

Assessing Ventilator-Associated Pneumonia (VAP) in the PICU Using Deep Learning

Members: Suraj Shah

Mentors: Drs. Mathias Unberath, Jules Bergmann, and Jim Fackler

Motivation:

- Chest X-Rays are the empirical standard in pneumonia diagnosis, yet subject to radiologist interpretation and conclusions
- Mechanical ventilation is a critical ICU therapy; 20% of ICU patients are diagnosed with VAP

Goal:

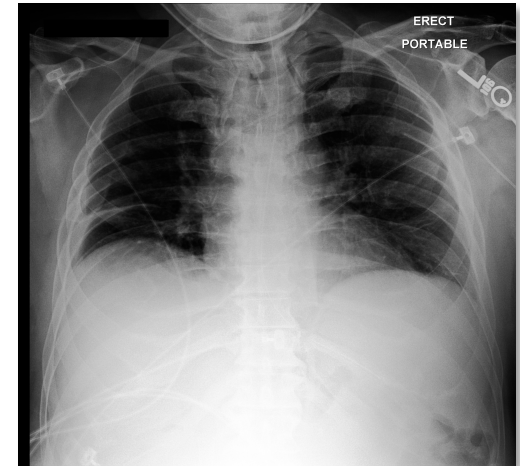
- Prepare automatic classifier to be used in ICU/PICU settings to diagnose VAP

Methods:

- Transfer Learning using pre-trained CNNs
- Class Activation Maps based on trained model

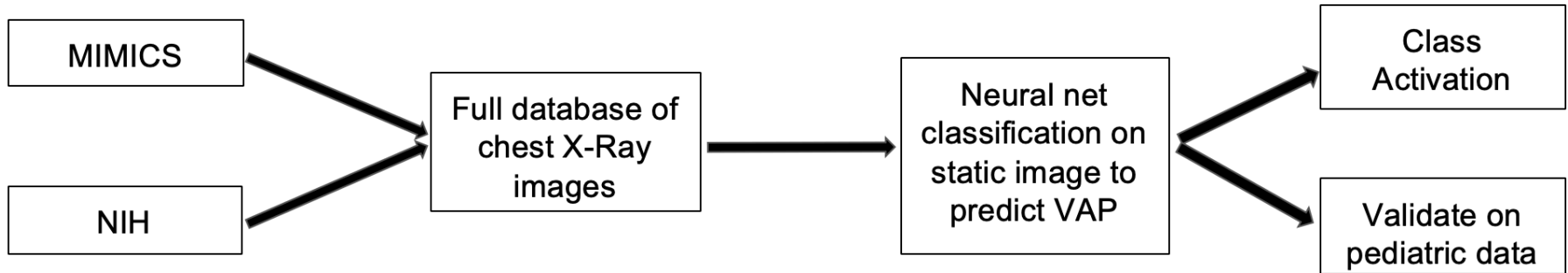
Results:

- Achieved 94%+ accuracy in diagnosing pneumonia
- Provided physicians with accurate image localization



Appending Information

Ingestion and Training Pipeline



Training Environment:

- Utilized GPU nodes from MARCC
- MIMICS: 350K+ images
- NIH: 115K+ images
- Trained on 65K image subsets from both databases, with cross-validation on both (10K image validation set)

Training and Validation Accuracy for Binary Classification

