

# Learning Semantic Image-Text Embeddings in the Radiology Context

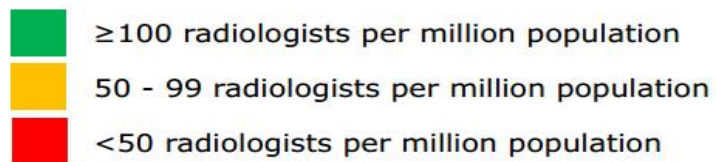
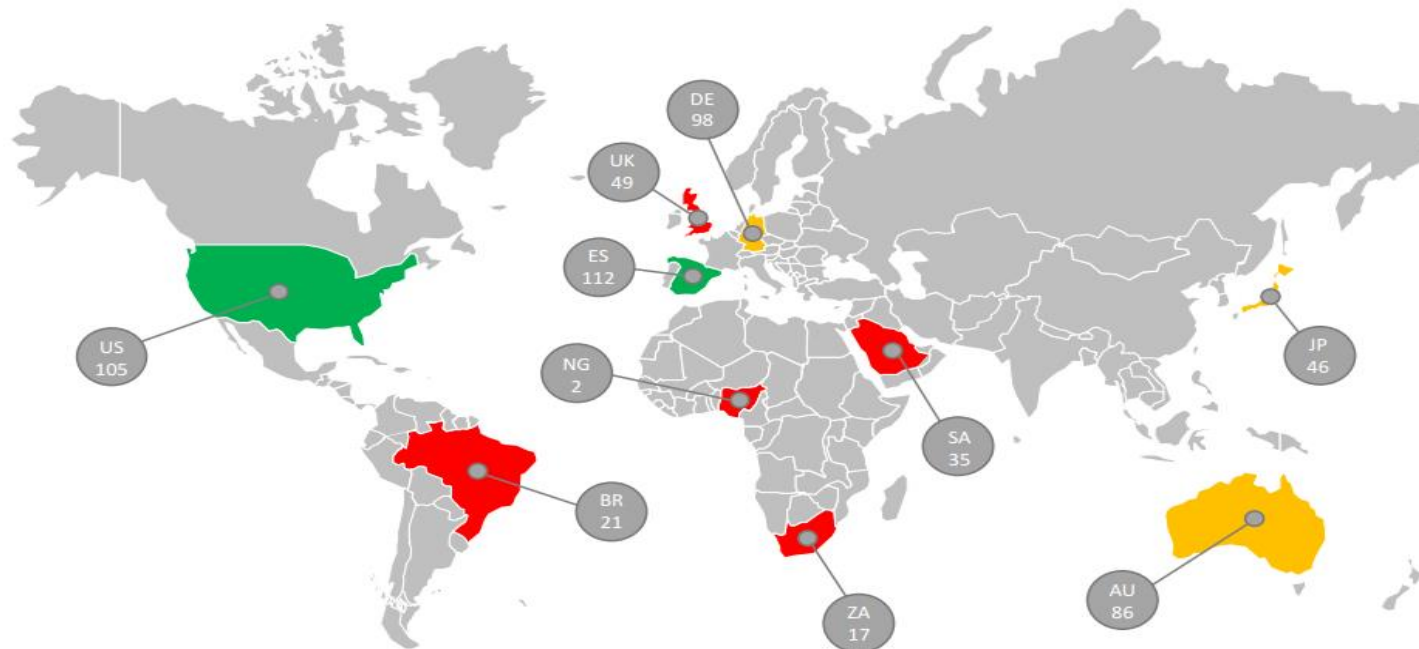
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# Motivation

