

Milestone 5

1. Covid19 Audio Cough Classification
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3. Client: Dr. Nematzadeh Zahra, Florida Tech College of Engineering and Science:
Department of Electrical Engineering and Computer Science

4. Milestone 5 Matrix

Task	Rodrigo	Emma	Lamine	Audrey	Notes
1. Finish cleaning data	0%	100%	0%	0%	Shortened each mel-spectrogram to 1 cough
2. ML testing and refinement of framework	0%	10%	90%	0%	Tested on CNN and ResNet50
3. Web testing	50%	0%	0%	50%	User model fully running
4. Integrating Base ML Model with Web Using a Neural Network Framework	50%	0%	0%	50%	Base model integrated

5. Discussion (at least a few sentences, ie a paragraph) of each accomplished task (and obstacles) for the current Milestone:

- Task 1:

After removing all audio files that had been labeled but were not cough recordings they are converted into mel-spectrograms with all white space on either end being removed. That way all recordings were focused entirely on the coughs within the recording. Unfortunately, the accuracy of our developed CNN did not improve at all. The next step for the CNN is to build a model with more layers to see if that improves accuracy, but also to further refine the data in pre-processing. All mel-spectrograms have been shortened to one cough in length to further

increase the accuracy of the CNN. This was then tested on both the ResNet50 model as well as our CNN.

- Task 2:

- Task 3:

The user model that was in development in the previous milestone has been completed and passed testing. This model allows for a user's demographic information to be saved to further inform our classification model. We have tested the audio recording feature of the app, and it also passed. We have also had aspects of the web app not pass testing. Classification via the web app does not currently pass testing. We are still having issues with feeding the mel-spectrogram made from the user audio into the model via the web app. Now that the user model and its associated storage is functional, we are approaching the task of feeding the data into the model differently in an attempt to resolve the current issues. Currently, we record audio, and then save it to the user model and send it for classification. We are now working to save the audio, and then pull it from storage for classification rather than trying to classify it directly when it is recorded.

- Task 4:

The primary benchmark model was integrated for this task. The model trained using the dataset prior to the completion of task 1 (meaning it was trained using data that was not fully cleaned) and had a validation accuracy of 42.09%. The weights of the trained model were then saved. The model architecture and the saved weights of the trained version of the model were then integrated into the ML container sub-app of the Django app. Due to the nature of this project, the ML model will continue to undergo refinements to improve accuracy. As the model continues to evolve, the model in the ML container sub-app will continue to be updated.

6. Discussion (at least a few sentences, ie a paragraph) of contribution of each team member to the current Milestone:

Rodrigo Alarcon

Added more information slots to the user login page using a custom Django model. Began to work on adding a user entry for a file to allow for audio files to be saved to the users directly. This has caused many problems which are still being dealt with, but I have managed to save files to the users at times. This just encounters a few issues when pushing to the live version. I have also worked on features to playback and upload files directly, instead of recording, but this is all dependent on the files being saved properly. Once fixed, this will directly convert to taking recordings and feeding them into the CNN.

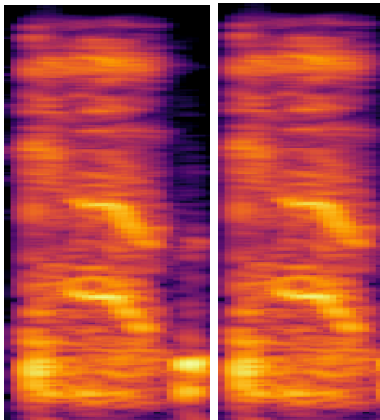
Emma Conti

Cleaned data to be one cough per mel-spectrogram to help further improve the accuracy of the CNN. Examples of what this will appear like for the mel-spectrograms are below. This can

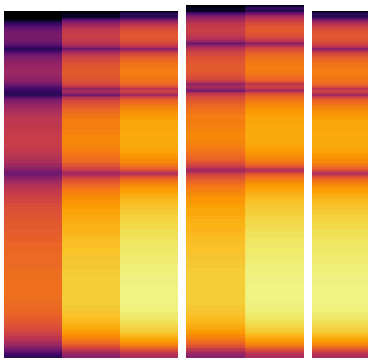
be further refined as needed, but there is some concern that we are already losing data by removing every cough except one.

