

Respiratory Disease Detection using Respiratory Sounds



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Introduction to the project

Respiratory diseases are among the most common and serious health challenges worldwide. Traditionally, diagnosis requires expensive equipment or specialist assessment making timely detection difficult for many.

Our project addresses this gap by harnessing AI to analyze respiratory sounds like coughs and breaths. By transforming everyday audio recordings into actionable health information, we aim to enable early, non-invasive, and accessible respiratory disease screening for anyone, anywhere.

- The Human Ear can hear, but can't analyze
- There is a gap between what is heard and what is hidden
- A Cough isn't just a noise, It Is Data.

Properties of Sound Perception



Problem Statement

is there a problem? Why is it??

Problem Statement

● PROBLEM 1

Traditional diagnostic methods for respiratory diseases—like X-rays and lab tests—are slow, costly, and inaccessible for many, especially in rural or resource-limited settings.

● PROBLEM 2

Relying on doctors to interpret cough sounds is subjective and often inaccurate, as different diseases produce overlapping symptoms and similar cough acoustics.

Objectives of our Project

What do we want to achieve??

Primary Objectives

1. Shifting focus from disease treatment to proactive healthcare.
2. Deploying an accessible platform for doctors and public for detection of diseases using cough sound analysis.
3. Prioritizing healthcare over sick care and leaving disease treatment as a last resort

Objectives of our Project

Secondary Objectives

1. Automate the diagnostic pipeline with AI and ML
2. Enable continuous patient monitoring that can handle large datasets efficiently.
3. Maintain strong diagnostic accuracy
4. Reduce the burden on healthcare staff by automated data analysis and alerting

Methodology and Project Execution

What is the procedure for
realising the objective??

