

*TEAM BIG BRAIN*

# RANZCR- CLiP

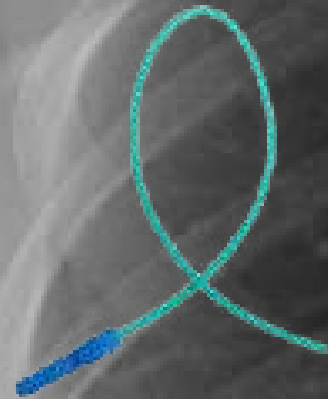
**Classifying the presence and correct placement of  
tubes on chest x-rays of COVID-19 patients**

# the team

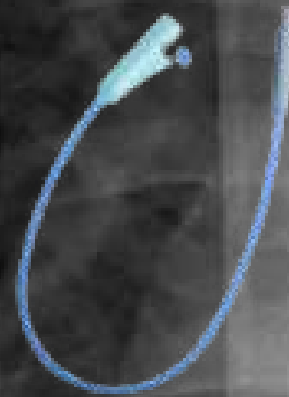
UOFT LEARNAI  
UNIVERSITY OF TORONTO



KADEN  
(MENTOR)



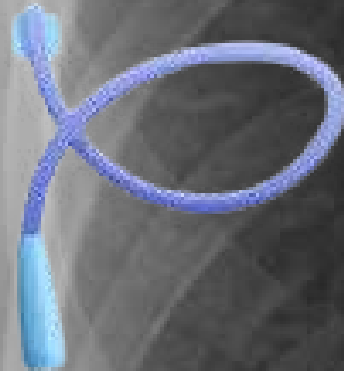
ARINA



STANLEY



MALIHA

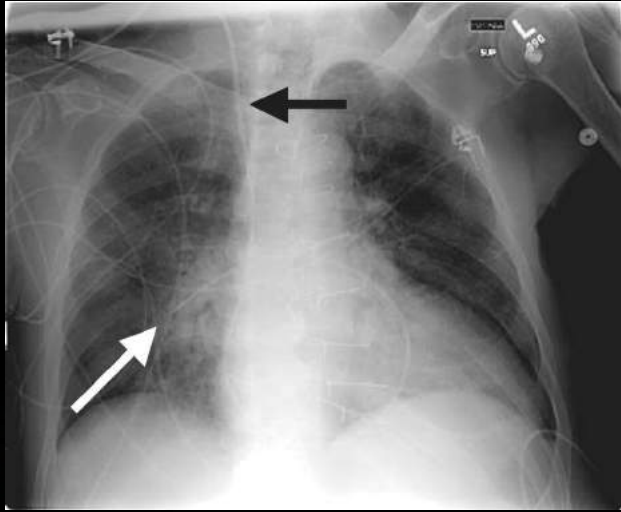


YASMEEN



WHITNEY

# the challenge



- THE ROYAL AUSTRALIAN AND NEW ZEALAND COLLEGE OF RADIOLOGISTS (**RANZCR**) | CATHETER AND LINE POSITION CHALLENGE (**CLIP**)

