Implementing Clinical Reasoning Models as a Second Site: Enhancements and Lessons Learned

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Background

- ***Clinical Reasoning*** is the ability to quickly distill medical knowledge and patient information into a concise diagnosis and treatment plan.
- Previous work developed and validated **machine learning** and **large language model** approaches to give **feedback on clinical reasoning** to Internal Medicine residents at the University of Cincinnati (UC) and New York University (NYU)

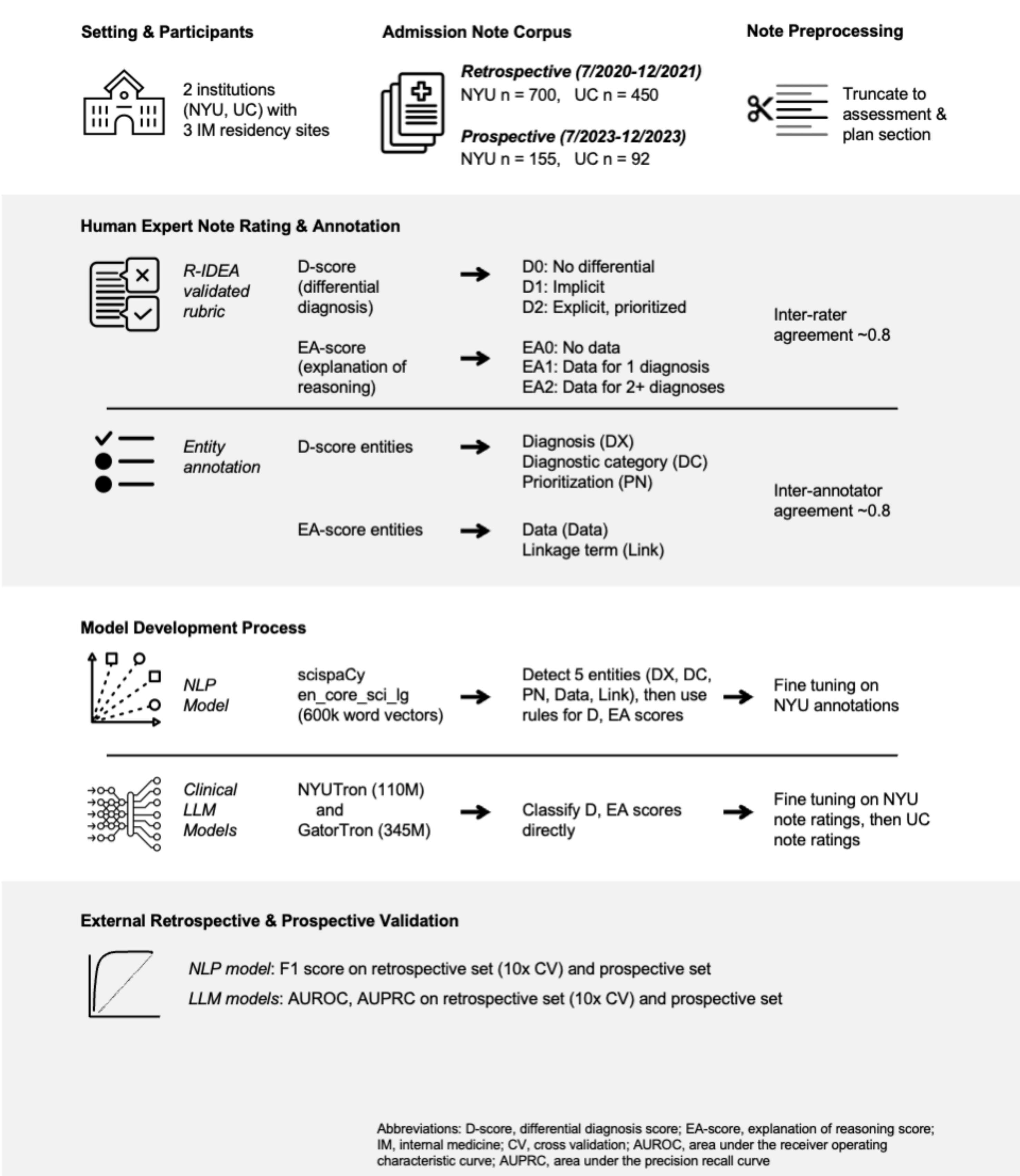


Figure 1. Summary of results for collaboration between NYU and UC to develop clinical reasoning AI models.

Objective

- Share lessons learned from the second site implementation of clinical reasoning models so that others may implement similar models.

