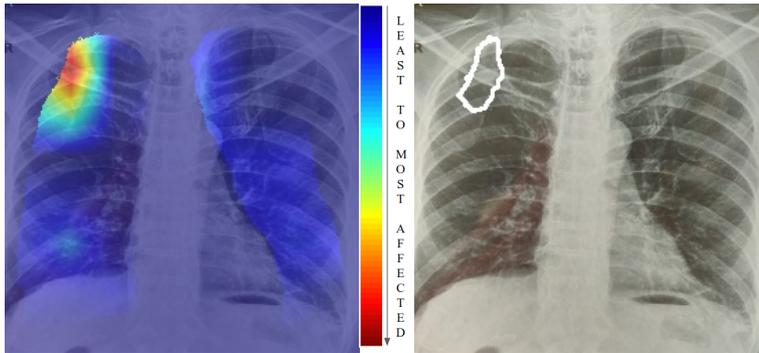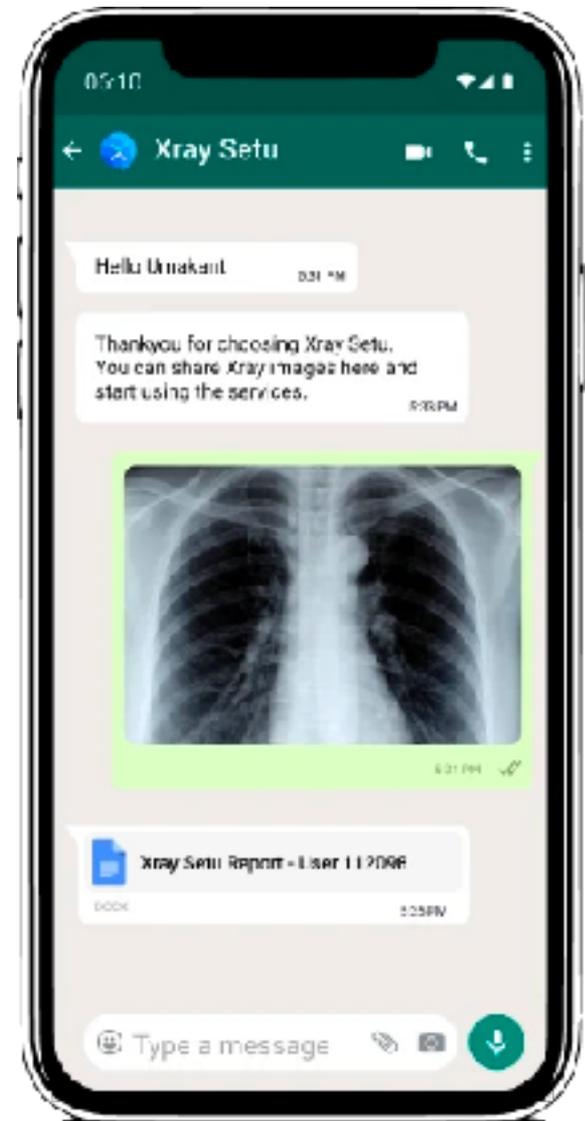# Xray Interpretation for Doctors via WhatsApp

For planning early intervention for Covid

Covid-19 (Confidence: 98.94%)

LEAST TO MOST AFFECTED

Disclaimer: The patient report is machine generated to aid interpretation by doctors.

ART PARK
AI & Robotics Technology Park

Niramai

IISc

Why XraySetu ?

1. RTPCR is less reliable in wave 2 and is often delayed

2. Covid virus variants are going into lungs

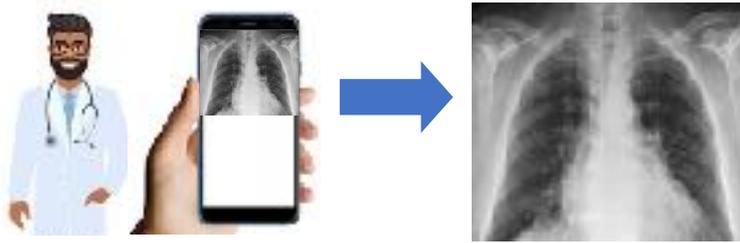3. Rural areas have poor access to radiologists

4. Early intervention reduces the need for oxygen

5. Reach via WhatsApp, no integrations needed

- 65% of the 1.3bn population of India lives in rural areas
- India has only 10000 radiologists, 90% of them are in metros and cities.

