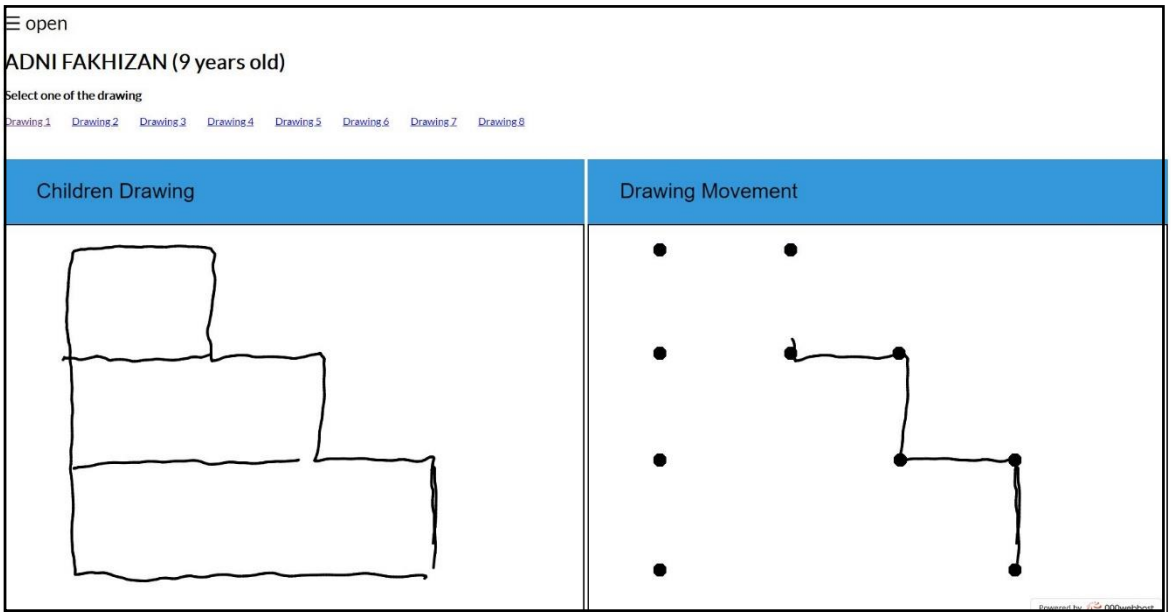

Figure 25: Drawing simulator

Pet Project

1. Object detection
   This project is using Python, OpenCV and Haar Cascades to create computer vision algorithm. This algorithm is used to detect object such as human facial, car or any object on image and video. This algorithm will be able to detect any object as long the feature has been extracting and train on Haar Cascade.
   https://github.com/DzulfikriPysal/Object-detection-using-haar-cascade-OpenCV-

2. Animal classifier
   Using deep learning algorithm using Python, Keras and TensorFlow to create animal classifier that can detect animal in image and video based on the data that have been fit and train to the algorithm. The algorithm used in this project is called 2D Convolutional Neural Network which is known as a good method for image classifier.
   https://nbviewer.jupyter.org/github/DzulfikriPysal/Cat-and-Dog-Classification-Example/blob/master/Untitled.ipynb

3. Drawing classifier
   Similar project with the animal classifier. Instead of using animal image to train the algorithm, we used simple drawing such as triangle, circle and rectangles image to train the deep learning model.
   https://nbviewer.jupyter.org/github/DzulfikriPysal/Simple-Drawing-Classification-Example/blob/master/Untitled.ipynb

4. House price predicter
   This project is developed by using Python, Keras and TensorFlow to predict the future price of house by using deep learning algorithm. The algorithm used in this project is known as Long Short-term Memory or LSTM model. This algorithm is good with sequence form of data.
   https://nbviewer.jupyter.org/github/DzulfikriPysal/House-Price-Prediction-Example/blob/master/Untitled.ipynb

5. Music generator
   This project purpose is to generate new simple music using deep learning. The algorithm used in this is known as generative adversarial network. This algorithm able to generate new data based on the dataset used for training the deep learning model. The data used in this project will be in musical instrument digital interface or MIDI format.
   https://nbviewer.jupyter.org/github/DzulfikriPysal/Music-Generator-Example/blob/master/Untitled.ipynb

6. Optical character recognition (OCR)
   Creating algorithm using Python and PyTessarect to detect and read text word embedded in image. This algorithm is a traditional method to read text from image where current technologies that more improve such as deep learning are available for text recognition.
   https://nbviewer.jupyter.org/github/DzulfikriPysal/Reading-Text-From-Image-with-python/blob/master/Reading%20Text%20From%20Image.ipynb

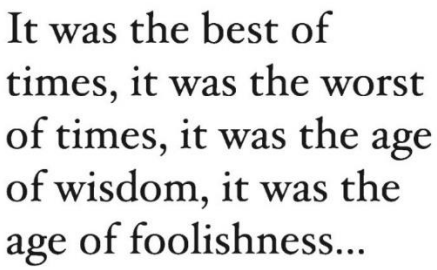

Image with text

It was the best of
times, it was the worst
of times, it was the age
of wisdom, it was the
age of foolishness...

Text extract from image