

Drones for Humanity

2.0

Milestone Four

February 2020

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1 Team Information

1.1 Names and Emails of Project Members

Name	Email	Position
Michael Mascari	mmascari2017@my.fit.edu	Programmer (Computer Vision/AI)
Ballard Barker	bbarker2017@my.fit.edu	Project Manager/ Structures
Matthew Backert	mbackert2017@my.fit.edu	Systems Engineer
Nicholas Davis	davisn2017@my.fit.edu	Avionics/ Propulsion/ Aerodynamics
Brendan Sanders	bsanders2017@my.fit.edu	Production/ Structures
CJ Gagni	cgagni2019@my.fit.edu	Avionics
Justin Williams	justin2017@my.fit.edu	Propulsion
Hamdan Alblooshi	halblooshi2016@my.fit.edu	Propulsion

1.2 Faculty Advisor

The CS faculty advisor for the project is Dr. Debasis Mitra. dmitra@cs.fit.edu

1.2.1 Faculty Advisor Meeting Dates

- Saturday February 13th

1.3 Client

The client is the project team ourselves

1.3.1 Client Meeting Dates

- Thursday, January 21th
- Thursday, January 28th
- Thursday, February 4th
- Thursday, February 11th

1.3.2 Client Feedback

- Client is happy with the progress made developing a neural network but were not happy with the low accuracy. After explaining what might be causing the low accuracy and possible solutions, I believe the clients are okay with it.

2 Project Details

2.1 Progress of Milestone 4

Task	Completion %	To do
1. Ensemble Methods	100%	none
2. Better comparison dataset	100%	none

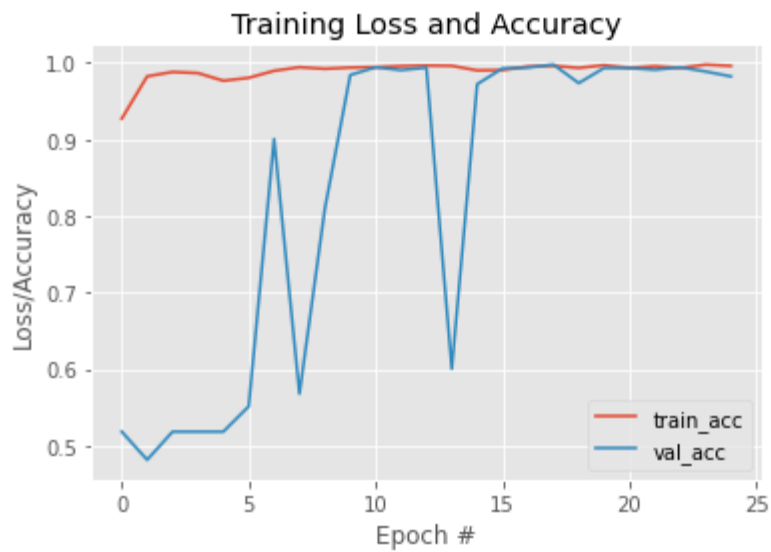
2.2 Discussion of Tasks in Milestone 4

Task 1: Three neural networks were made. A MiniVGGY, MiniGoogLeNetY, and a LeNetY were combined to make an ensemble. The prediction of the neural networks were averaged to get the prediction of the ensemble.

```
MiniVGGY = np.copy(predictedY)
```



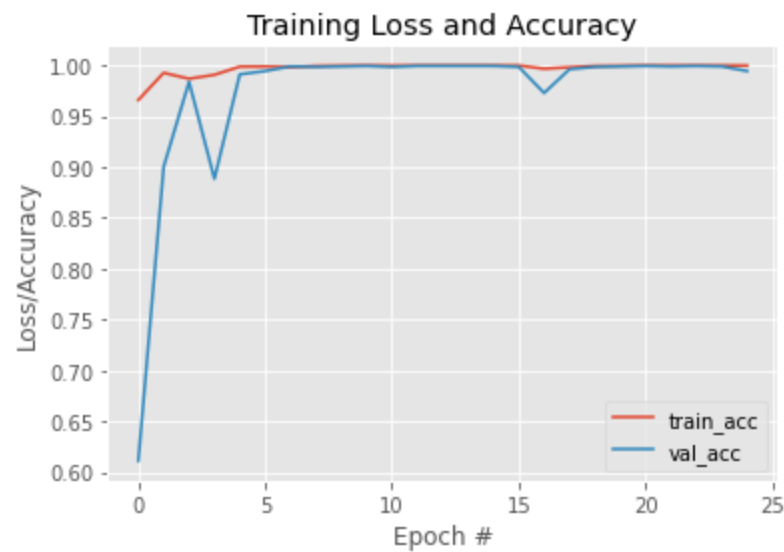
	precision	recall	f1-score	support
0.0	1.00	1.00	1.00	1370
1.0	1.00	1.00	1.00	1354
accuracy			1.00	2724
macro avg	1.00	1.00	1.00	2724
weighted avg	1.00	1.00	1.00	2724



```
MiniGoogLeNetY = np.copy(predictedY)
```



