



# 생성형 AI 기반 심폐질환 진단 및 치료경과 예측



2025 제4회  
COMMUNITY  
CONFERENCE

TANGO

Target Adaptive No-code neural network  
Generation and Operation framework

성명 이동현

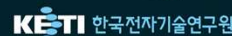
소속 서울대학교병원

주관 ETRI (TANGO)

주최 과학기술정보통신부 IITP 정보통신기획평가원

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후원



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# 1. 의료 AI 활용

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## 소개



### 학력/경력

#### 학력

2015. ~ 2020. 서울대학교 공과대학 협동과정 바이오엔지니어링, 박사  
2013. ~ 2015. 서울대학교 공과대학 협동과정 바이오엔지니어링, 석사  
2008. ~ 2013. 한양대학교 전자시스템공학, 학사

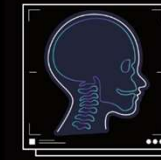
#### 경력

2025. 3. ~ 현재 서울대학교 의과대학 영상의학교실 | 서울대학교병원 영상학과, 조교수  
2021. 3. ~ 2025. 2. 충남대학교 의과대학 의공학교실 | 충남대학교병원 의공학과, 기금조교수/조교수  
2021. 3. ~ 2023. 12. 충남대학교병원 의생명연구원 빅데이터센터, 의료IT개발지원실장/부센터장  
2020. 9. ~ 2021. 2. 서울대학교병원 의생명연구원, 연구조교수  
2016. 9. ~ 2019. 8. 서울대학교병원 의생명연구원, 전문연구요원

#### 학회

2025. 4. ~ 현재 대한영상의학회, 초빙회원  
2025. 1. ~ 현재 대한의료인공지능학회, 교육이사  
2024. 1. ~ 현재 Radiological Society of North America (RSNA), 정회원  
2024. 1. ~ 현재 European Society of Radiology (ESR), 정회원  
2023. 1. ~ 현재 대한의용생체공학회, 종신회원  
2021. 3. ~ 현재 대한의료인공지능학회, 정회원  
2021. 3. ~ 현재 대한의료영상정보학회, 정회원  
2021. 3. ~ 현재 대한의료정보학회, 정회원  
2021. 3. ~ 현재 MICCAI Society, 정회원

### Research Areas



#### AI-driven Radiology Applications

This area leverages AI to perform in-depth analyses of radiological images covering the entire human body, including modalities such as X-ray, CT, MRI, and Ultrasound. Our objective is to demonstrate the clinical utility of AI in radiology applications and ultimately enable radiologists to integrate these solutions effectively into real-world clinical settings.

#### Multi-modal Biomedical Data Analysis

This area comprehensively analyzes diverse multi-modal biomedical data—including endoscopic images, bio-signals, omics data, and EHR—to offer in-depth insights into disease mechanisms and facilitate personalized medicine. Our objective is to leverage hospital real-world data (RWD) to expand the applications of a Large Multi-modal Model (LMM) and Agentic AI, and to validate them in clinical settings.



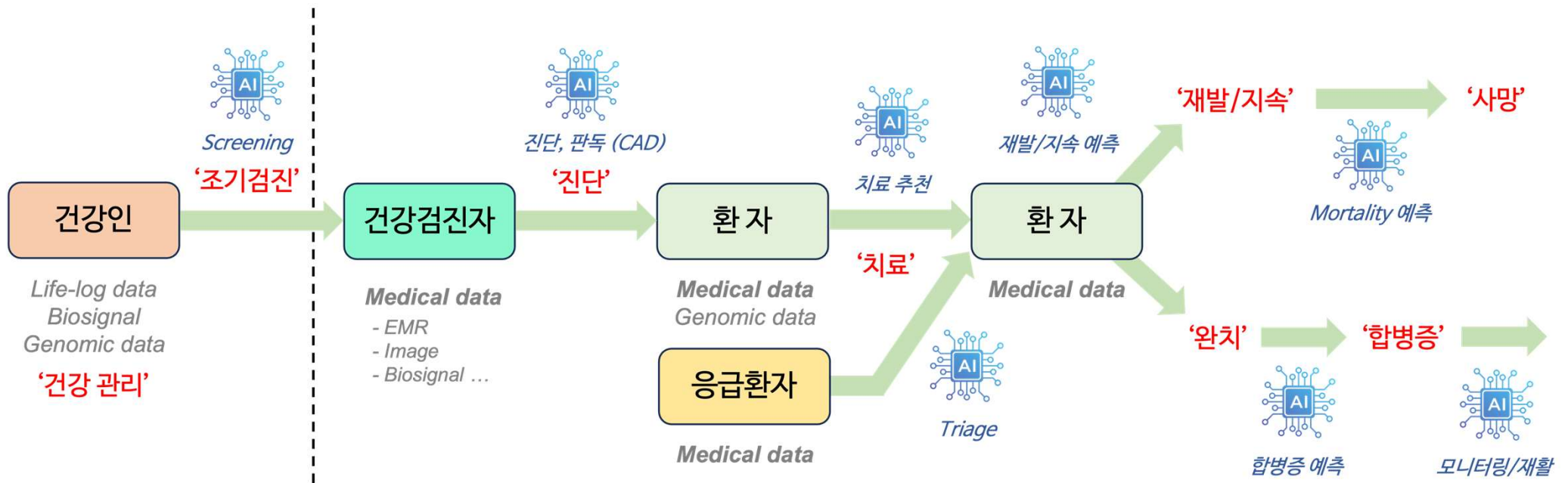
#### Advanced AI Techniques for Medical Applications

