

# Real-time implementation of an NZ bird detector

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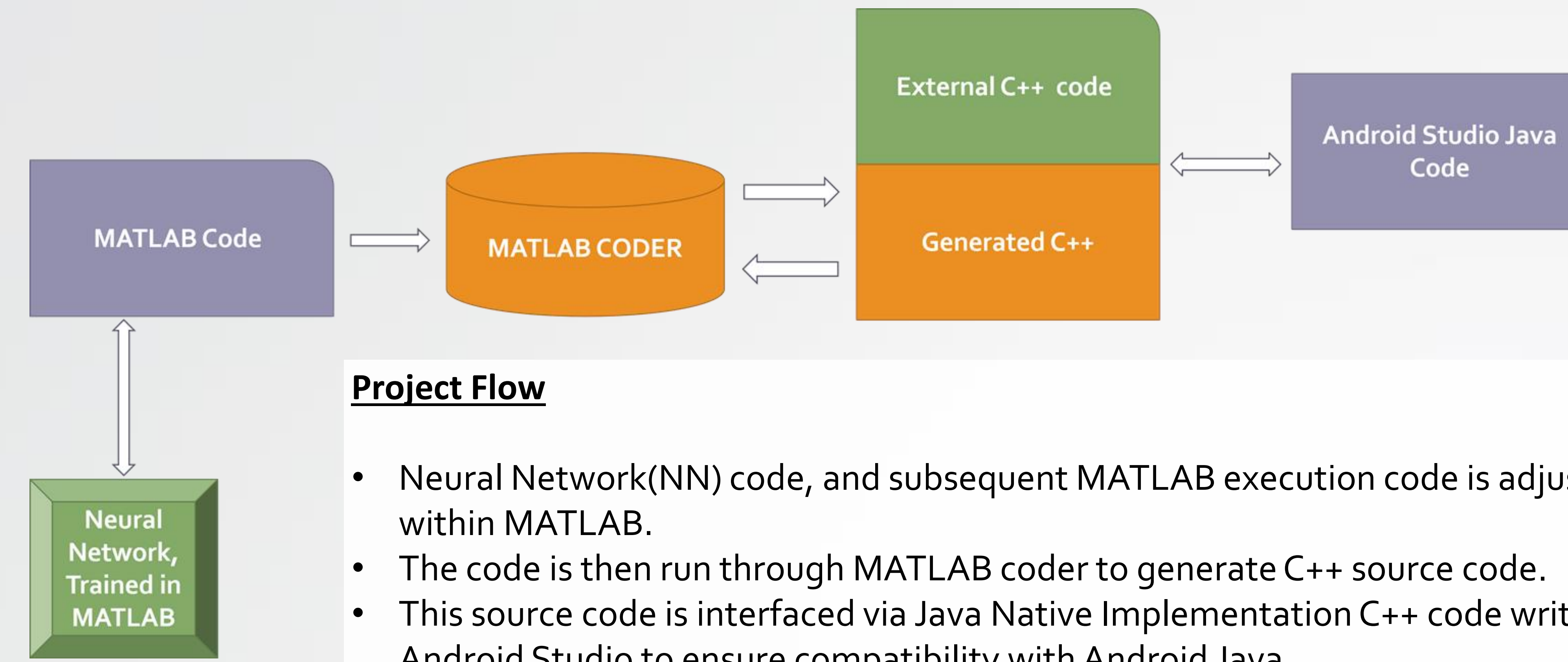
## Overview

The implementation of a Bird detector that can correctly identify several NZ birds; on an android device had two key purposes.

1. To allow end-users access to a highly flexible and versatile Neural Network, in a short period of time.
2. To determine whether a Neural Network, implemented in MATLAB could be converted into a format to access on an Android Device.

Both of these goals were ultimately achieved using MATLAB coder to help create an interface between the Neural Network and Android Applications.

