Edge Impulse Exercise

1. Please provide a description of the initial data set you brought to class. What were the objects, how many … and why you chose those specific objects. Provide an image of each distinct object.

In my initial data set I had a variety of objects pictures, in total there were about 52 objects. 50 random objects with 1-3 pictures each and 2 objects with 50 photos each. For the specific objects, I looked for 2 distinct things that would be a challenge for the program but still hopefully readable. The first was a ceramic flower pot I painted and the second was a notebook with a plant pattern all over it. Other than the coincidental plant theme, I tried to choose these objects because they had unique features to them that should be obvious for a computer to recognize. The flower pot was a bit of a common shape but it had bright colours and a unique pattern to it that I hoped would help the computer recognize it. The notebook was more focused on the unique shape, as it was not similar to any other object in my data. The random objects weren't really chosen with a reason in mind, I just tried to get as many differently shaped and colorful objects as possible.

2. What was the purpose of the task you were asked to do in class?

I believe the purpose was to see how machine learning could be useful in projects and future media we create. Seeing how it "thinks" and learning how to create our own was very interesting and can be used in a diverse amount of scenarios. I also believe it was a way to show the many ways data can be represented and collected as in this case we created the data sets ourselves to see the flaws. This connects well with the material we've been learning in class while showing a potentially useful tool for the future.

3. Describe in a series of steps what you did to complete the initial task in class

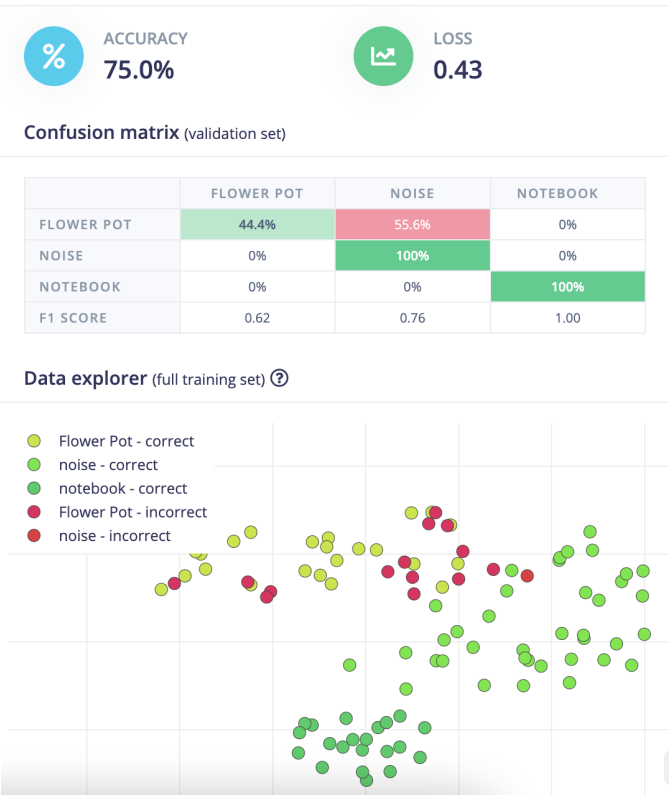
Unfortunately, I wasn't fully able to follow in class as my photos took a long time to upload to the website. I was however able to set up the application in class by uploading most of my photos by the end of the class. A few days later I continued the exercise by setting up edge impulse to have the right image settings so they would all be similar sizes and added the image and transfer learning blocks. After that I tested the accuracy using the training data, which had pretty good results overall. The program easily identified the notebook pictures but had a bit more trouble with the flower pot. Finally I tried it out with live testing and the program did not perform as well. It had trouble recognizing anything I showed it classifying everything, even the 2 main objects as noise.

