

How to leverage Computer Vision & NLP to improve the quality of digital health?

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AGENDA

1. Problem statement
2. Our breakthrough technologies

PROBLEM STATEMENT

Global shortage of radiologists

- **Global:** estimated **shortage of 15 million** health workers by 2030 (Per World Bank)
- **USA:** projected **shortage up to 124,000** physician by 2034 as (Per AACM)
- **UK:** **80%** in the UK **not enough** interventional radiologists
- **VN:** there are **only 3 radiologists per 10,000** populations (compared to USA with 8 radiologists)



Global Health inequity

- Under-developed/developing countries' infrastructure (healthcare facility, technologies) **prevents at least half of the world's population from early detection and getting the healthcare consultation on time**
- Healthcare services & facility in **rural areas are much lower quality than sub-urban/city areas**

How does AI solve Radiologist Shortage?

- “AI as the extra radiologist”

AI as a second trustful radiologist –
mimic & transfer doctor’s knowledge

**24/7
Reliable AI
(>90%)**



DrAid

By VinBrain

**AI-powered
platform for
image analysis**

AI can automate basic tasks (screening
abnormal & normal findings) and
integrate seamlessly with workflows

**Autonomous
Appliance
by AI**

AI provides connectivity & synergy for
medical knowledge exchange

Teleradiology

How does AI tackle health inequity?

“ease of accessibility and central, smart EHR management”

POOR ACCESSIBILITY

Lack access to
basis health services

DISCONNECTED HEALTH

Disparate health records
Poor patient outcomes

INCREASED COSTS

Travelling time & money
Limited ability “working
from home” for doctors



Ease of accessibility to
primary care for **anyone**
anytime, anywhere via
virtual telehealth

Centralized & timeseries
EHR drives early abnormal
detection & personalized
precision care

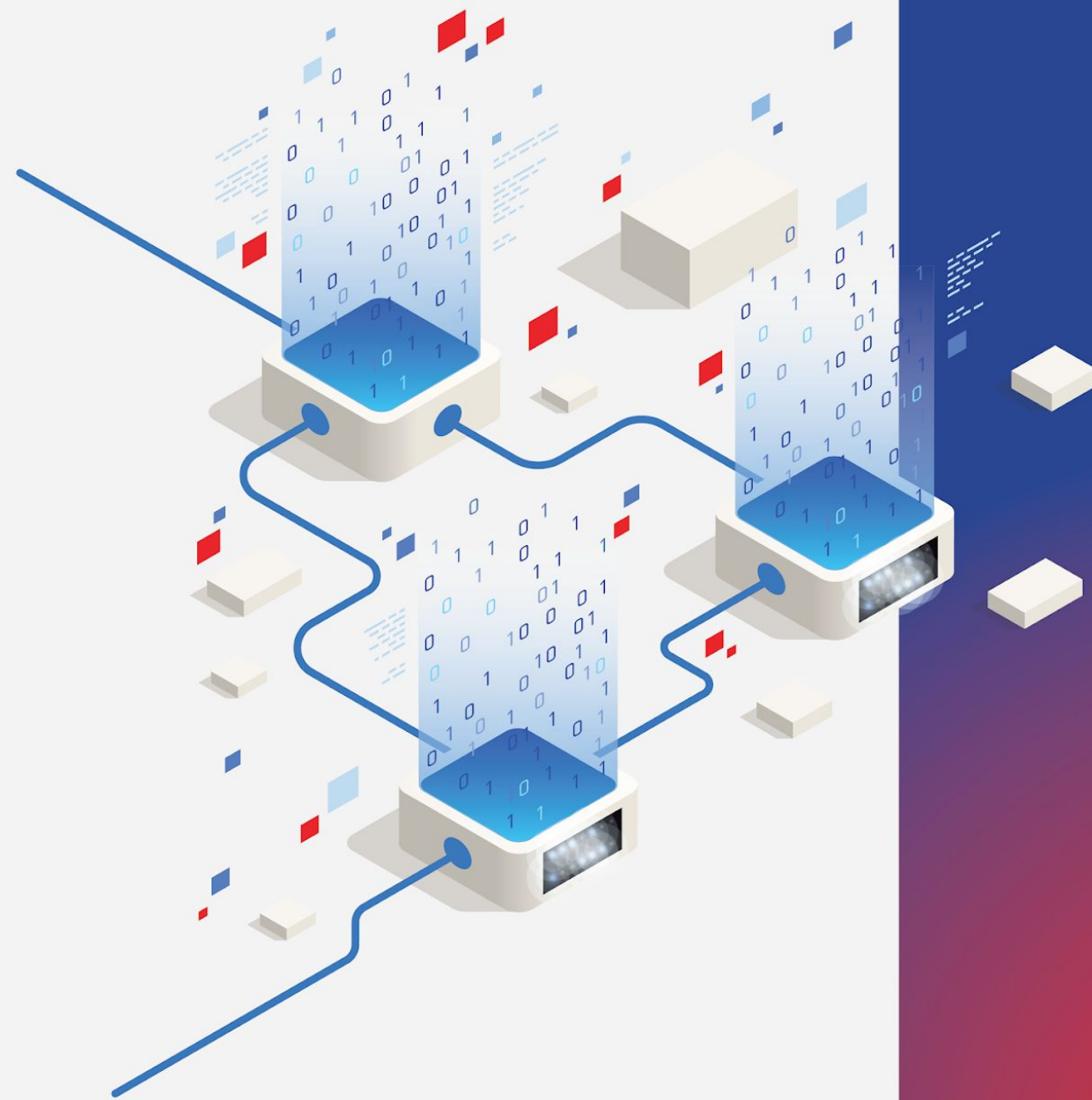
Reduce unnecessary onsite
travel cost and increase
doctors' productivity via
O2O healthcare services