This area is dedicated to exploring innovative AI methods specifically designed for medical applications. We focus on developing novel algorithms and optimization strategies to address a wide range of challenges in the clinical domain. Our objective goes beyond methodological advancement; we aim to create AI solutions that seamlessly integrate with clinical workflows and settings, ultimately enhancing patient care.



# 1. 의료 AI 활용

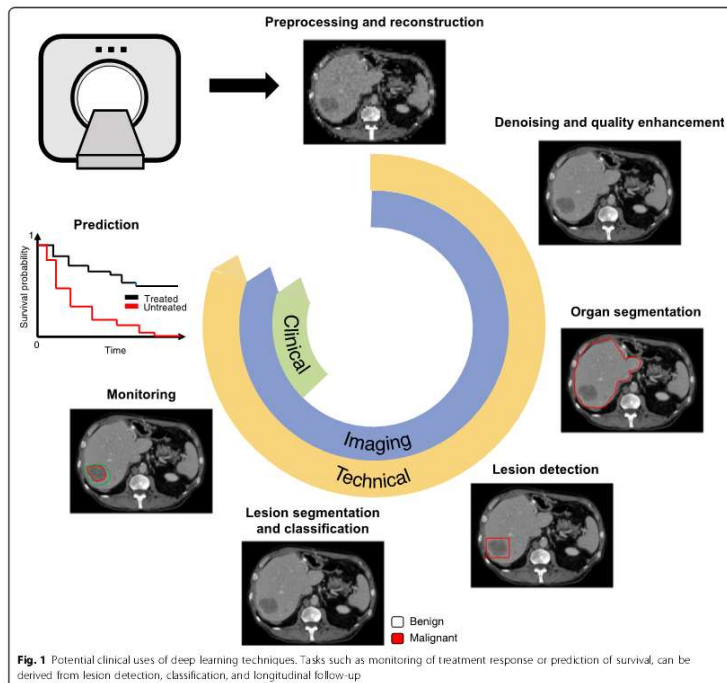
## 임상 현장에서의 AI 활용



참고자료: '의료 영역에서 인공지능의 역할', 국립암센터 항보울

# 1. 의료 AI 활용

## 의료 AI 기대효과



- ✓ 정확한 진단 (Increased Accuracy)
- ✓ 자동 분석 (Automated Analysis)
- ✓ 조기 예측 (Early Detection)
- ✓ 스크리닝 (Enhanced Screening)
- ✓ 연속적인 모니터링 (Continuous Monitoring)
- ✓ 맞춤형 치료 계획 (Personalized Treatment Plans)
- ✓ 교육 및 연구 지원 (Education and Research Support)

Montagnon, Emmanuel, et al., *Insights into imaging* 11.1 (2020): 22.



# 1. 의료 AI 활용

## 의료 AI 기대효과

✓ **정확한 진단** (Increased Accuracy)

속련도



피로도



# 1. 의료 AI 활용

## 의료 AI 기대효과

✓ 자동 분석 (Automated Analysis)