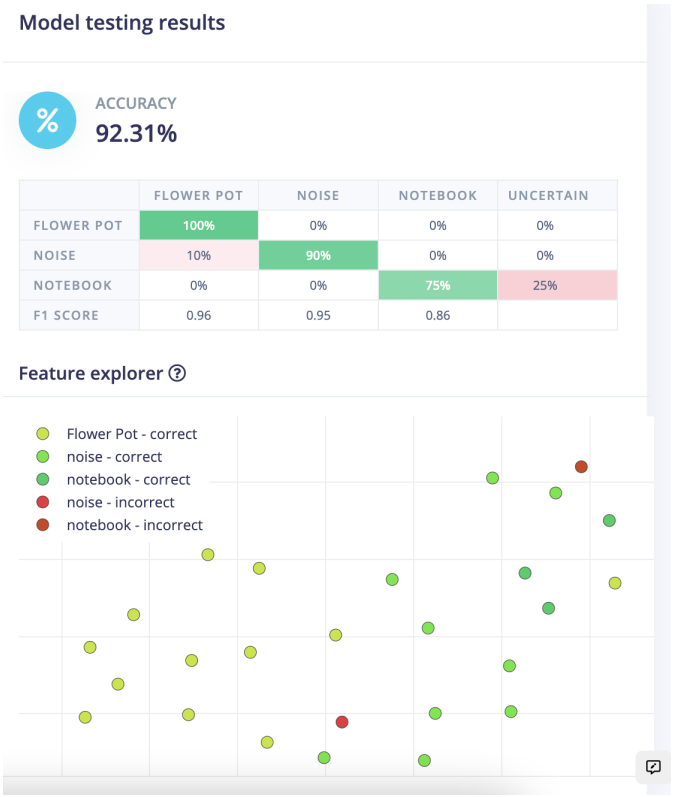
4. How well did your dataset do in terms of Accuracy, Precision and Recall?

Personally, my dataset didn't work too well. When I tested it out the program had a lot of trouble recognizing anything at all. I believe it was a lighting issue as I used a warmer light when taking the photos that I couldn't recreate when testing the program. I also realized through Elio's presentation that my photos weren't taken as well as they could have been as most of them were very zoomed out and the lighting was poor.

5. Take screen grabs of the graphs available through the Feature Explorer for both the training and test/ live classification sets. Discuss the graphs in detail.

The graph provided below shows the results of the training set (left) and the test classification. As I mentioned before, in the training section, the pictures of the notebook were easily classified by the program. There is little to no errors, or red dots, in their area. The same can pretty much be said about the noise. Most of it is split from the rest with only a few of the pictures being mistook for the main objects. However the flower pot was not as successful as it has quite a few errors sprinkled throughout it. I believe this is due to the simple shape of the flower pot and potentially the warm lighting making it hard to see the yellow parts. The live classification however was better overall but had nearly equal trouble with the notebook and the flower pot. When I looked at the images I found the notebook error was due to it being at a weird angle in the picture.





6. Provide brief postulations for how you think you could get your model to perform better. What does better mean?

As I mentioned above, I believe one of my biggest issues was lighting. I had 2 very different lighting setups in my training photos vs my live testing. To be specific, my training photos were taken in a warm lighting in my room with no extra objects in the area while my live testing had fully cool, natural lighting with both me and extra objects in the view of the camera. I also believe if I had included more objects that resemble the 2 main objects it would have trained the program a bit better. My dataset was full of uniquely shaped objects like pens and lamps but didn't include any pots or books that were closer to the shape of my 2 main objects. That may have altered the training by not giving it enough variety to pick apart the differences.

Provide a written scenario:
I can imagine some kind of kitchen gadget that would help you recognize different ingredients as you’re cooking. It would include the recipe you're cooking and light up green or red depending on what you show it. Whatever your hold up to the camera would be identified then a light would light up green if its part of your recipe red if it isn’t. I would also maybe add a yellow light that means it is part of the recipe but not yet time to use it, just to be 100% clear for clueless chefs like myself. This would be very useful for people who are new to cooking and need some help with identifying ingredients and how they can be used. I would also imagine this gadget can be used outside of cooking to identify food and give suggestions on recipes to use them for or how to properly store them, etc.