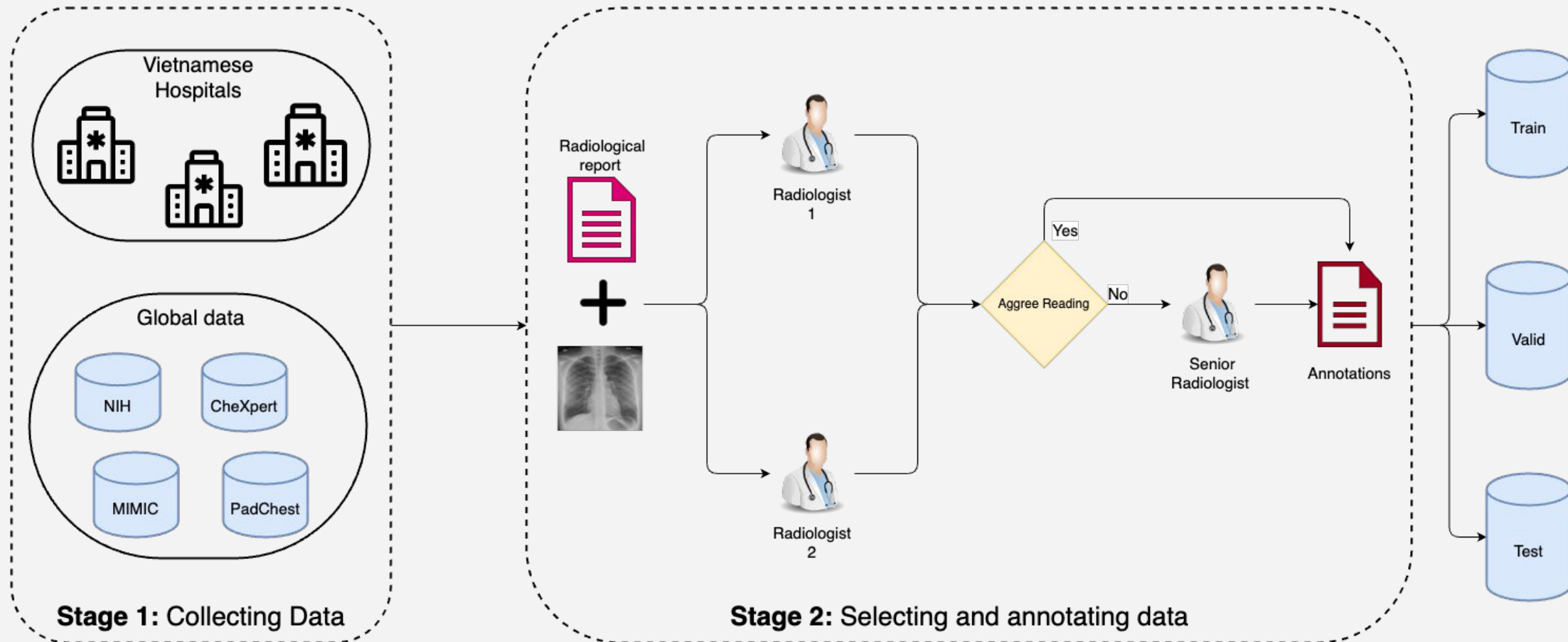
AlviCare
By VinBrain

**AI-powered
platform for online
personalized
healthcare**

Our break-through technologies

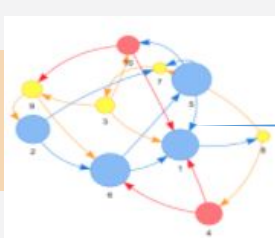


Fundamental: Big data, multi-regional datasets and standardized labeling Process*



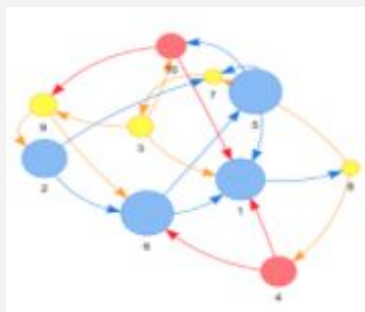
* Proven by FDA's approval #K221241

Advanced Computer Vision techniques drives AI accuracy



Airspace Opacity: 8

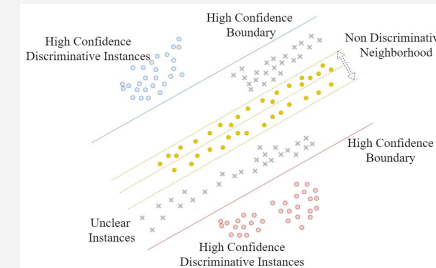
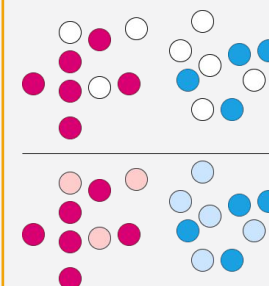
Fibrosis: 67%



Graph Neural Network

- To model inter-dependency between abnormal findings
- Formed with 2 layers with adjacency matrix, which is calculated by correlation between each findings in the data.
- Improve performance of each abnormal findings by using data correlated with it