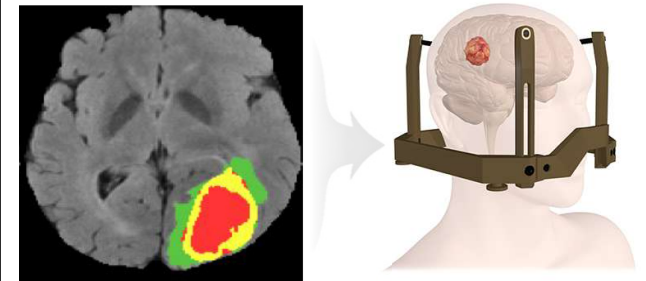
### 응급상황



### 의료 지원

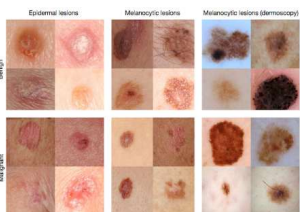
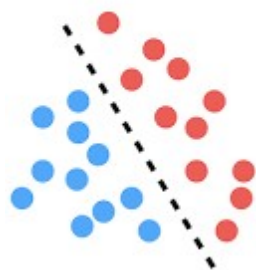


### 정량화

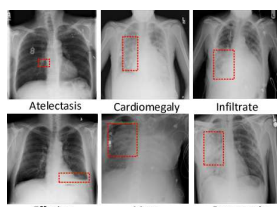


## 2. 의료 분야의 생성형 AI

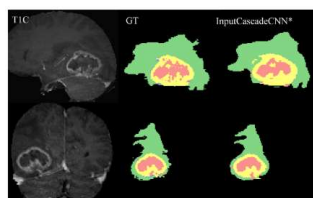
Discriminative



Classification



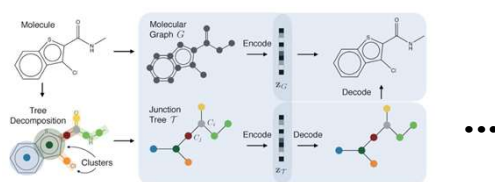
Object Detection



Segmentation

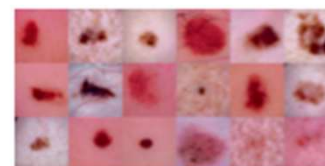
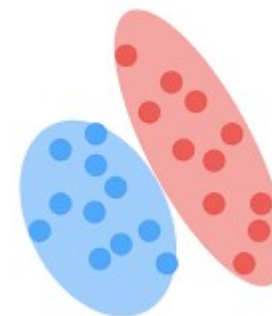


Pose Estimation

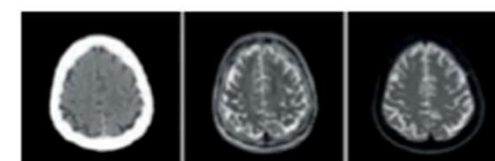


Graph Convolution

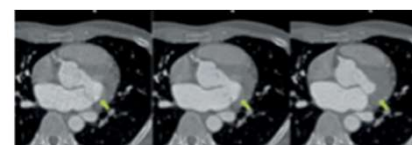
Generative



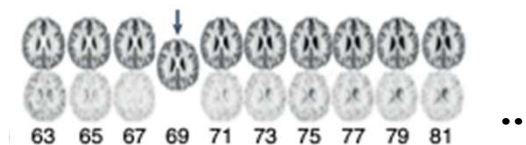
Synthesis



Cross-modality



Denoising



Disease modelling



## 2. 의료 분야의 생성형 AI

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### 생성형 AI



언제 어디서나 궁금하면?  
**네이버 지식iN**

지식과 내가 함께 커가는 곳.  
4천만 지식iN 사용자가 함께 궁금증을 해결하고 있어요.