kaggle

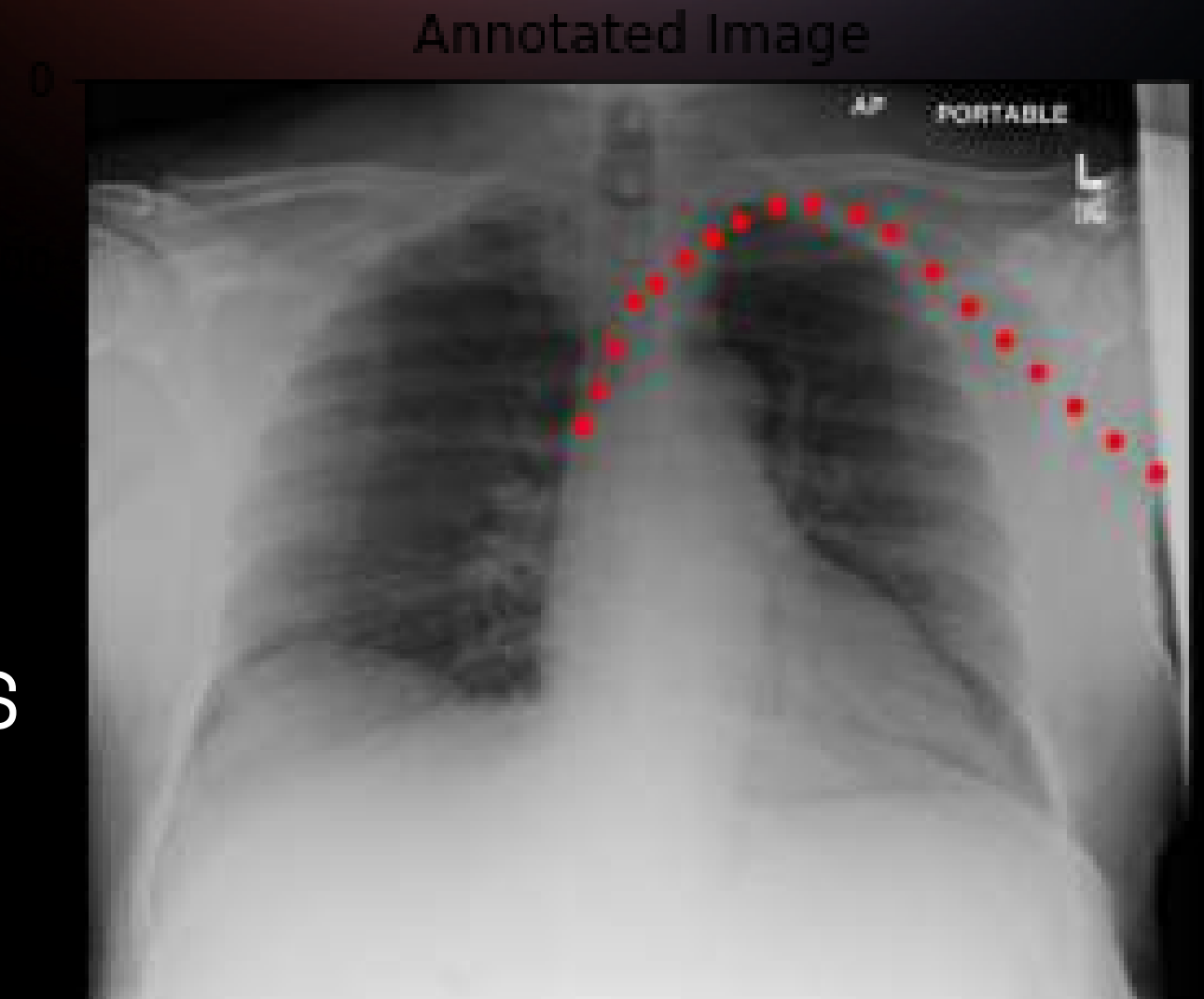
- **INCORRECT POSITIONING** OF CATHETERS
- VERIFYING THE POSITIONING IS **TIME CONSUMING** AND PRONE TO **HUMAN ERROR**



The Royal Australian and New Zealand  
College of Radiologists

# data

- 40,000 CHEST X-RAYS
- 11 TYPES OF CONDITIONS
- UNDER 4 TYPES OF CATHETERS





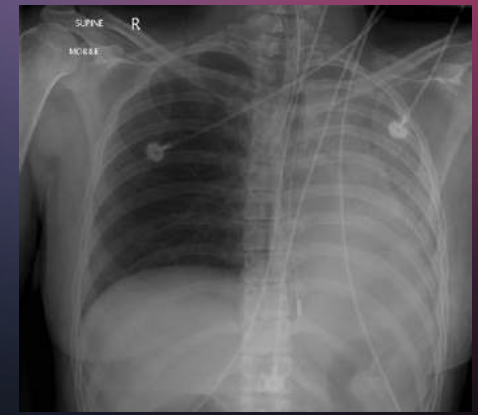
# target variables

- **ETT**: ENDOTRACHEAL TUBE
  - abnormal, borderline, normal

---
- **NGT**: NASOGASTRIC TUBE
  - abnormal, borderline, incompletely imaged, normal