The new dataset was then run through the ResNet50 model and achieved an accuracy of ____.

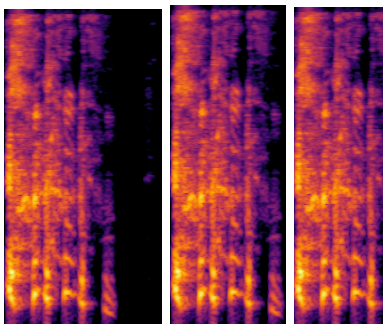
Example of Past Data vs. Current Data



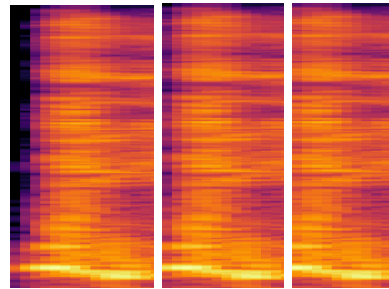
Audio 23 Original Image, 1st Attempt at Cutting



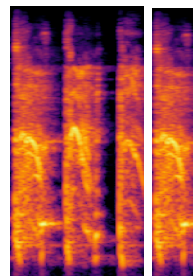
Audio 135 Original Image, 1st Attempt at Cutting, 2nd Attempt at Cutting



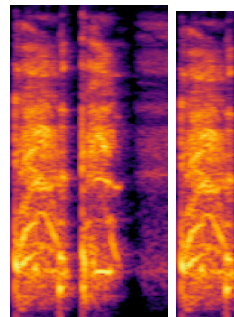
Audio 223 Original Image, 1st Attempt at Cutting, 2nd Attempt at Cutting



Audio 226 Original Image, 1st Attempt at Cutting, 2nd Attempt at Cutting



Audio 242 Original Image, 1st Attempt at Cutting



Audio 247 Original Image, 1st Attempt at Cutting

Lamine Deen

Worked

Audrey Eley

Trained Emma's benchmark CNN and saved the trained weights as a .pth file. Replaced placeholder model and weights in the local web app with the architecture and weights of the trained benchmark model. Worked to integrate recording and audio classification functionality into the live version of the site (not yet finished).

7. Plan for the next Milestone 5 (Task Matrix)

Task	Rodrigo	Emma	Lamine	Audrey
1. ML Testing and refinement of framework	Test using benchmark model (ResNet50) and initial testing from our model. Continue to improve the ML model. Determine which improvement strategies to implement based on testing results.			
2. Web testing	Continue implementing additional features to optimize user experience when using the COVID detector			
3. Integrating WebApp and CNN	Determine what may need to change within the web framework to better accommodate and suit the CNN.			

8. Discussion (at least a few sentences, ie a paragraph) of each planned task for the next Milestone or

- Task 1: With the ResNet50 model attaining a higher accuracy level than the CNN, we will continue to add more layers and other feature improvements to see what will provide the most effective final CNN. There is very little left that can be done in terms of data pre-processing, but continued testing and building more complex models should increase the accuracy of our CNN.
- Task 2: A questionnaire will be added for users to log symptoms when they record a cough, which will allow us to provide more data about their symptoms over a period of time. This will also potentially help prevent false positive COVID identifications for users.
- Task 3: Initial versions of our CNN will be integrated into the webapp and will be replaced with newer versions as the accuracy continues to increase. There continue to be issues with making sure the webapp can have coughs recorded, currently they can be uploaded and run through the webapp, but the accuracy is incredibly low. Further steps may need to be added after a user uploads their recording to shorten it to the first cough to better pinpoint what the CNN needs to be assessing.

9. See Faculty Advisor Feedback Below

10. Meeting Date: February 27th, 2025

11. Faculty Advisor feedback on each task for the current Milestone 4

- Task 1:
- Task 2:
- Task 3:
- Task 4:

Faculty Advisor Signature: _____ Date: _____

Evaluation by Faculty Advisor

Faculty Advisor: detach and return this page to Dr. Chan (HC 209) 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)

Rodrigo	0	1	2	3	4	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10
Emma	0	1	2	3	4	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10
Lamine	0	1	2	3	4	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10
Audrey	0	1	2	3	4	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10

Faculty Advisor Signature: _____ Date: _____