서비스 바로가기



질문하기



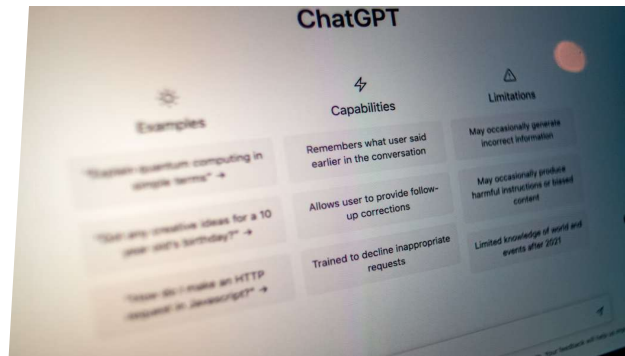
지식iN 베스트



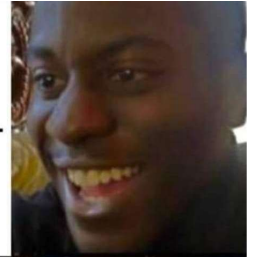
지식iN 우수답변자



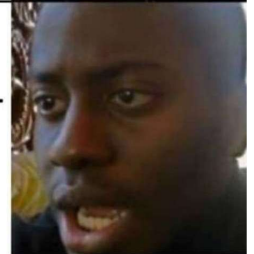
지식iN 전문가



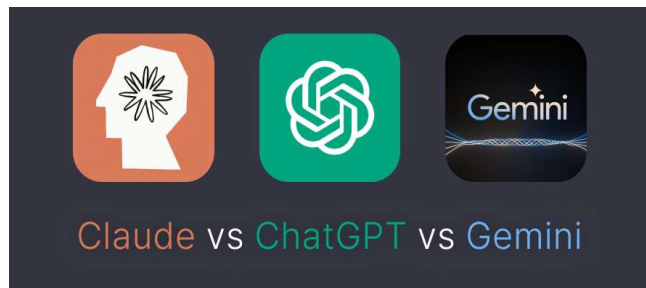
When I  
realize ChatGPT  
can do my job



When I  
realize ChatGPT  
can do my job



### Large Language Model (LLM)



### Small Language Model (sLM)



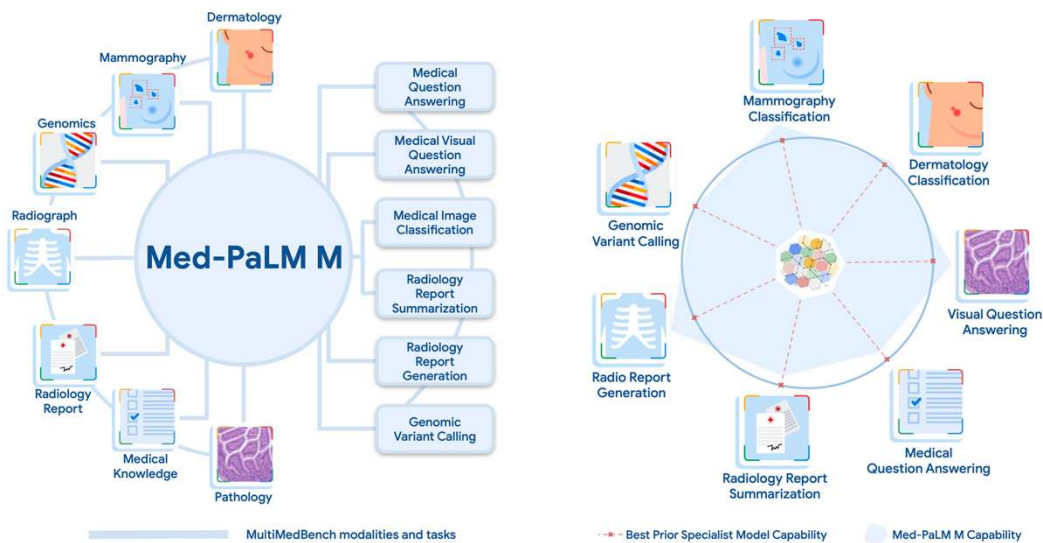
## 2. 의료 분야의 생성형 AI

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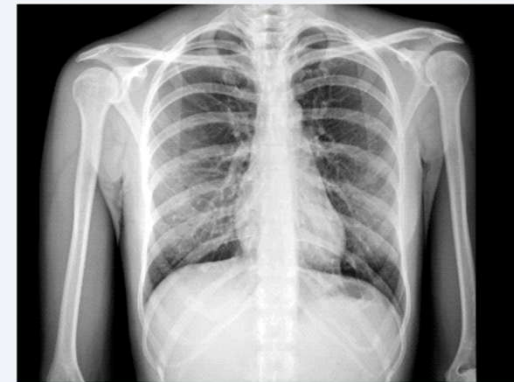
### 의료 분야의 생성형 AI

**Med-PaLM M** (2023) *"Towards Generalist Biomedical AI"*

: 14 tasks across modalities (text, medical imaging, and genomics)



Can you write me a report analyzing this chest X-ray?



#### Findings:

- Devices: None.
- Lungs: No pneumothorax. No substantial pleural effusion. Lungs appear clear.
- Cardiomeastinal: Normal heart size. Mediastinal contours within normal limits.
- Other: No acute skeletal abnormality.

#### Impression:

No active disease seen in chest.