Methodology and Project Execution

01

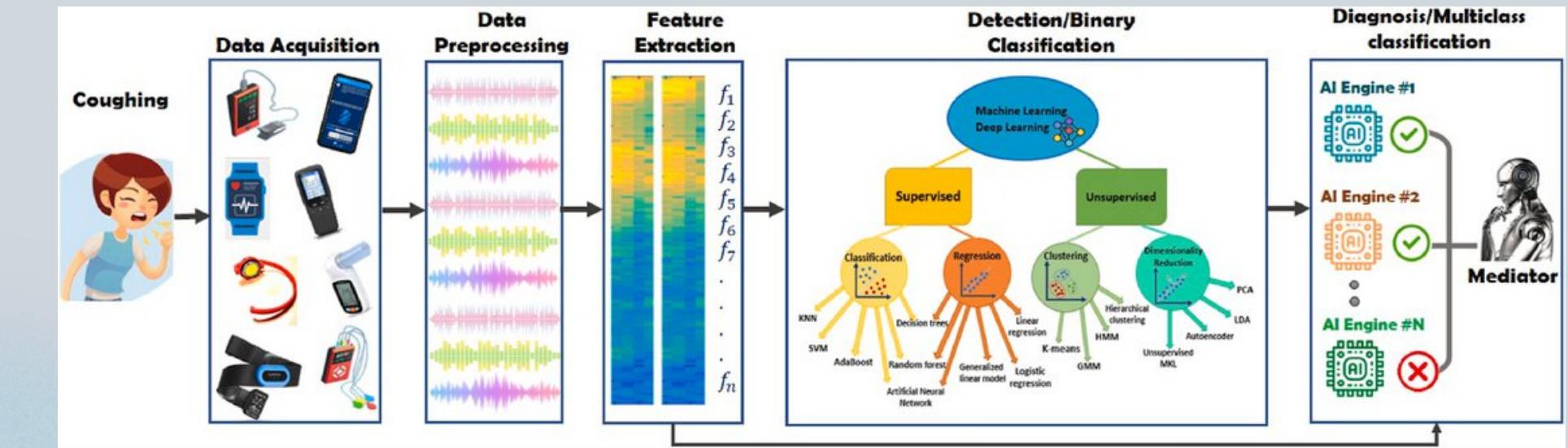
Step 1

- Collect and clean cough audio samples
- COUGHVid V3
- Librosa Py Lib

02

Step 2

- Extract key acoustic features and train ML models
- MFCC , Spectrogram



03

Step 3

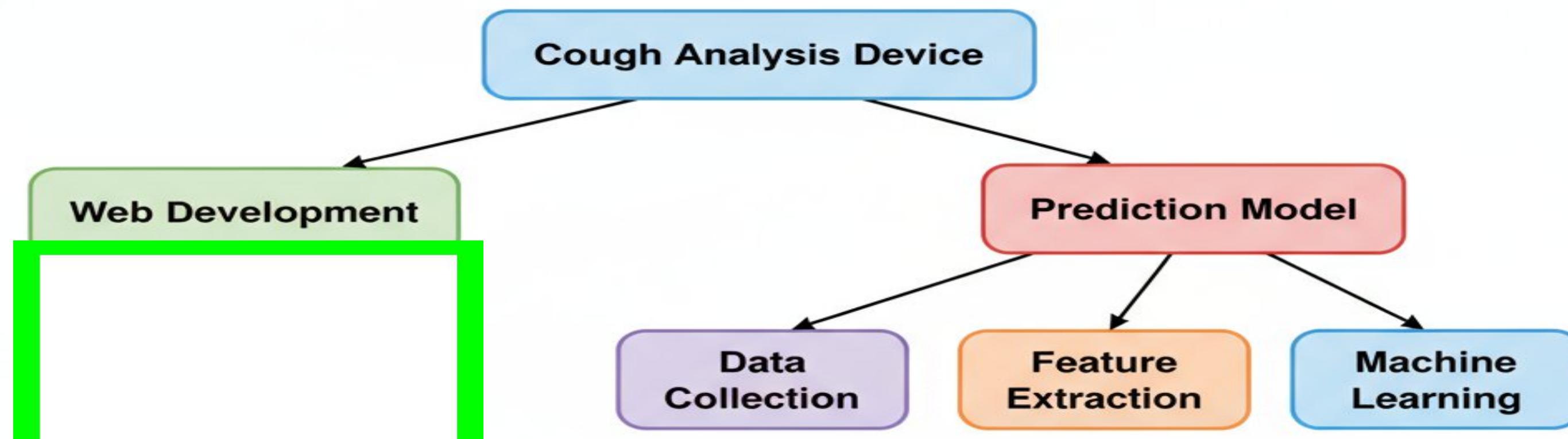
- Build web interface, connect backend, enable real-time inference
- SQL databasing, Backend development

04

Step 4

- Test accuracy and optimize for performance
- Web-App Deployment

Cough Analysis Device



Data Preprocessing

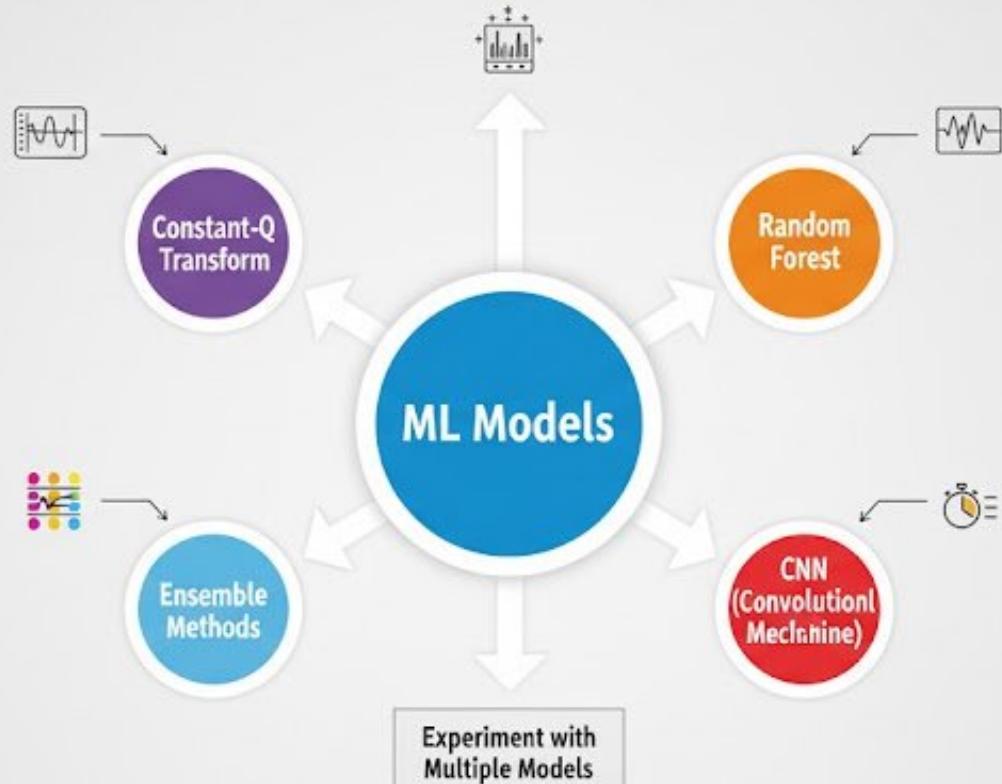


The database can be collected from: hospitals, lab setting, and normal routine with varying levels of noise environment.

