Automated COVID-19 Detection Using Deep Learning

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Task Matrix: Milestone 3

Task	Rodrigo	Emma	Lamine	Audrey
1. Finish cleaning data	25%	25%	25%	25%
2. ML testing and refinement of framework	0%	50%	50%	0%
3. Web testing	50%	0%	0%	50%
4. Integrating Base ML Model with Web Using a Neural Network Framework	25%	25%	25%	25%

Task 1 - Finish Cleaning Data

- Dataset cleaning must be completed before further testing can be completed
- Removed all audios from DB which would not be useful for training the CNN
- Most egregious examples of this were
  - Singing in spanish
  - Full conversations
  - Counting to 10 in french

Task 1 - Finish Cleaning Data

- Also removed audios which
  - Were silent
  - Blew out the microphone
  - Had some coughing but were mostly talking
  - Had exceptionally poor audio quality

Task 2 - ML Testing

- **Both CNN and ResNet50 Model are being used for testing**

Task 2 - Refine ML Workflow

- **Oversampling**: Used for the COVID-19 class to address class imbalance.
- **Augmentation**: Applied three techniques to increase dataset size and diversity.
- Changed the data augmentation method to be applied randomly to covid 19 class replaced timestretch with loudness and quietness
- **Improved Learning**: Enhanced the model's capacity with better preprocessing.
- **Data Split**: 60% Training, 20% Validation set, and 20% Test set.

Improvement

Improved Training Dynamics: Enhancements led to higher training accuracy and reduced loss.

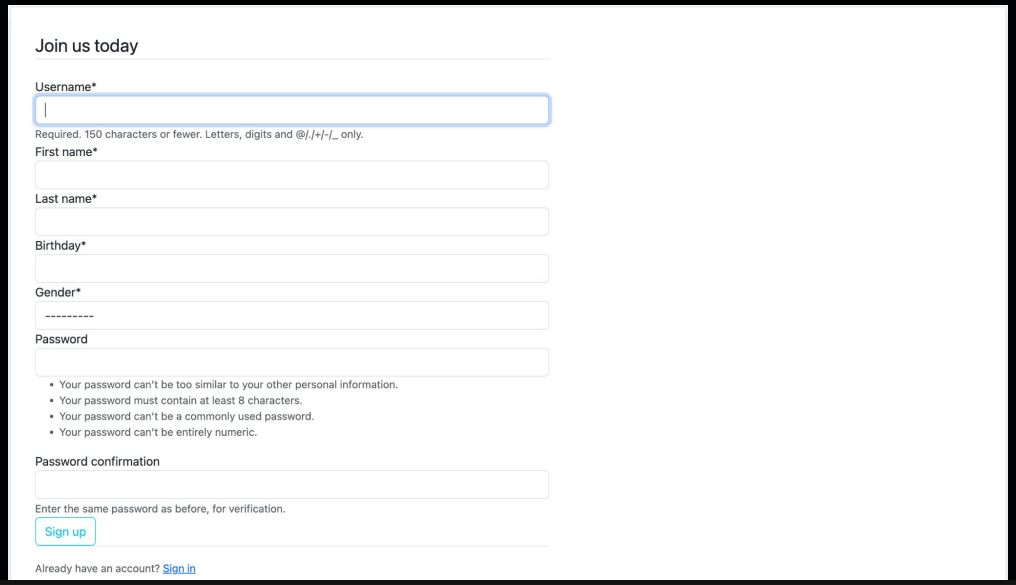
Experiment Focus: Experiment 4 used augmented, high-resolution grayscale spectrograms; Experiment 5 added new data processed with librosa and oversampling.

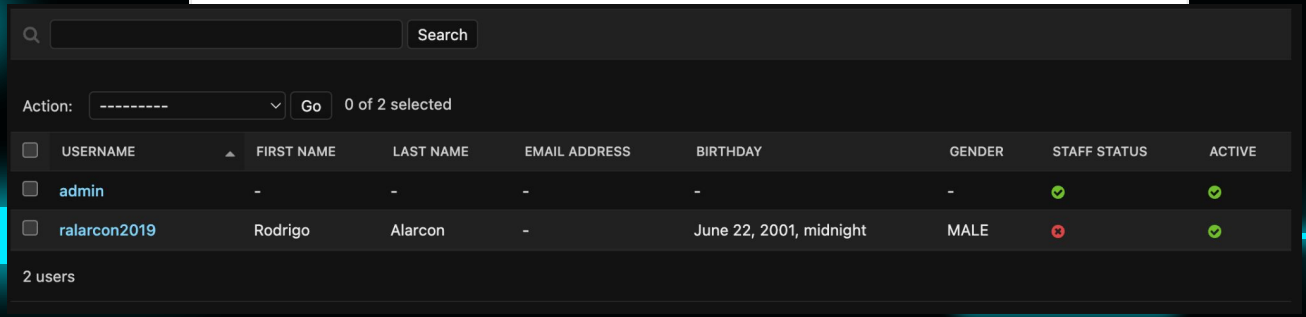
Validation Challenges: Despite training improvements, validation accuracy remained unchanged, highlighting generalization issues.

Task 3 - Web Testing

- User model has been created and swapped with standard Django model
  - Allows for additional user information to be saved which will work in tandem with the audio recordings to produce a prediction
- Changes reflect in database
  - DB connection needs to fixed on hosted site

Task 3 - Web Testing





Task 3 - Web Testing

- Still working to debug the sub-app for audio recording and classification that was developed in previous milestone
    - When this is completed, audio app will be integrated with new user model and DB

Task 4 - ML/Web Integration

- When the CNN is trained using the cleaned audio dataset, it will be substituted with the current classification model in the audio sub-app

Task Matrix: Milestone 5

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 a framework for users to access the CNN and upload their coughs.			
3. Integrating WebApp and CNN	Determine what may need to change within the web framework to better accommodate and suit the CNN.			

Milestone 5

March 26 — ML Testing

March 26 — Refined ML workflow

March 26 — Continued Integration of CNN and WebApp

Questions?