Enter a question here

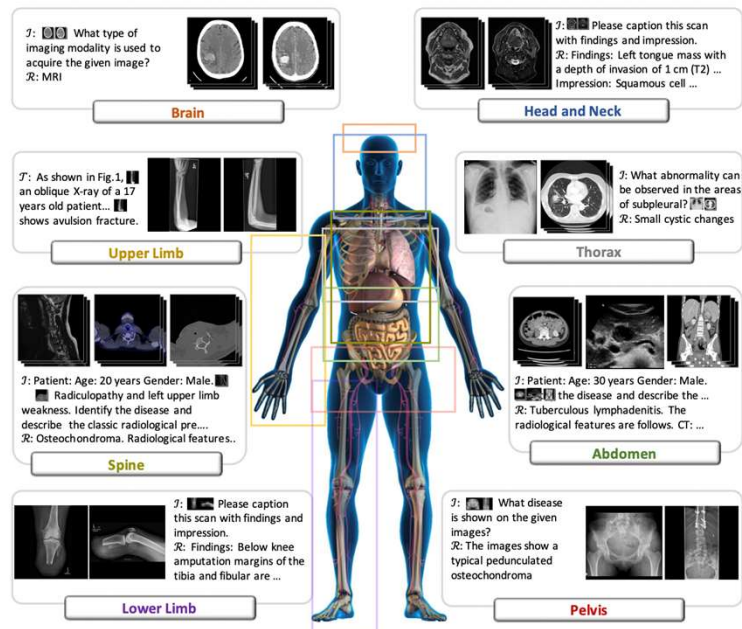
Tu, Tao, et al. "Towards generalist biomedical ai." *NEJM AI* 1.3 (2024): A10a2300138.

## 2. 의료 분야의 생성형 AI

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### 영상의학 분야의 생성형 AI

#### RadFM (2023)



Qualitative examples of medical visual question answering task	
Input Prompt	RadFM Prediction
A 25-year-old Iranian man presented with symptoms and signs of Cushing's syndrome (weight gain, proximal muscle weakness, abdominal purplish striae, hypertension, diabetes mellitus, and fragility fracture thoracic and lumbar spines due to osteoporosis, Z score -5. The whole body CT scan was unremarkable. Bilateral adrenalectomy was performed. Four years later, follow-up chest CT scan revealed a 17 × 11 mm mass in the posterior basal segment of the right lung. What is the abnormality in the posterior aspect of the inferior third of right lung highly suggestive of? <image-1>	<image-1> <image-2> <image-3> <image-4>
Input Prompt	RadFM Prediction
The postoperative laboratory results were notable for hemoglobin of 10.1 g/dL. CT pulmonary angiography demonstrated a nearly occlusive thrombus in the left pulmonary artery (LPA). Radiology indicated that it most likely represented tumor embolism, with additional bilateral segmental and distal subsegmental emboli. What was noted about the right ventricle? <image-1>	<image-1> <image-2> <image-3> <image-4>
Input Prompt	RadFM Prediction
A 19-year-old female reported to radiology for evaluation of palpable mass in the submandibular region on the left side. The lesion had few cystic foci within and had increased vascularity on color Doppler. It is separate from, but compressing the adjacent submandibular gland. Magnetic Resonance Imaging (MRI) of the neck was performed for characterization of the lesion. <image-1> Where was the lesion found on the MRI?	<image-1>

Qualitative examples of report generation task	
Input Prompt	RadFM Prediction
<image-1> <image-2> Patient Data: Age: 40 years Gender: Male Perianal purulent discharge and tenderness. Please caption this scan with finding and impression. <image-3> <image-4>	<p>Finding: Injection of contrast via the orifice of purulent discharge showed opacification of the perianal abscess. No evidence of obvious contrast extravasation into the anal canal or rectum is seen.</p> <p>Impression: Opacification of the perianal abscess. No evidence of contrast extravasation into the anal canal or rectum.</p>
Reference Report	
<p>Finding: Injection of contrast via the orifice of purulent discharge showed opacification of the left perianal abscess. No evidence of obvious contrast extravasation into the anal canal or rectum.</p> <p>Impression: Left perianal abscess with no evidence of contrast extravasation into the anal canal or rectum</p>	