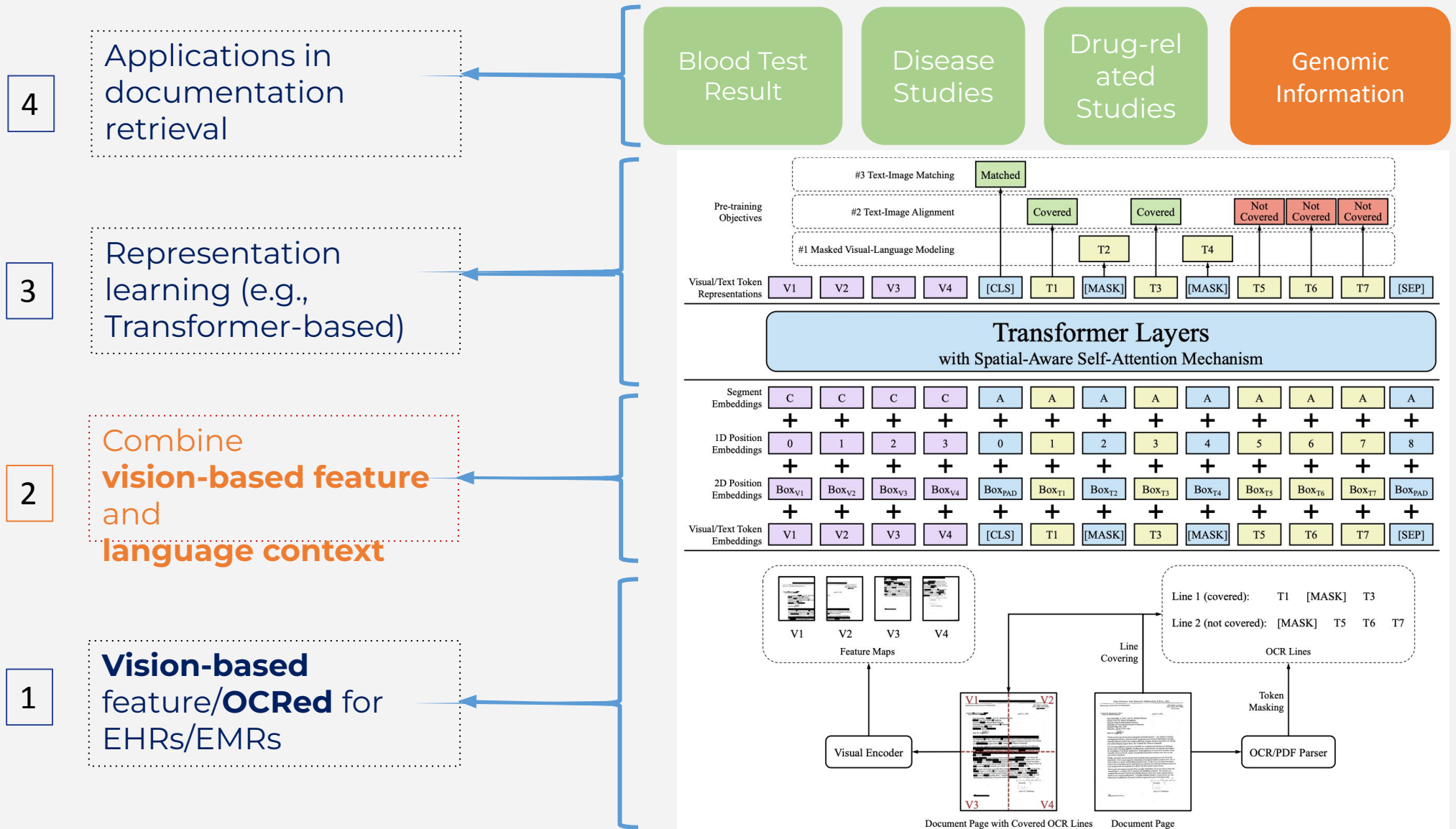
1,391,000



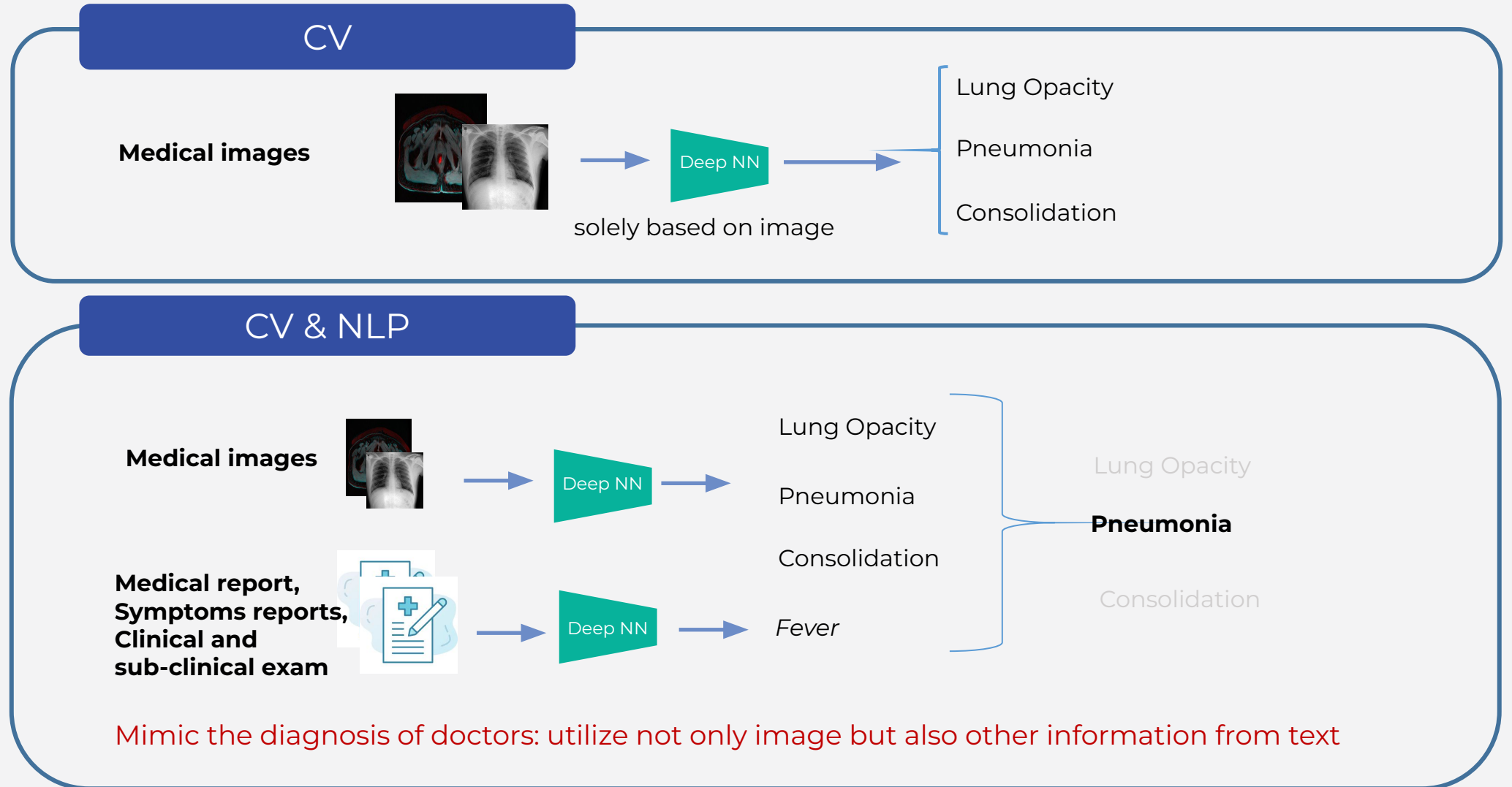
Semi-Supervised & Active Learning

- Utilize the large pool of unlabelled Chest X-rays by selecting the most needed to label next.
- Pseudo-labels helps smooth the loss landscape and improve the learning process efficacy.

Visually Rich Documents (VRDs): vision-based and with language textual features - outcome (F-measure): better than $\geq 5\%$