	precision	recall	f1-score	support
0.0	1.00	0.98	0.99	1370
1.0	0.98	1.00	0.99	1354
accuracy			0.99	2724
macro avg	0.99	0.99	0.99	2724
weighted avg	0.99	0.99	0.99	2724



```
LeNetY = np.copy(predictedY)
```

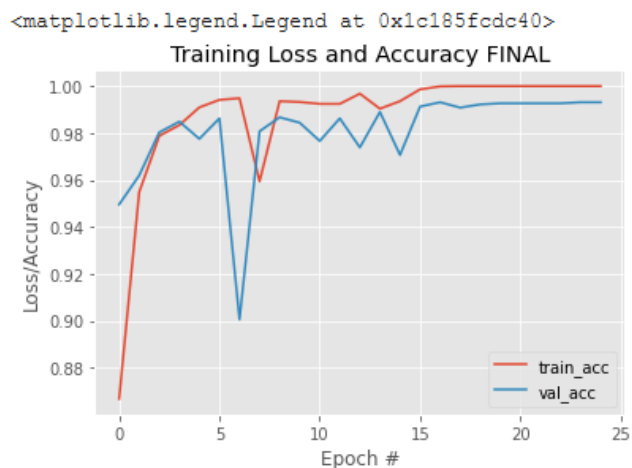


	precision	recall	f1-score	support
0.0	0.99	0.99	0.99	1370
1.0	0.99	0.99	0.99	1354
accuracy			0.99	2724
macro avg	0.99	0.99	0.99	2724
weighted avg	0.99	0.99	0.99	2724



The final graph for the ensemble was:

	precision	recall	f1-score	support
0.0	1.00	1.00	1.00	1370
1.0	1.00	1.00	1.00	1354
accuracy			1.00	2724
macro avg	1.00	1.00	1.00	2724
weighted avg	1.00	1.00	1.00	2724



giving the program 100% accuracy.

Task 2: A second dataset was found that contains images of forests and images of forest fires! However, the dataset was fairly small, about 18x smaller than the current dataset being used. Even with the small scale it was able to achieve 95%-97% accuracy. The accuracy can be worked on with data augmentation to try to increase the dataset size. There also were very few orange images in the comparison dataset so still not sure how easy that is able to trick the neural network. (Using CIFAR10 is was able to overcome being tricked by orange images).

	precision	recall	f1-score	support
0	0.94	0.93	0.94	73
1	0.98	0.98	0.98	227
accuracy			0.97	300
macro avg	0.96	0.96	0.96	300
weighted avg	0.97	0.97	0.97	300

2.3 Plan for Milestone 5

Task 1: Connect all physical components (Camera and Raspberry Pi)

Task 2: Set up data stream from camera to neural network

Task 3: Evaluation results

Task 4: Set up GPS Chip signaling

Task 5: Create poster for senior design

3 Faculty Advisor Tasks

3.1 Faculty Advisor Feedback

Task 1: Good job. Good plan

Task 2:

Faculty Advisor Signature: ____Debasis Mitra____ Date: ____2-15-2020__

3.2 Student Grade and Advisor Signature

Faculty Advisor: detach and return this page to Dr. Chan (HC 214) or email the scores to pkc@cs.fit.edu

Score (0-10) for each member: circle a score (or circle two adjacent scores for .25 or write down a real number between 0 and 10)

Michael Mascari	0	1	2	3	4	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10
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Faculty Advisor Signature: _____ Date: _____