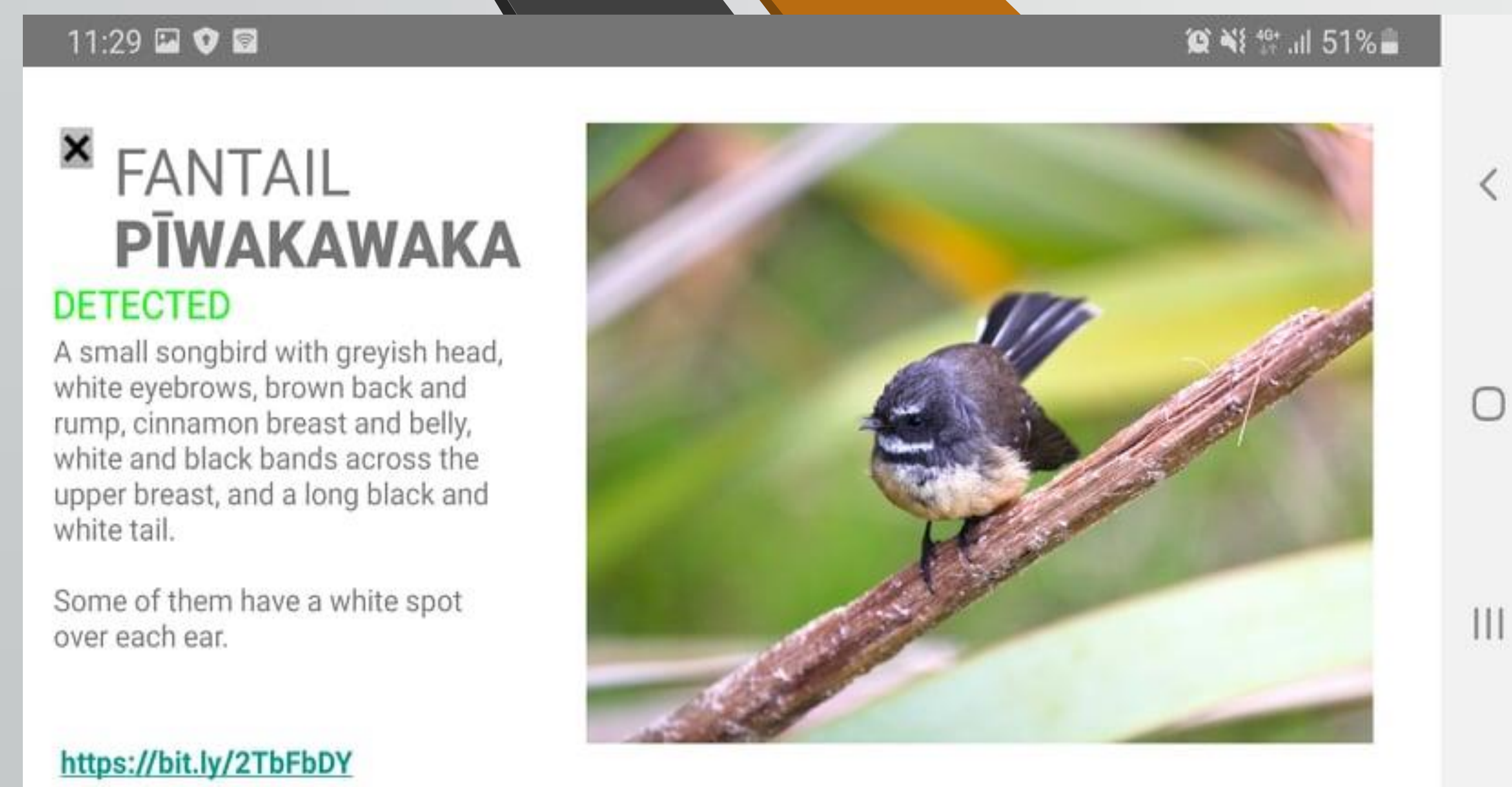
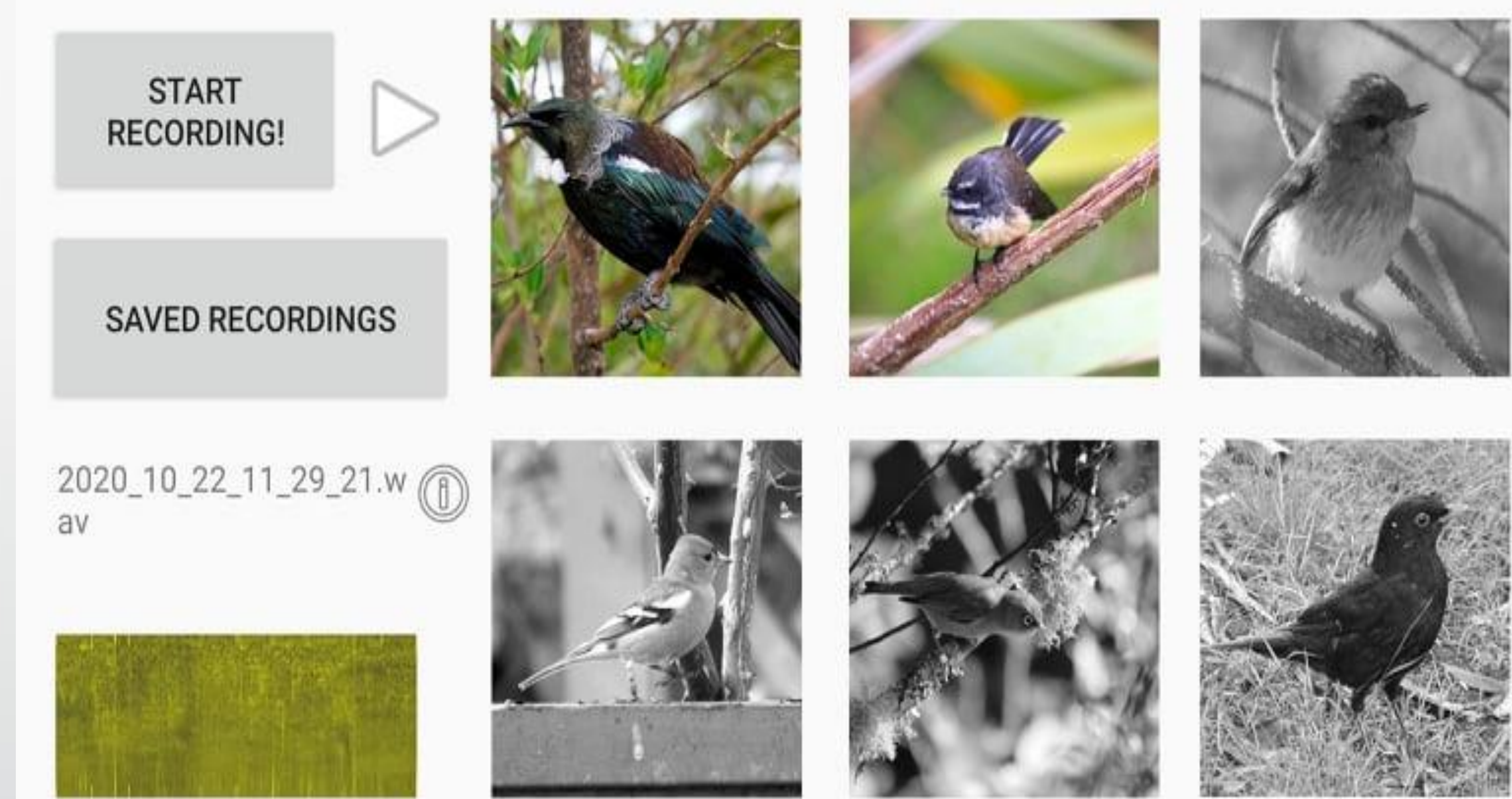
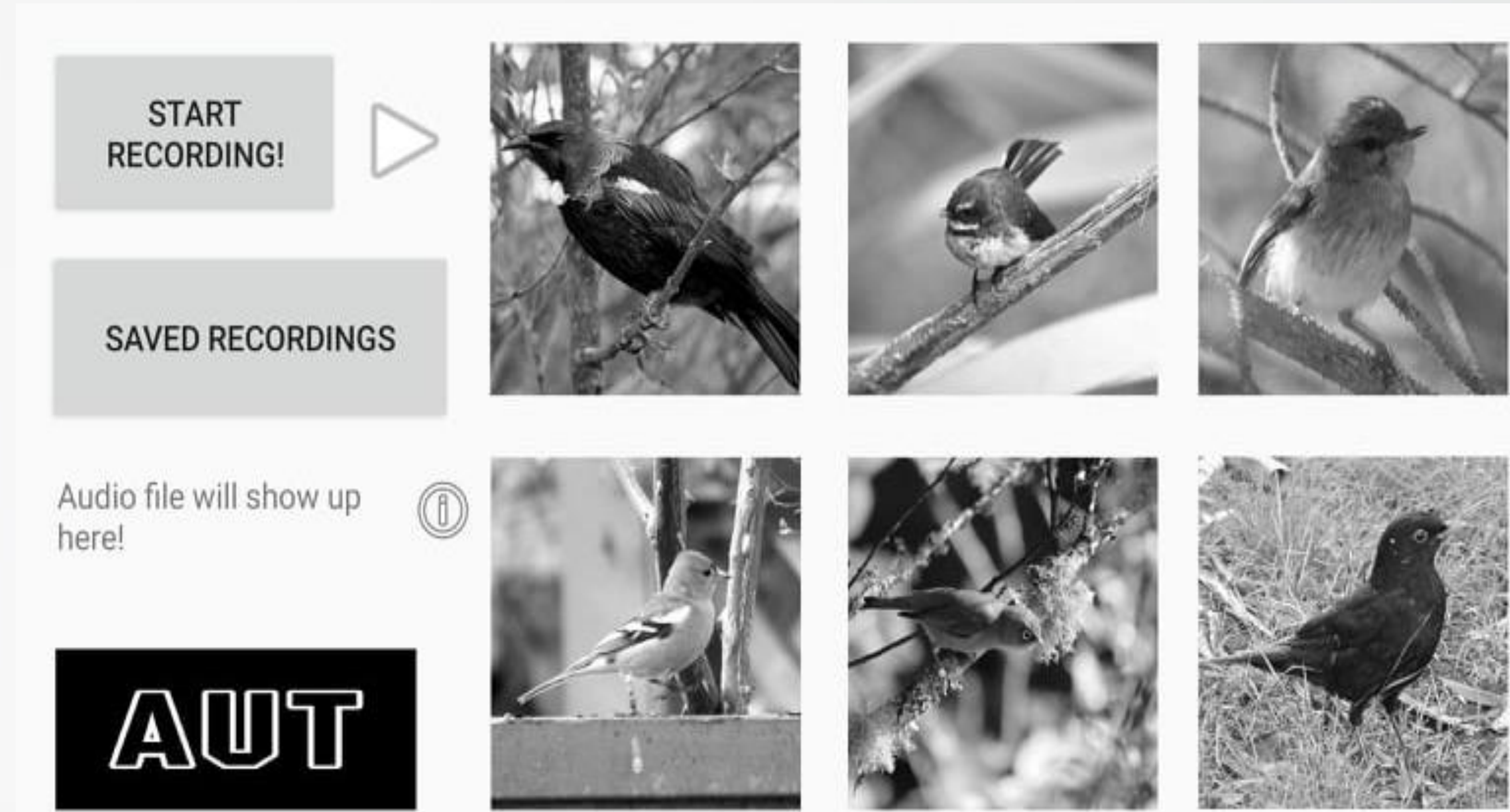
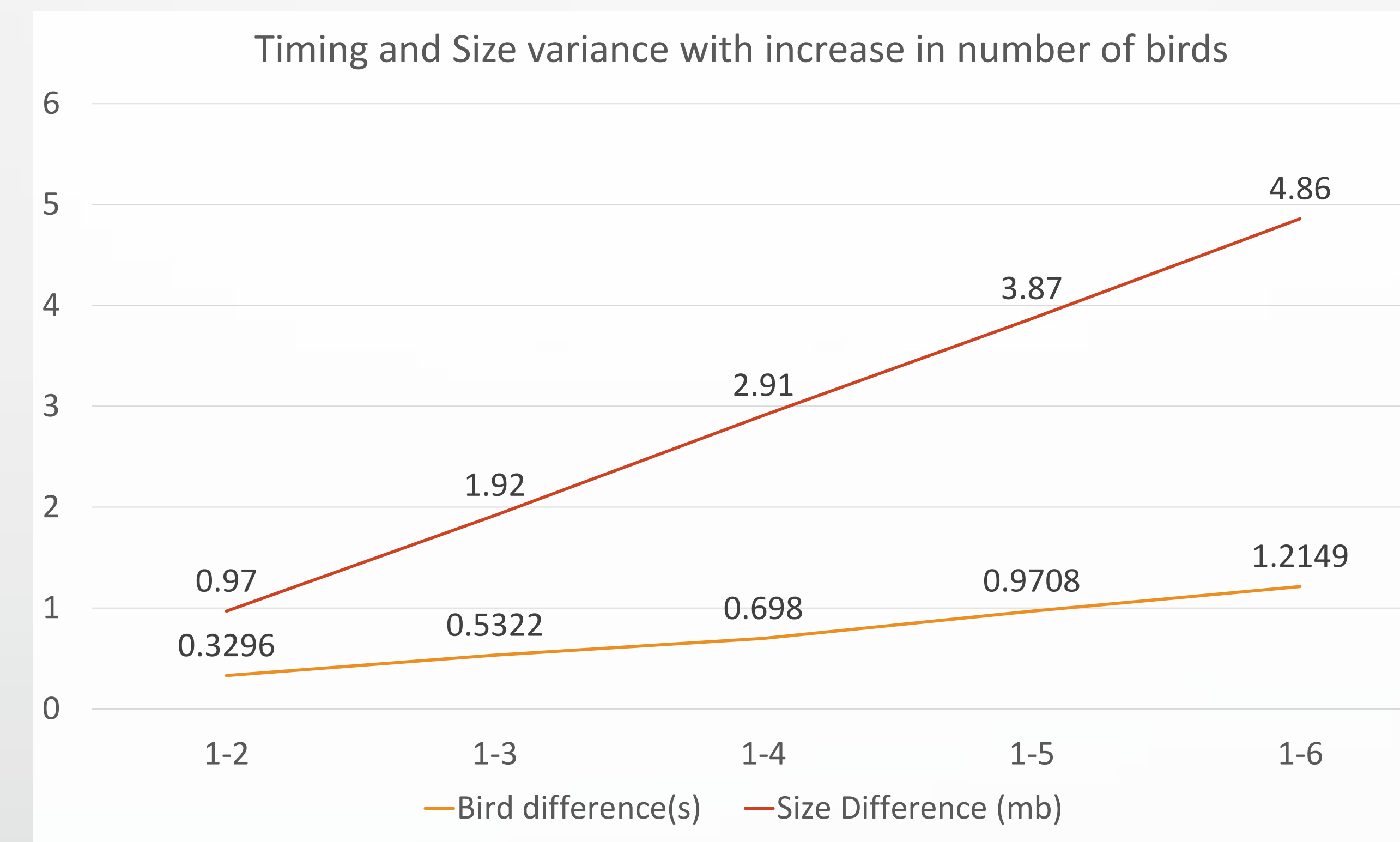
- On an Android device this runs at approximately 2.5 seconds with 6 birds, and takes up 18.52 MB of on device file space.
- This is an entirely reasonable amount of time for this neural network.
- This allows the user to get near instantaneous feedback of which birds are in the environment.