## ○ Global shortage of Radiologists

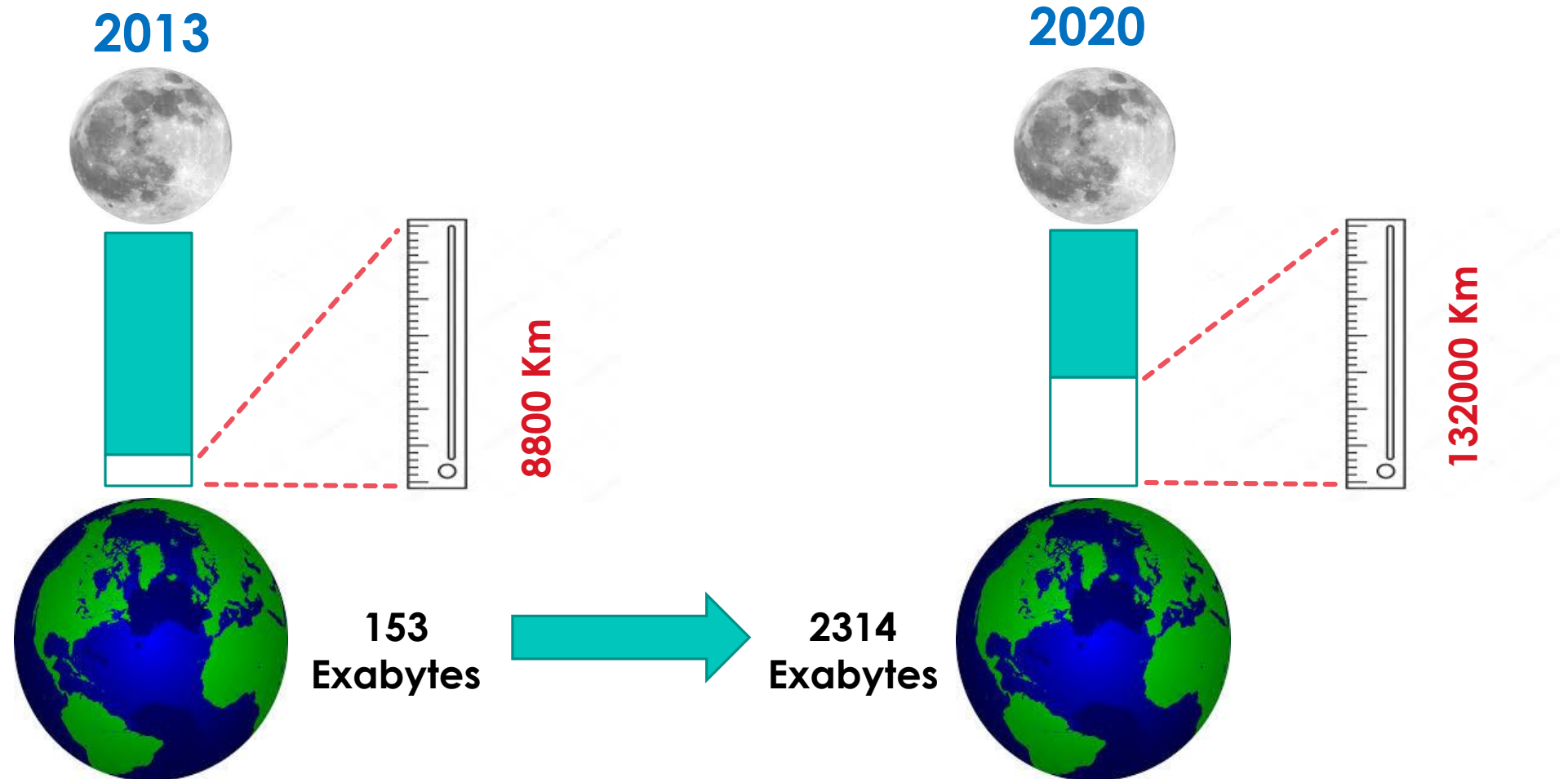


- ! In most countries there is an insufficient number of radiologists to meet the ever-increasing demand for imaging and diagnostic services
- ! The situation will get worse, as imaging volumes are increasing at a faster rate than new radiologists are entering the field.
- ✓ Cognitive computing techniques, such as neural networks, deep learning and predictive analytics, may help by improving the productivity of radiologists

Sources: National radiology societies and government agencies. See slide 9 for details