Qualitative examples of rationale diagnosis task	
Input Prompt	RadFM Prediction
<image-1> Patient Data: Age: 65 years Gender: Male Acute onset chest pain and hypoxia. Analyze the provided images and identify the disease that is commonly associated with such radiological findings. Discuss the characteristic radiographic manifestations.	<p>Pulmonary embolism. The Radiographic features can be summarized as follows. Plain radiograph:</p> <ul style="list-style-type: none"> <li>- Fleischner sign: enlarged pulmonary artery</li> <li>- Hampton hump: peripheral wedge of airspace opacity implying lung infarction</li> <li>- Westermark sign: regional oligemia</li> <li>- Pleural effusion</li> <li>- Knuckle sign: enlarged right descending pulmonary artery</li> <li>- Palla sign: enlarged right descending pulmonary artery</li> <li>- Chang sign: dilated right descending pulmonary artery with sudden cut-off</li> <li>- Elevated diaphragm</li> </ul> <p>CT:</p> <ul style="list-style-type: none"> <li>- Filling defects within the pulmonary vasculature with acute pulmonary emboli</li> <li>- Polo Mint sign: central filling defect surrounded by a thin rim of contrast</li> <li>- Thin stream of contrast adjacent to non-occlus</li> </ul>
Input Prompt	RadFM Prediction
Patient Data: Age: 75 years Gender: Male Follow up of traumatic subarachnoid hemorrhage Analyze the provided images and identify the disease that is commonly associated with such radiological findings. Discuss the characteristic radiographic manifestations. <image-1> <image-2>	<p>Subarachnoid haemorrhage. The Radiographic features can be summarized as follows. CT. Non-contrast CT is frequently performed first due to wider availability. It is more sensitive to hemorrhage and can detect hyperdense material filling the subarachnoid space, commonly around the circle of Willis or in the Sylvian fissure. Small amounts of blood may also be seen pooling in the interpeduncular fossa or within the occipital horns of the lateral ventricles. Subarachnoid hemorrhages are grouped into four categories according to the amount of blood on unenhanced CT by the Fisher scale. MRI: MRI is sensitive to subarachnoid blood and can visualize it well in the first 12 hours as a hyperintensity in the subarachnoid space on FLAIR. Susceptibility-weighted</p>

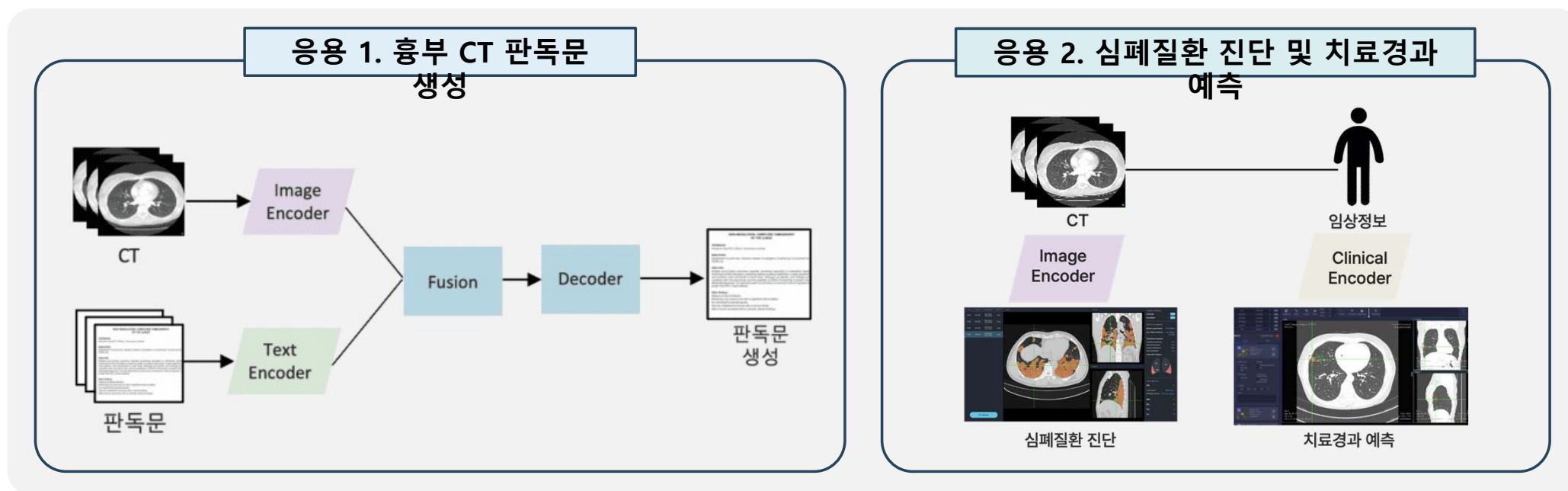
Wu, Chaoyi, et al. *arXiv preprint arXiv:2308.02463* (2023).