Audio Feature Extraction Techniques



Machine Learning Model Selection



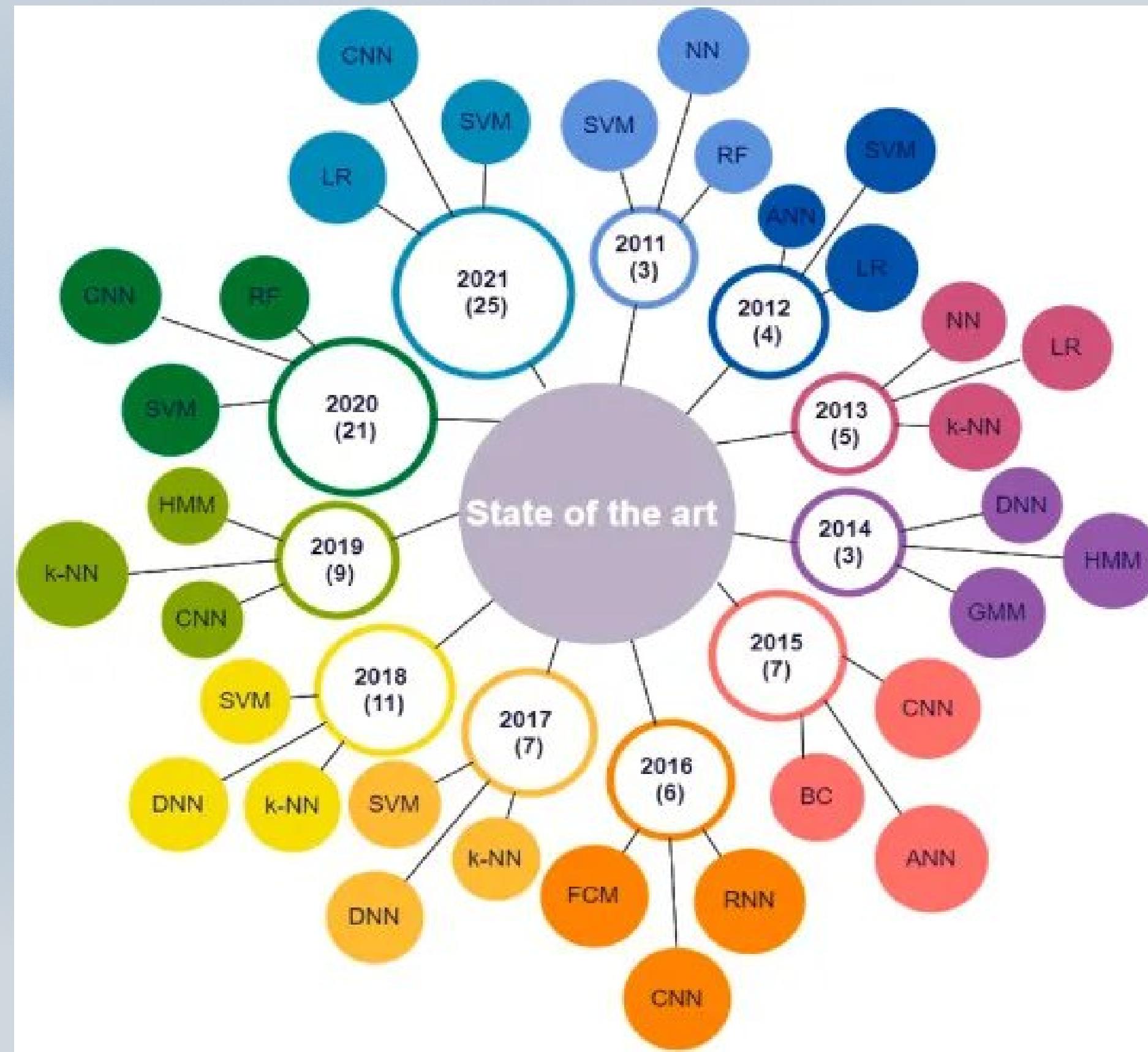
Tools and Techniques

What is the plan of action??

TOOLS AND TECHNIQUES USED

We use Python, librosa, and scikit-learn for audio analysis and machine learning; open datasets like COUGHVID for real-world data; and proven AI techniques to extract, process, and classify cough sounds—making screening scalable and accessible.





"State of the art" means the most advanced or cutting-edge level of development in a field. It reflects the latest innovations, techniques, or technologies available. Often used to describe top-tier systems, tools, or research at a given time.

By applying AI to cough sounds, we show how simple recordings can be turned into reliable health indicators using modern technology and machine learning. This approach delivers accessible, affordable screenin.

Result and Discussion

- Our machine learning model is expected to achieve strong accuracy (80%+) in classifying respiratory diseases using cough audio features on the basis of model and literature study done so far.
- The approach will demonstrate that AI can extract valuable diagnostic signals from simple smartphone recordings, even with real-world noise

Outcome of Work (Expected)

- Our project will Provide a reproducible foundation for future teams or researchers to enhance and deploy digital health screening solutions.

- It'll deliver a functional AI-based prototype capable of respiratory disease screening from cough sounds.
- It'll raise awareness of digital health solutions and demonstrate pathway for future clinical integration.
- Our project will showcase effective collaboration across computer science, AI, and engineering, laying a foundation for tech-driven healthcare innovation.

Conclusion

- The project demonstrates the promise of integrating affordable technology and AI to close gaps in global healthcare delivery.

- AI-powered cough analysis offers a fast, scalable, and accessible route to early disease screening.
- Our work validates that even with basic recording tools, reliable disease prediction is can be feasible.
- The method potentially promises major impact for healthcare in both resource-rich and resource-limited settings.

References

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**Thank
You**

for your time and
attention

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