Xray Setu

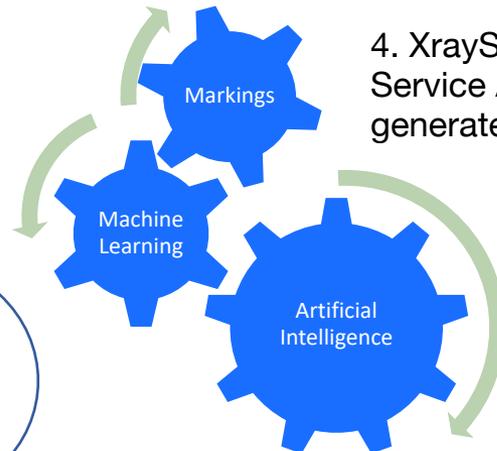**1. A rural doctor takes a phone picture of Chest Xray of a suspected patient**

Xray Setu

7. Doctor reads the report and appropriately advices the patient

2. The doctor sends the Xray pic Over to **XraySetu Whatsapp number** via chat bot

6. Doctor receives the report on the WhatsApp

Xray Setu

AI driven X-Ray analysis for COVID intervention via WhatsApp

3. Technician does Image review

5. Full 2 page report with probability of COVID, pneumonia, markings on the lung image in minutes, generated with explainable AI with annotations

