Percy (Vinh Tuan Dat Nguyen)
LETS COMMUNICATE EXERCISE I

PART A

1. The initial data set comprises a black panther mask made of cardboard taken from various angles while the object is in various poses (neatly placed, upside down, lay on left and right side).

The second data set is of a wine bottle covered in clay. Its pictures are also taken using the same method above.

The first two objects are both in black so I may test whether or not the AI would recognize each one or mistakes the one for the other.

The third data set is of random household objects ranging from stationery to a stool.

2. The purpose was to understand how AI builds a model using features given from the object's and random noise dataset.

3. Step 1: Upload each data set onto Edge Impulse
Step 2: In Impulse Design, use Transfer Learning block to let the AI recognize the features of each object and of the other objects
Step 3: Test the AI accuracy using training data
Step 4: Test the AI accuracy using test data/ live classification

4. Bottle
    - F1 score: 0.9
    - Accuracy: 1
    - Recall: 0.82

Mask
    - F1 Score: 0.92
    - Accuracy: 0.86
    - Recall: 1

Noise
    - F1 Score: 0.8
    - Accuracy: 0.84
    - Recall: 0.89

The overall score is rather quite reasonable with all F1, accuracy and recall scores falling in the range from 0.8 to 1l.

5. Latest Training Classification
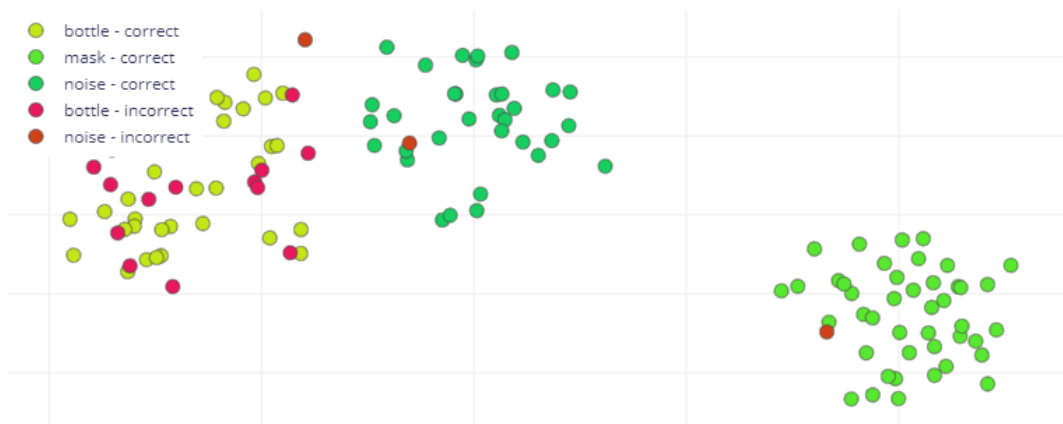
Last training performance (validation set)

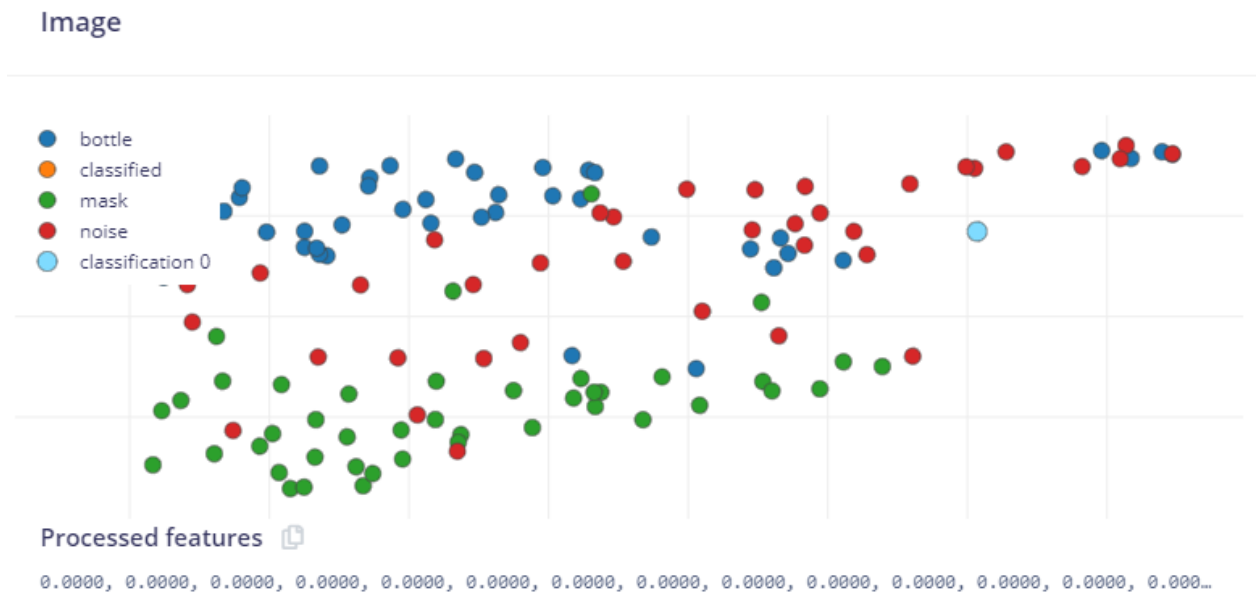| % | ACCURACY 88.5% | | LOSS 0.43 |

Confusion matrix (validation set)

	BOTTLE	MASK	NOISE
BOTTLE	81.8%	0%	18.2%
MASK	0%	100%	0%
NOISE	0%	11.1%	88.9%
F1 SCORE	0.90	0.92	0.84

Data explorer (full training set) ⑦

- bottle - correct
- mask - correct
- noise - correct
- bottle - incorrect
- noise - incorrect

On-device performance ⑦

Test Classification sets:

Image

Processed features

0.0000, 0.0000, 0.0000, 0.0000, 0.0000, 0.0000, 0.0000, 0.0000, 0.0000, 0.0000, 0.0000, 0.0000, 0.0000, 0.000…

Both graphs represent the performance of the classified dataset. Each model's images are grouped up in their respective clusters as they share similar features. The noise data set is spread across the x axis as it comprises of different objects

6. I define better as to have more defined features and increase accuracy.
   The following steps could be taken to improve the accuracy:
   - Increasing the amount of images per data set should get my model to perform more accurately.
   - Taking pictures of the bottle and mask with the same static pose as opposed to random poses (straight up and not upside down or sideway).
   - For pictures of the same zoom level, only change 1 axis of rotation to build a consistent model.

Part C

At home, I tend to be very sleepy and tired in the early morning so it is possible for me to mistake a pancake from a scrambled egg. Hypothetically speaking, both dishes are always on the table every morning. I only want to eat pancakes during the week while eating scrambled eggs on the weekend. To save myself from this trivial trouble, I shall create a machine that can only recognize pancakes and serve me pancakes from monday-friday. If it sees anything other than pancakes, it will take the dish away from me while pushing pancakes towards me.

Since I eat pancakes 5 times a week, I would rather have the machine mistake pancakes for eggs than mistake eggs for pancake. Therefore I would prefer error type 1 (predicted pancake but not actually pancake) over error type 2 (predicted not pancake but is actually pancake). Hence I would want a high recall.

if pancake

EGG

PANCAKE

if not pancake

NOM NOM

non

NOM NOM