# RadNLP: Natural Language Processing for Radiology

NTCIR-18 kickoff meeting

Yuta Nakamura, MD PhD, The University of Tokyo Hospital

~~MedNLP Rad~~

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1. TL;DR (one-page introduction)
2. Background
3. About RadNLP task

# TL;DR (one-page introduction)

- Multi-label classification task to predict lung cancer stage from radiology reports
- We enhance our datasets from the previous NTCIR-17

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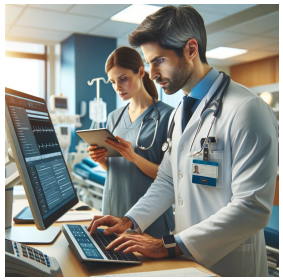
# Background

- Roughly, biomedical NLP has three major applications
- RadNLP contributes to professional workflow



Professional workflow

Clinical records

Inside hospital
Professional lexicon

Research

Articles

Outside hospital
Professional lexicon

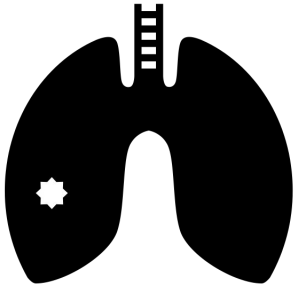
Interactions with laypeople

Chatbot, social media, telemedicine etc.

Outside hospital
Non-professional lexicon

# Background

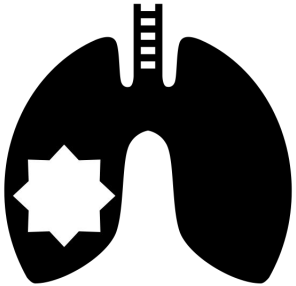
- Lung cancer has different optimal treatments depending on its stage (degree of progression)



Early cancer

Surgery applicable

Different treatment

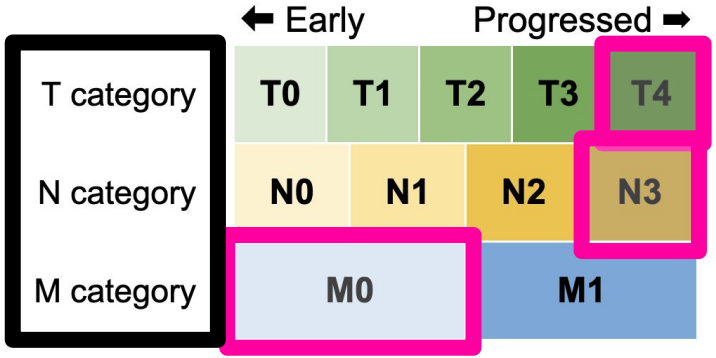


Progressed cancer

Surgery not applicable

# Background

- Stage is determined in combination of T, N, and M categories



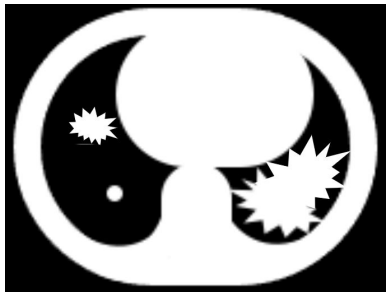

T: primary tumor size and extension
- How many mm?
- Extending to where?

N: metastasis to lymph nodes
- To what lymph nodes?

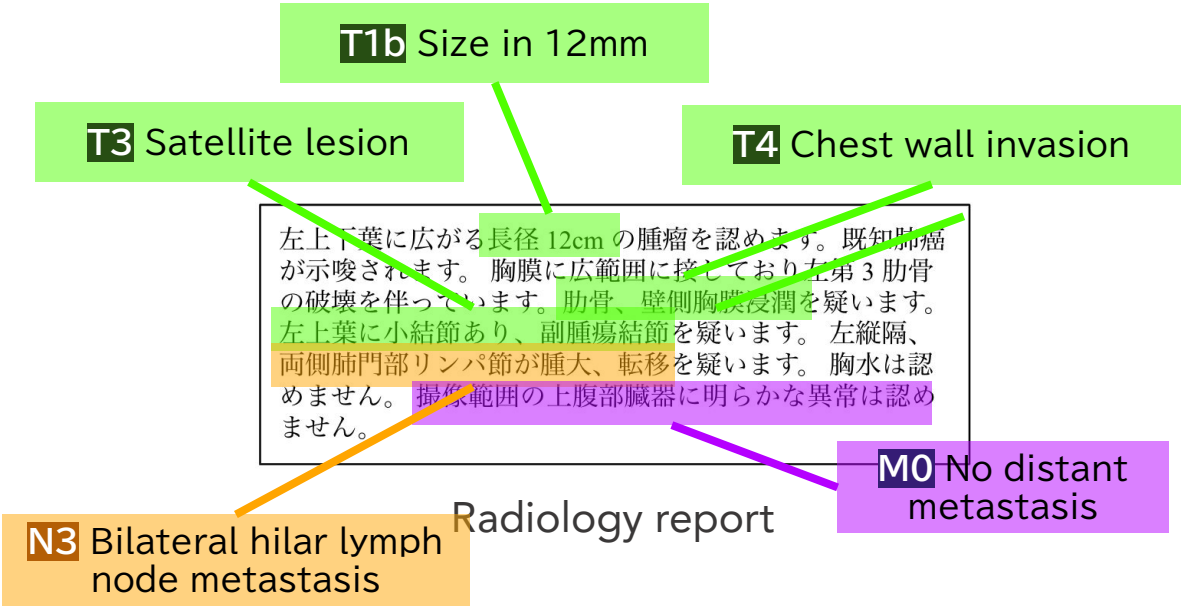
M: metastasis to distant organs
- No/Single/multiple?