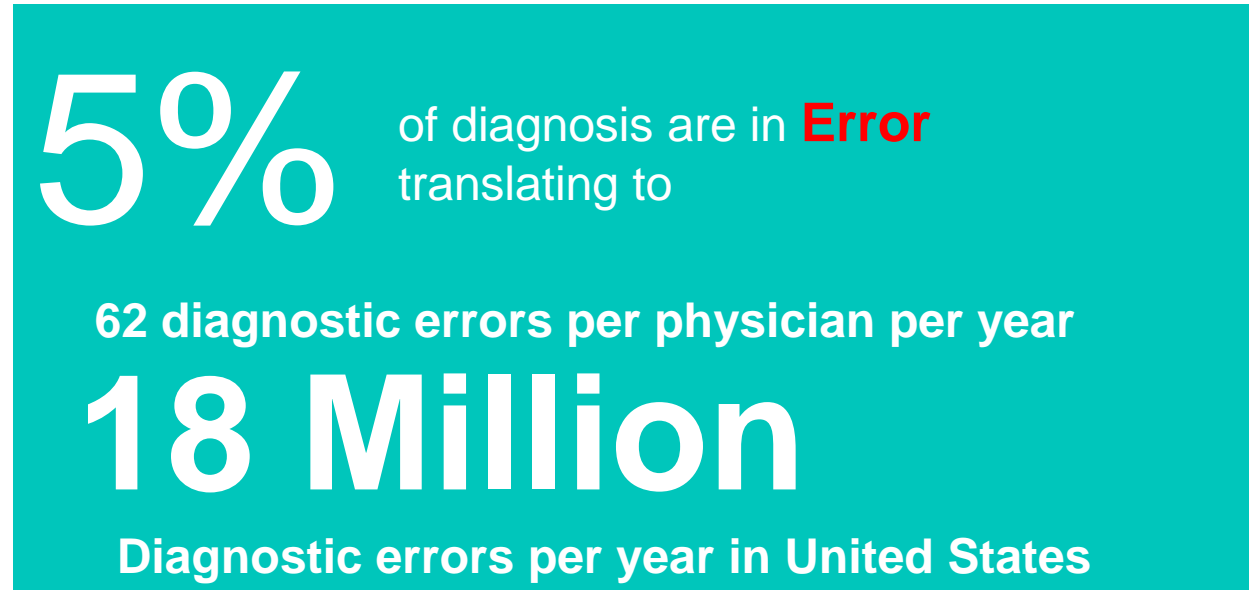
# Motivation

- Medical and Imaging data is growing



# Motivation

- Average radiologists spend **3-4 seconds, 8 hours per day.**
- **Missed radiological findings** can be as high as **30%.**
- **Diagnostic errors** leads to **multiple scans**, and in the worst case, **death of a patient.**

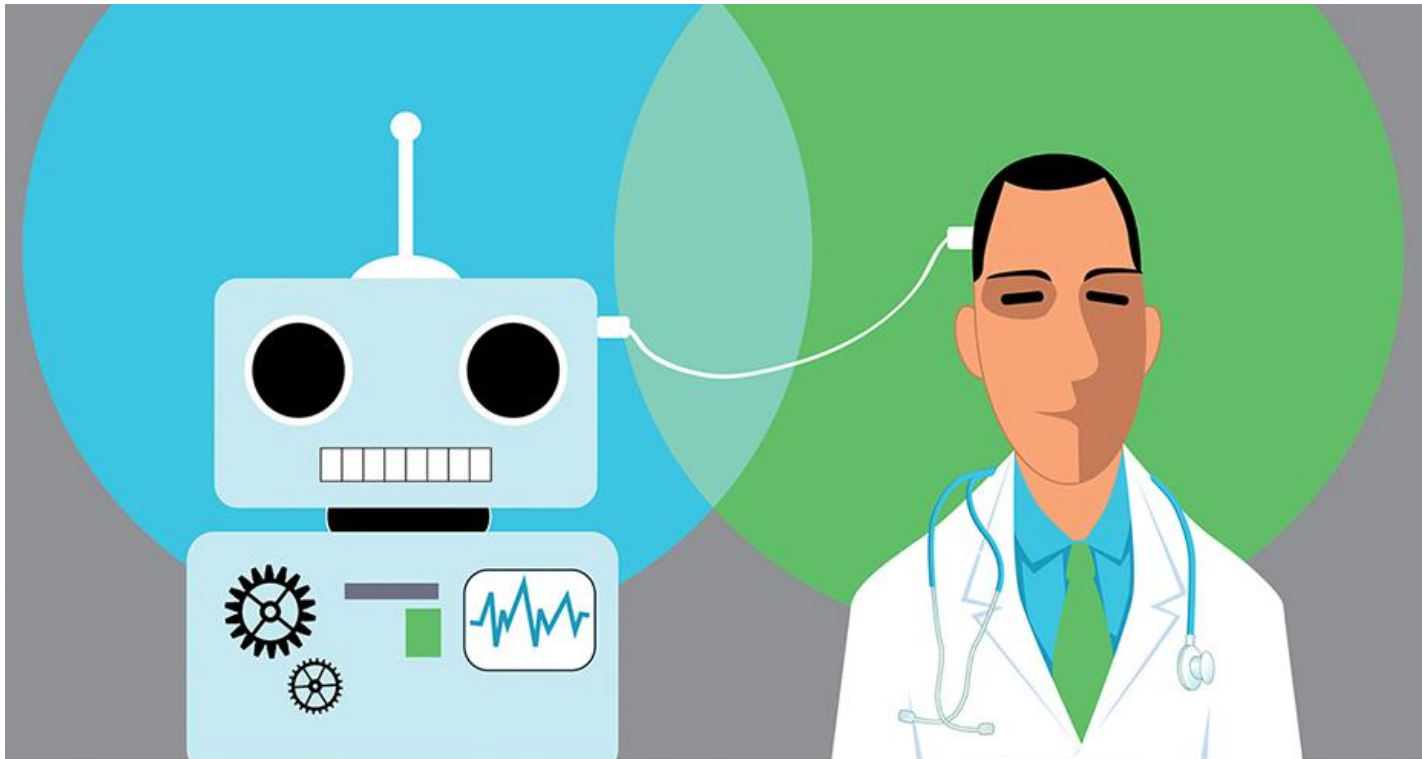


H. Singh et al. The frequency of diagnostic errors in outpatient care: estimations from three large observational studies involving US adult populations, BMJ Qual Saf. 2014 Sep;23(9):727-31.

