

Automated COVID-19 Detection Using Deep Learning

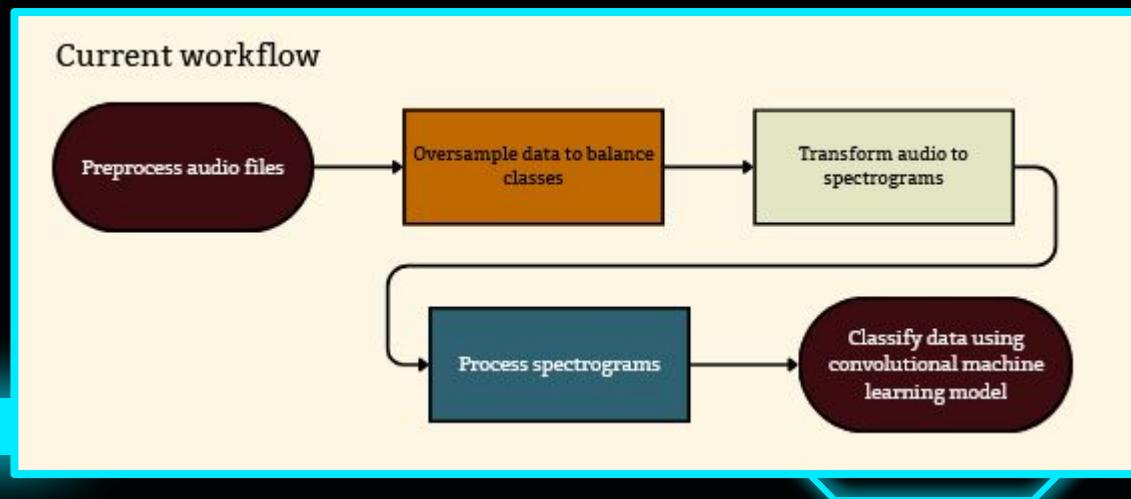
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Task Matrix: Milestone 2

Task	Completion %	Rodrigo	Emma	Lamine	Audrey	To Do
1. Refine ML Workflow	100%	15%	15%	35%	35%	Nothing to refine as of yet due to issues with dataset
2. Begin Feature Engineering on Dataset	100%	5%	5%	85%	5%	First set of features selected for initial tests, accuracy of 39%
3. Begin Working on Web Framework Frontend	80%	85%	5%	5%	5%	Complete layout including home page. Add an additional page to present ML model
4. Begin Working on Web Framework Backend	80%	85%	5%	5%	5%	Add additional fields to User DB and incorporate with account
5. Pick 3 benchmark models	100%	10%	70%	10%	10%	All benchmarks selected

Task 1 - Refine ML Workflow

- Researched and explored potential workflows
- Initial workflow was defined
- More workflow phases were added



Task 2 - Begin Feature Engineering on Dataset

- Loaded the cough audio dataset to inspect metadata, including file sizes, durations, and completeness, to ensure data consistency.
- Validated the dataset to identify and resolve any issues such as missing files or inconsistencies.
- Converted audio files from .webm to .wav format using pydub to ensure compatibility with machine learning tools like librosa.
- Applied various data augmentation techniques to the .wav files, such as noise addition and pitch shifting, to increase dataset diversity and improve model generalization.
- Transformed the .wav files into Mel spectrograms using torchaudio for visual frequency analysis, followed by conversion to the decibel scale for CNN input.

Task 3 - Framework

Frontend

- Created initial website in django
 - Currently displays project documentation
- Includes page to create a new user account
- Using bootstrap for styling and layout

The screenshot shows a Django-based website for a COVID19 Detection project. At the top, there's a navigation bar with links for Home, Project, and Login. Below the navigation, there's a section for Project Name: COVID19 Detection, Team Members and Email Addresses (including Rodrigo Alarcon, Emma Conti, Lamine Deen, and Audrey Eley), and Faculty Advisor: Zahra Nematzadeh. The main content area is titled "Project Milestones" and is divided into two sections: "First Semester" and "Second Semester". Each semester section contains three boxes representing milestones. Each milestone box has a title and several blue buttons labeled with tasks like Plan, Requirement, Design, Test, Presentation, and Progress Evaluation.

User Login

Username*

Password*

Register a New User

Username*
Required: 150 characters or fewer. Letters, digits and @/./-/_. only.

Password
* Your password can't be too similar to your other personal information.
* Your password must contain at least 8 characters.
* Your password can't be a commonly used password.
* Your password can't be entirely numeric.

Password confirmation
Enter the same password as before, for verification.

Task 4 - Framework Backend

- Implemented user functionality with Django's built-in authentication system
- Integrated views and url routing to handle authentication requests
- Working on extending current DB to allow for additional user info as well as a more secure authentication service

Task 5 - Selected Benchmark Models

- VGG 16 (90%)
 - Mel Spectrogram Classification
- Resnet 14 (40%)
 - Medical Image Classification
- Resnet 50 (87%)
 - Tuberculosis Cough Mel Spectrogram Classification
- Inception v4 (71%)
 - Complex Soundscape (Bird Call) Classification

Task Matrix: Milestone 3

Task	Rodrigo	Emma	Lamine	Audrey
1. Begin ML Testing				Test using 3 chosen benchmark models and initial testing from our model.
2. Refine ML Workflow				Continue to improve the ML model. Determine which improvement strategies to implement based on testing results.
3. Begin Web Testing				Begin implementing a framework for users to access the CNN and upload their coughs.
4. Integrating Base ML Model with Web Using a Neural Network Framework				Determine how successfully and efficiently the two can be integrated, and what may need to change within the web framework to better accommodate and suit the CNN.

Milestone 3



NOV 25

Begin ML Testing



NOV 25

Refine ML workflow



NOV 25

Begin web testing



NOV 25

Integrating base ML model with web
using a Neural Network framework



Questions?