# Background

- Radiology reports are rich in information related to staging
- However, stage is rarely specified in radiology reports

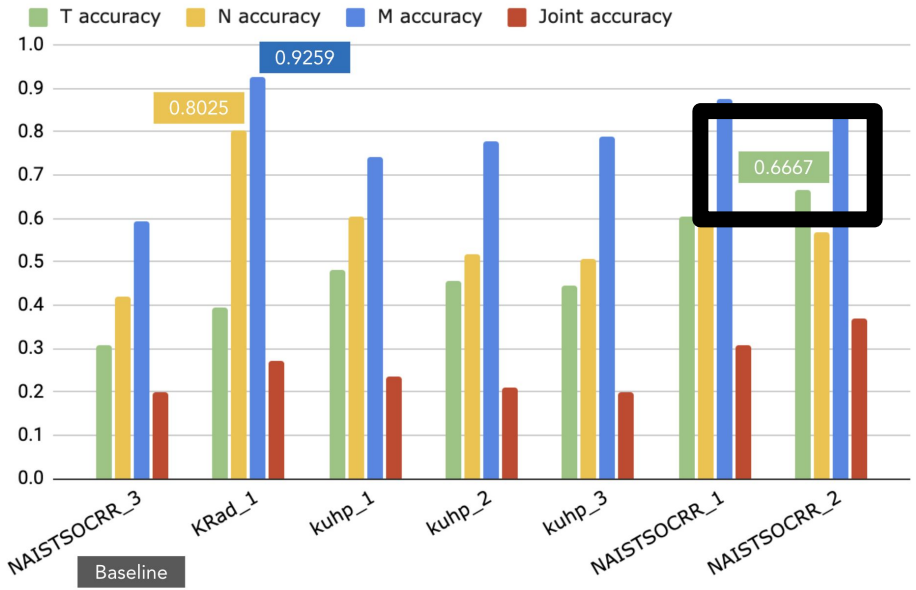


(Lung cancer image)



# Background

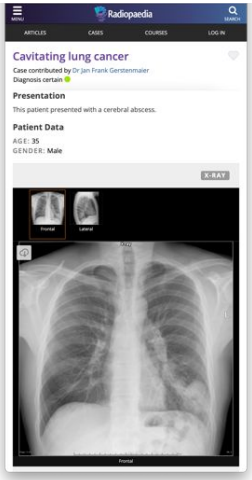
- We continue this topic from NTCIR-17
- Even with LLMs, we had large room for improvement



1. TL;DR (One-page introduction)
2. Our past task series
3. About RadNLP task

# Dataset (new feature is underlined)

- NTCIR-17: 243 Japanese reports
- NTCIR-18: 243 Japanese and English reports
- No personal information
  - Created by diagnosing images on radiopaedia.org



# Subtasks (new feature is underlined)

- Subtask: sentence classification
  - Metric: F1 score

左上下葉に広がる長径 12cm の腫瘤を認めます。既知肺癌が示唆されます。胸膜に広範囲に接しており左第 3 肋骨の破壊を伴っています。肋骨、壁側胸膜浸潤を疑います。左上葉に小結節あり、副腫瘍結節を疑います。左縦隔、両側肺門部リンパ節が腫大、転移を疑います。胸水は認めません。 撮像範囲の上腹部臓器に明らかな異常は認めません。

Positive findings for T category

Positive findings for N category

- Main task: lung cancer staging
  - Metric: Accuracy

**Input**
**(lung cancer radiology report)**

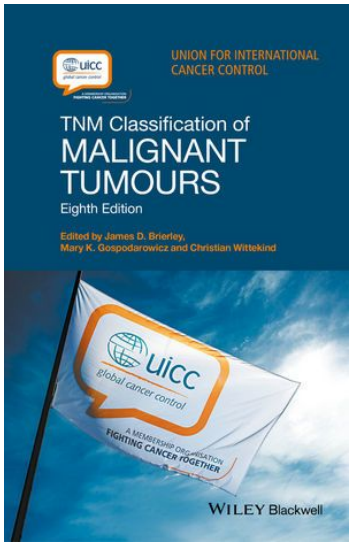
左上下葉に広がる長径 12cm の腫瘤を認めます。既知肺癌が示唆されます。 胸膜に広範囲に接しており左第 3 肋骨の破壊を伴っています。肋骨、壁側胸膜浸潤を疑います。左上葉に小結節あり、副腫瘍結節を疑います。 左縦隔、両側肺門部リンパ節が腫大、転移を疑います。 胸水は認めません。 撮像範囲の上腹部臓器に明らかな異常は認めません。

**Answer**
**(clinical stage)**

T4N3M0

# Annotation

- Follows the 8th edition of TNM classification rule by Union for International Cancer Control (UICC)
- Annotated by board-certified radiologist(s)



# Organizers (★ radiologists)

- Co-chair

★Yuta Nakamura, MD PhD
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★Shouhei Hanaoka, MD PhD
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Eiji Aramaki, PhD
NAIST

Shuntaro Yada, PhD
NAIST

- Supporter
  - ★ Koji Fujimoto, MD PhD (Kyoto University)
  - ★ Kluckert Jonas, MD PhD (Zurich University)
  - ★ Michael Krauthammer, MD PhD (Zurich University)

# Schedule plan

- Jul 2024
  - Release of the training & validation sets
- Nov 2024
  - Release of the test set
  - Participation registration closes
- Jan 4, 2025
  - Submission deadline of the test predictions
- Feb 1, 2025
  - Score return

# Contact

- radnlp@googlegroups.com
- Feel free to ask us any questions!