### 3. 생성형 AI: 심폐질환 진단 및 치료경과 예측

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#### 홍부 CT-판독문 생성형 AI

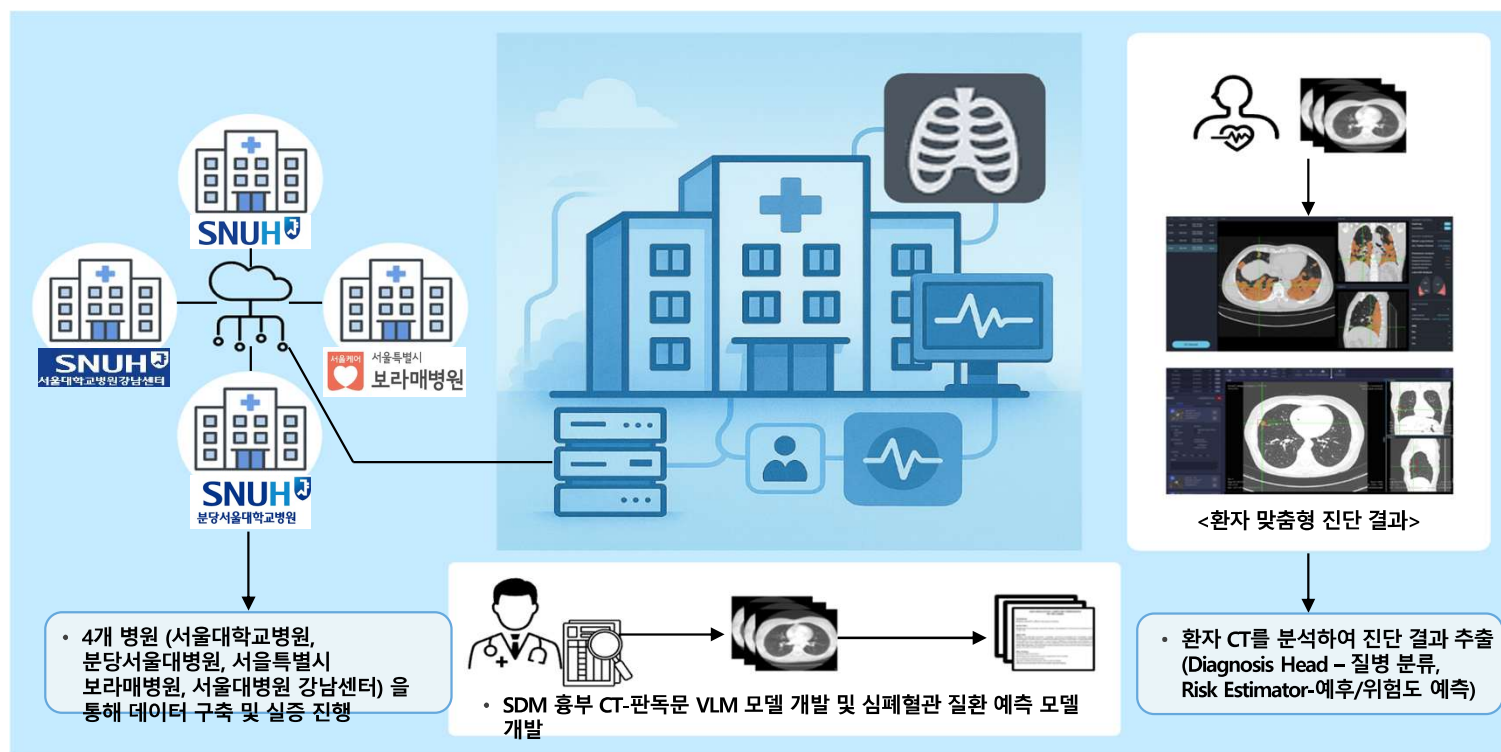
- 멀티모달 데이터(홍부 CT – 판독문)를 이용한 Vision-Language Model(VLM) 개발