# The Need: Augmentation Intelligence

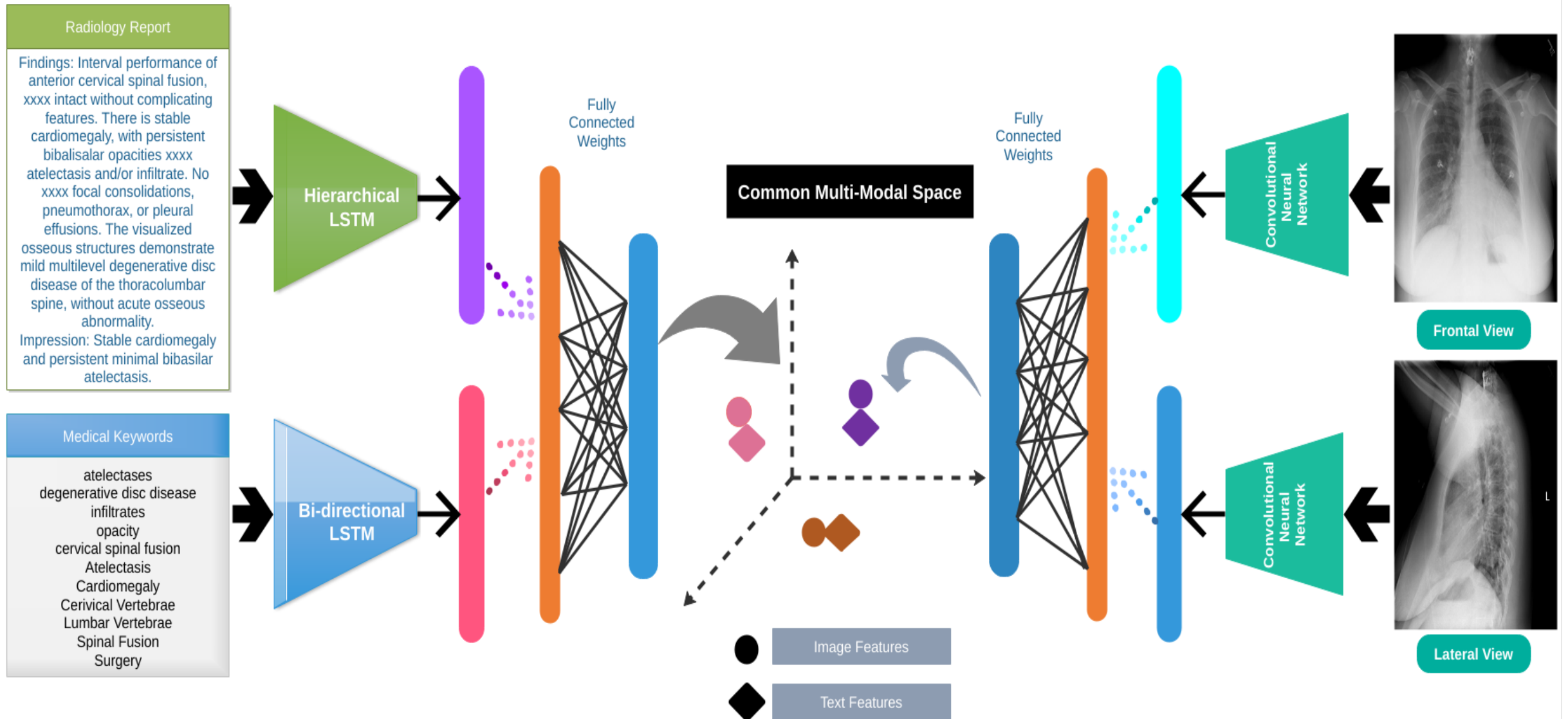
- Human + Computers can achieve better performance than either alone.

## Augmentation or Companionship



*In contrast to automation, augmentation presumes that smart humans and smart machines can coexist and create better outcomes than either could alone. AI systems may perform some health care tasks with limited human intervention, thereby freeing clinicians to perform higher-level tasks.”*

# Proposed Model





# Scope

- The proposed model can enhance radiologist's productivity by

**Automatic image annotation and quantification**

**Alert for relevant regions of interest in a medical image**

**Compare readings, diagnosis, and outcomes of similar cases existing in the Picture Archiving and Communication Systems (PACS)**

**Retrieving radiology reports given medical image and vice-versa**

**Allow multi-modal query expansion to retrieve radiology reports or medical images as per radiologists' special needs.**