Encrypted Data stored as required per GDPR standards for data protection

4. XraySetu AI Service Analyses to generate a report

Markings

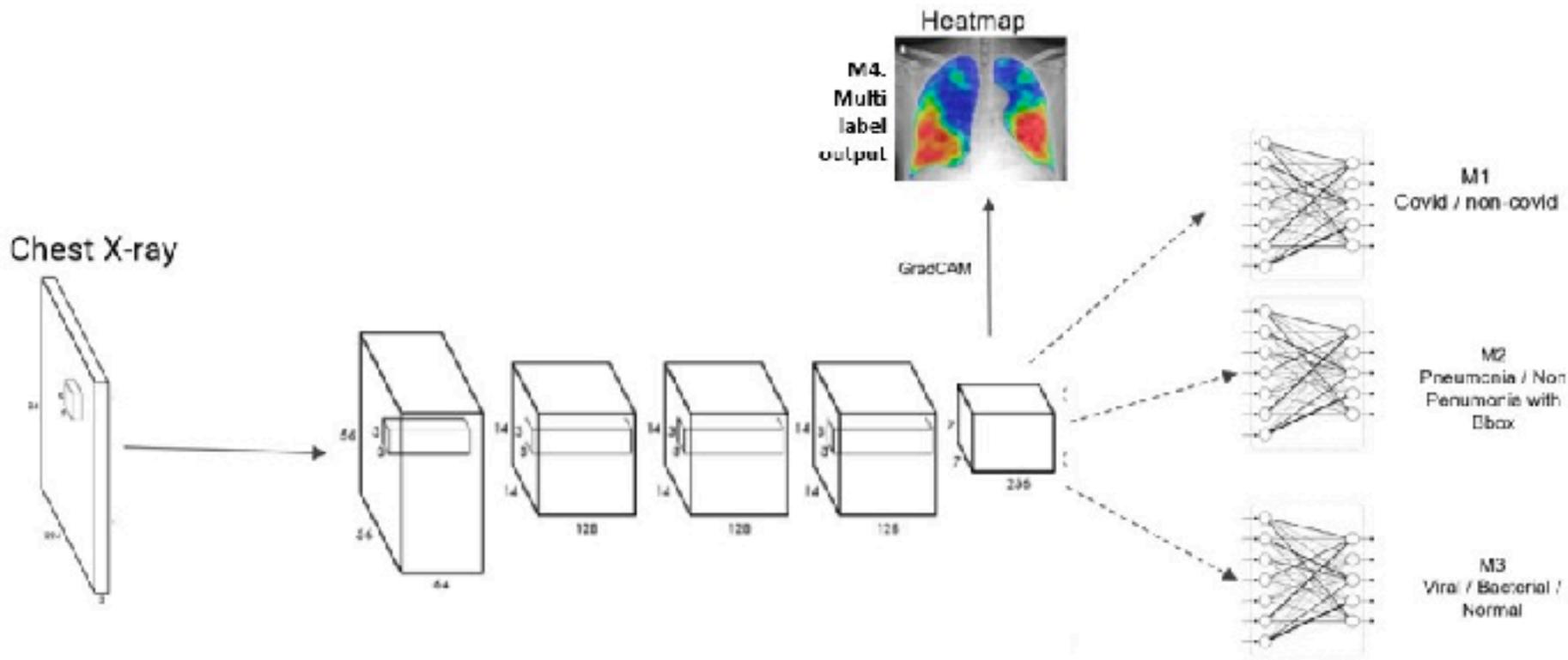Machine Learning

Artificial Intelligence

Key Highlights of the Solution

- Mobile messaging Interface makes it simple and accessible service

- Rapid automated interpretation enables early intervention for covid patients

- Supplemental screening modality to RTPCR addressing delays on RTPCR reporting

- Works for both analog and digital XRay machine

- No integration needed with existing systems. Easily pluggable for any medical unit.

Technical Differentiators

- Works on low resolution images sent over mobile messaging system
- Explainable AI: Semantic annotations of affected areas for review by doctors
- Framework suitable for several lung abnormalities and variants of infection
- Localized heatmap for easy review
- 2 page automated report generation with annotated images and probability of covid or pneumonia
- Explainable AI: Marking 15 different lung abnormalities, including Covid
- Uses Deep-Multi-task Learning Network

Cutting edge Multi-task Deep Learning Model (Inference)

Detection performance metrics with explainable AI

- Open Source NIH COVID19 dataset

- Sensitivity : 98.86%

- Specificity: 74.74%

- AUC: 0.9316

Labelling Accuracy

Dataset	Mean Accuracy	Mean Sensitivity	Mean Specificity	Mean AUROC
Open source NIH validation dataset	0.7400	0.7537	0.7448	0.9095

- Beta tested with 300+ doctors over last 10+ months.
- AI built with dataset of 125000 Xrays

Legend (Lung Abnormalities)	
1. Atelectasis	9. Consolidation
2. Cardiomegaly	10. Edema
3. Effusion	11. Emphysema
4. Infiltration	12. Fibrosis
5. Mass	13. Pleural Thickening
6. Nodule	14. Hernia
7. Pneumonia	15. Covid-19
8. Pneumothorax	

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Future roadmap

1. Launch the WhatsApp Chatbot (for doctors in Karnataka) - 18th may

2. Key Enhancements - Whatsapp Chatbot

3. Research Bed - Collaborative research on various models

4. Longer term future - Whatsapp based image interpretation & suggestions for rural India

Xray Setu

How you can help?

Corporates, foundations, Individuals & other donors

Doctors, Radiologists, researchers and other medical professionals

Concerned Individuals, run a self help group, work with rural India or well wishers

Help us with money and resources for further research & computing. We are a section 8 (Not for Profit) and can take in CSR grants.

Help us with further improvements in technology, research outreach, output validation and testing. We would be very happy to get you in the WhatsApp group.

Let others know how this will work and might help, specially doctors in rural areas.

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Please out to - umakant@artpark.in or xraysetu@artpark.in

About Partners

AI driven X-Ray analysis for COVID intervention via WhatsApp

AI & Robotics Technology Park

Niramai

Indian Institute of Science (IISc)

ARTPARK (AI & Robotics Technology Park) is a section 8 company (Not for profit), created to bring Global Industry, Academia, Society and Govt. together for leapfrog innovations in AI & Robotics, promoted by IISc and supported by AIfoundry. It is Seed-funded by DST (GoI) & GoK.

NIRAMAI Health Analytix is a Bangalore-based AI startup addressing critical healthcare problems through automated solutions. Recognised as one of the top 100 global AI startups by CBInsights. Niramai's mission is to create a Universal Cancer Screening Method that can save lives by using AI driven thermal imaging.

Founded in 1909, IISc is the oldest research university in India. QS World University rankings ranked IISc second in the world in terms of citations per faculty. With more 2000+ PhD students, it has one of the largest AI & Robotics research clusters in India.