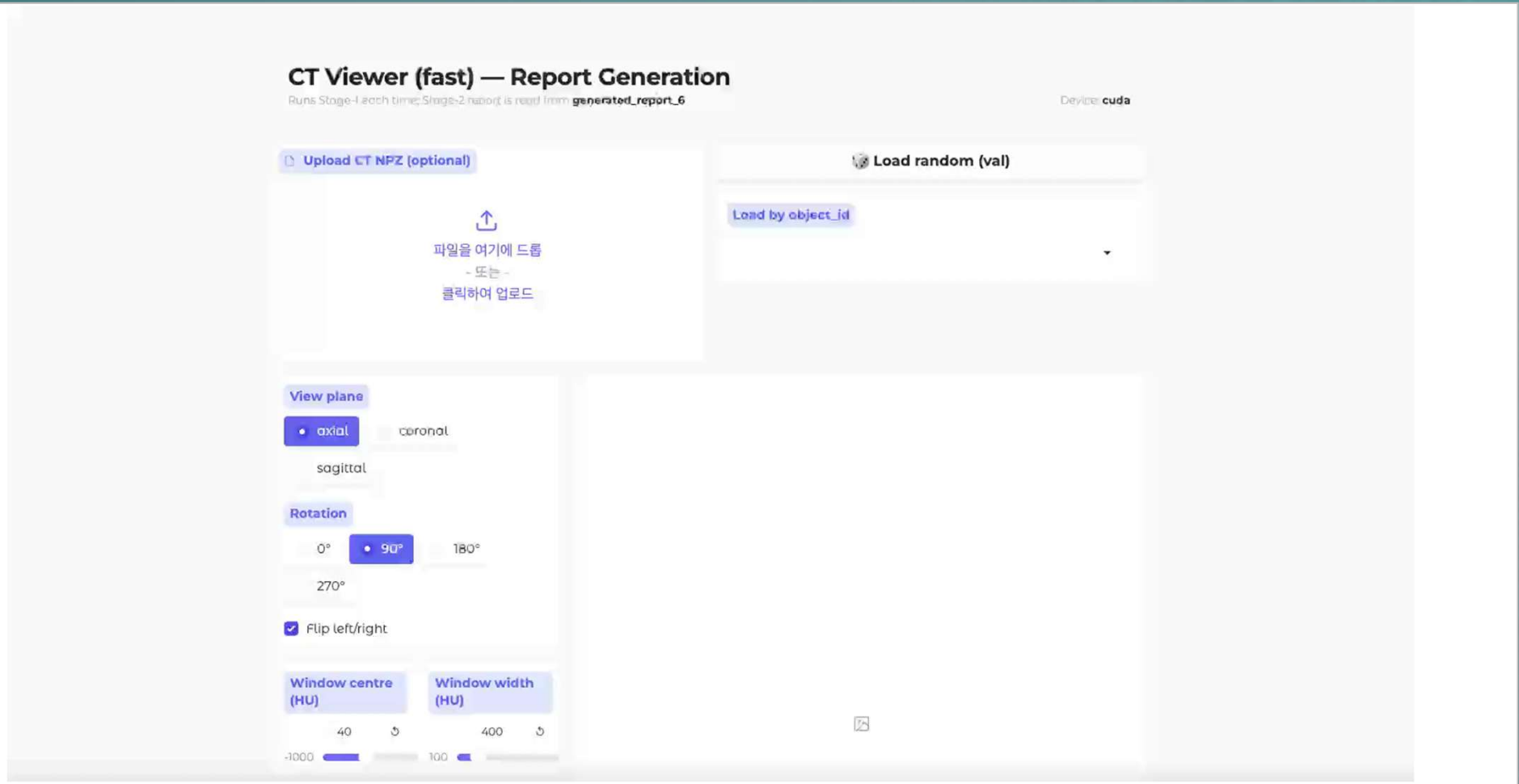


### 3. 생성형 AI: 심폐질환 진단 및 치료경과 예측

#### 흉부 CT-판독문 생성형 AI



### 3. 생성형 AI: 심폐질환 진단 및 치료경과 예측



# 감사합니다.



주 관 ETRI (TANGO)  
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문 의 parkjb@etri.re.kr / 042-860-5565

후 원 LGS labup w e o a tesla system (사)한국인공지능협회 SNUH 서울대학교병원 고려대학교 KOREA UNIVERSITY 영익대학교 YONGIK UNIVERSITY 중앙대학교 CHUNGANG UNIVERSITY RTst Reliable & Trustworthy

KEITI 한국전자기술연구원 AIVN SUREDATA ACRYL h 하늘소프트 KTA 한국정보통신기술협회

# 1. 강연 제목 (G마켓 산스 Bold 24pt)

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## 강연 소제목 (나눔스퀘어 Bold 20p)

내용입력하시면 됩니다. (나눔스퀘어 14pt)

**강조내용** (나눔스퀘어 14pt, ctrl+B)



# 1. 강연 제목 (G마켓 산스 Bold 24pt)

17

## 강연 소제목 (나눔스퀘어 Bold 20p)

내용입력하시면 됩니다. (나눔스퀘어 14pt)

**강조내용** (나눔스퀘어 14pt, ctrl+B)