---
- **CVC**: CENTRAL VENOUS CATHETER
  - abnormal, borderline, normal

---
- **SWAG**: SWAN GANZ CATHETER PRESENT



# multi-label classification

- *REFRESH*: **BINARY CLASSIFICATION**
  - ASSIGNS ONLY ONE CLASS TO ONE OBJECT
  - EX. IMAGE - DOG/CAT
- **MULTILABEL CLASSIFICATION**
  - ASSIGNS  $\geq 1$  CLASS TO ONE OBJECT
  - EX. MOVIE - COMEDY, HORROR, ACTION

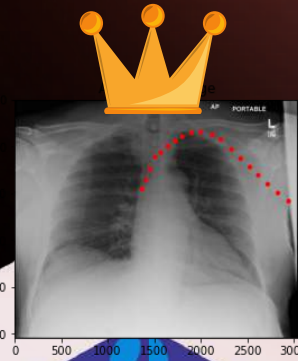
# timeline

MULTI-LABEL  
NEURAL NETWORK

RESNET50  
EFFICIENT NET

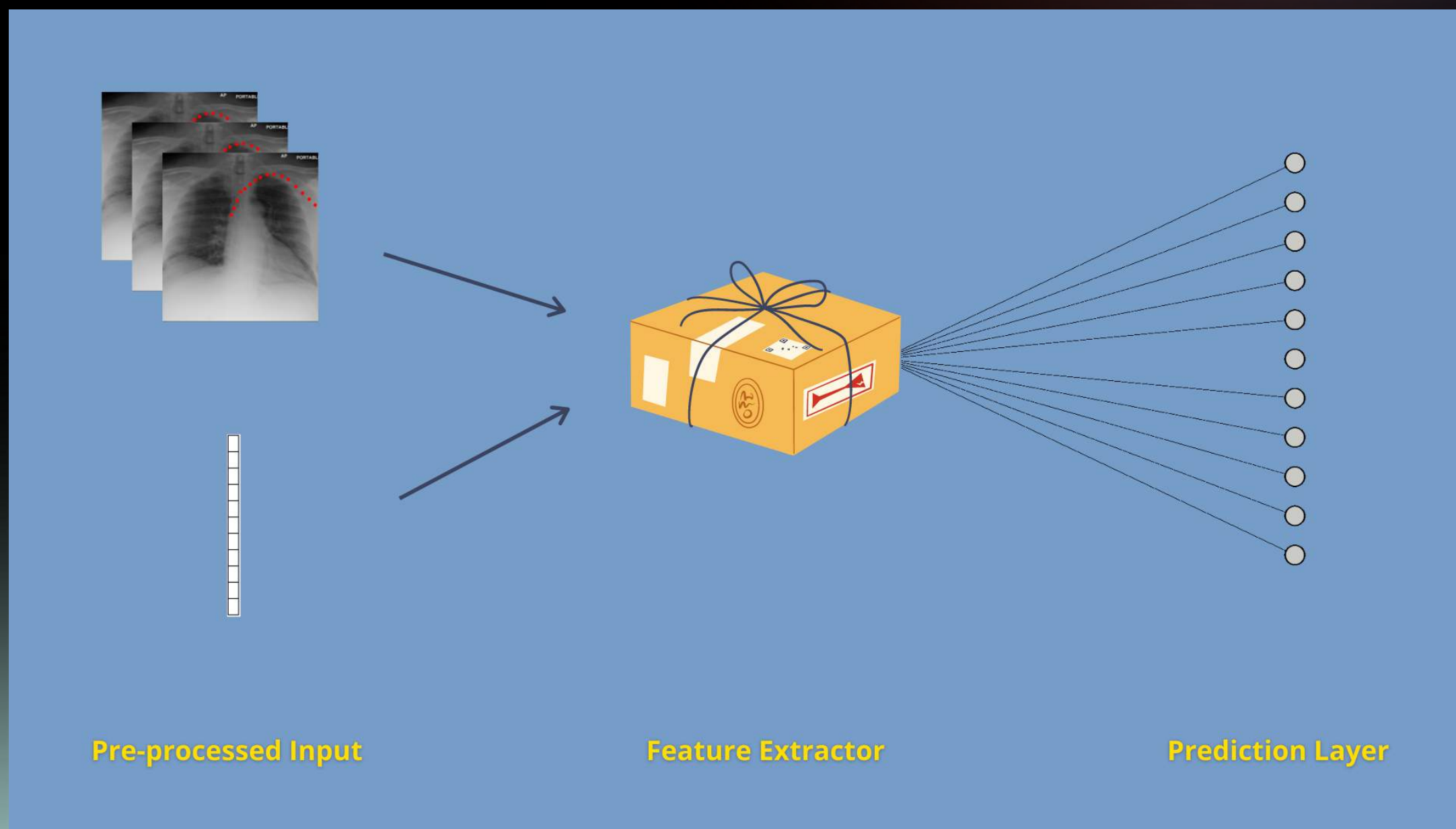
CLASSIFIER CHAIN  
BINARY RELEVANCE

AMY MODEL



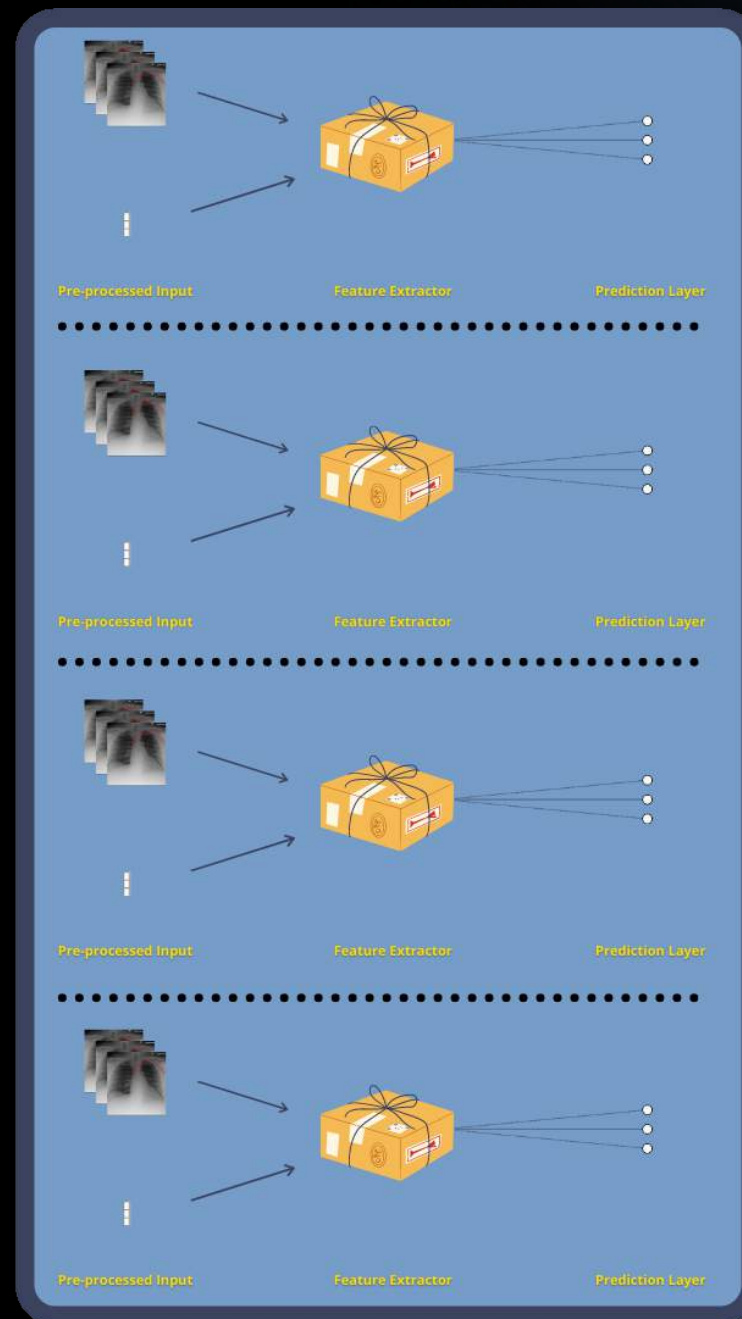


# our approach



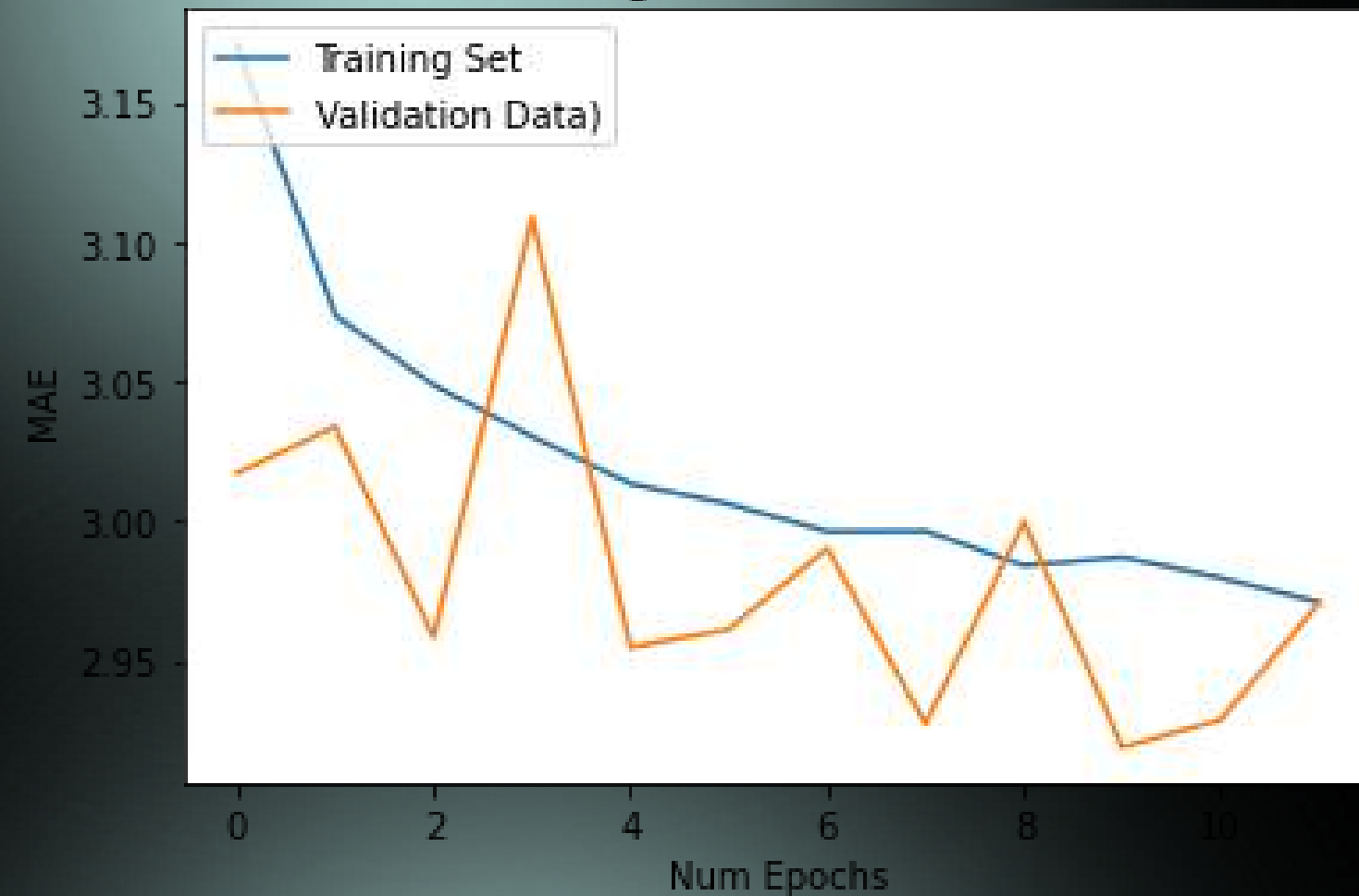


# our approach (cont.)



# training (full model)

Training and Validation loss



- **TRAINING TIME:** 7-9 HOURS
- **ACTIVATION:** SIGMOID
- **LOSS:** BINARY CROSS-ENTROPY
- **OPTIMIZER:** STOCHASTIC GRADIENT DESCENT

An X-ray image of two hands, palms facing each other, with fingers slightly curled to form a heart shape. The bones of the hands and wrists are clearly visible against a dark background. The word "thanks!" is written in white, bold, lowercase letters across the center of the heart shape.

**thanks!**