## Project Flow

- Neural Network(NN) code, and subsequent MATLAB execution code is adjusted within MATLAB.
- The code is then run through MATLAB coder to generate C++ source code.
- This source code is interfaced via Java Native Implementation C++ code written in Android Studio to ensure compatibility with Android Java.
- Java code is written for the GUI and as an interface for the C++ Neural Network
- If any changes are required in the NN, this must be done in the MATLAB code, and C++ source code regenerated.

	File Size(MB)	Average Time(s)	App Size(MB)
1 Birds	13.7	1.1686	5.17
2 Birds	14.72	1.4982	6.14
3 Birds	15.09	1.7008	7.09
4 Birds	16.65	1.8666	8.08
5 Birds	17.58	2.1394	9.04
6 Birds	18.52	2.3835	10.03



	1	2	3	4	5	6	7	8	9	10	Average
Colour(initial Map)	50	34	15	13	13	13	27	13	14	12	20.4
Colour Button	11	23	18	18	23	18	18	22	20	18	18.9
Input Function	372	134	99	86	91	98	97	96	83	87	124.3
Output Function	76	48	58	46	46	46	71	47	45	45	52.8
Spectrogram	1601	1290	1241	1153	1201	1298	1322	1165	1082	1196	1254.9
Total	2110	1529	1431	1316	1374	1473	1535	1343	1244	1358	1335.5

## Further Work

- Compatibility with all Android Devices
- Re-training of NN for Urban Environment
- Speed and size comparisons for more birds