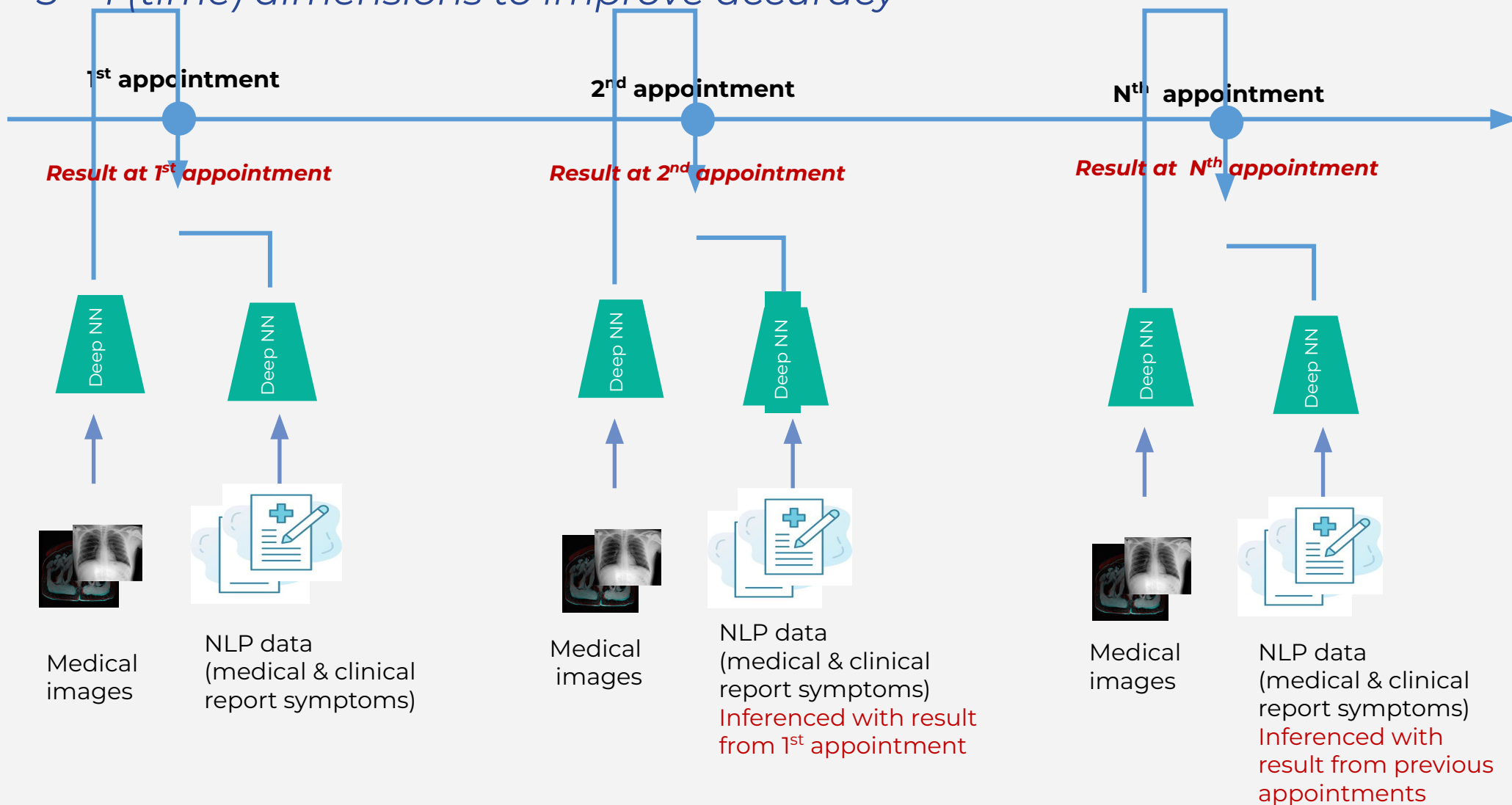


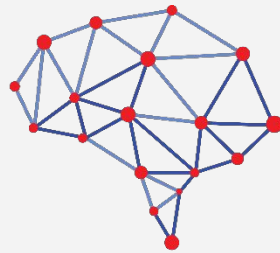
Looking forward: Automate feature extraction for combining CV & NLP to achieve higher accuracy



Looking forward: Achieve personalized precision care by incorporating historical data

3 + 1 (time) dimensions to improve accuracy





VINBRAIN

VinBrain Joint Stock Company

THANK YOU

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Our solution: Create a differentiated, long-term eco-system that enables big data & early validation with near real-time feedback loop