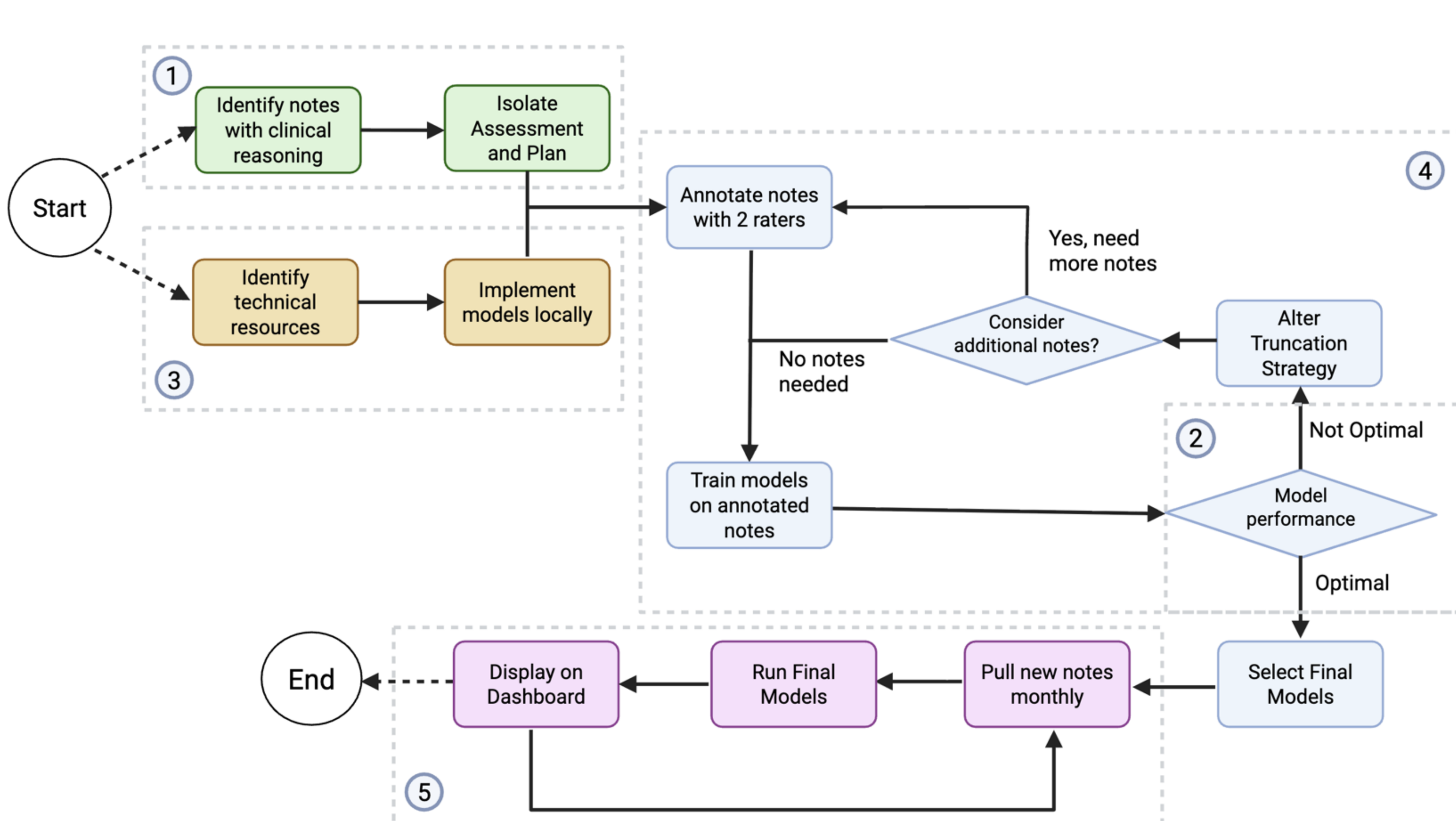
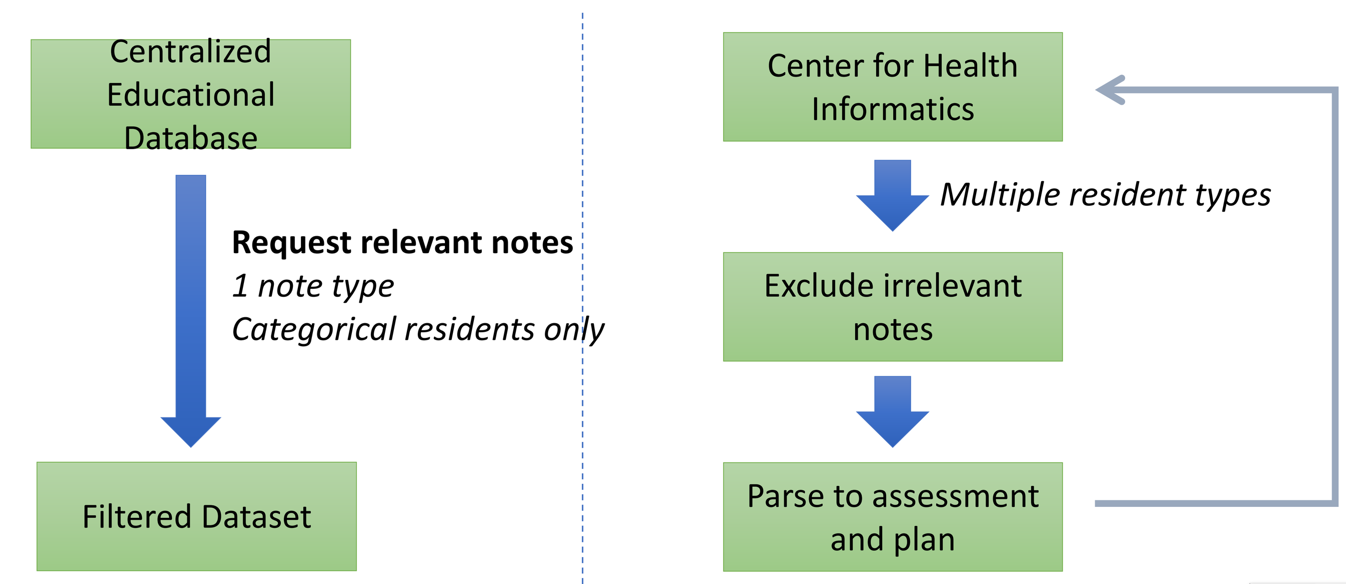


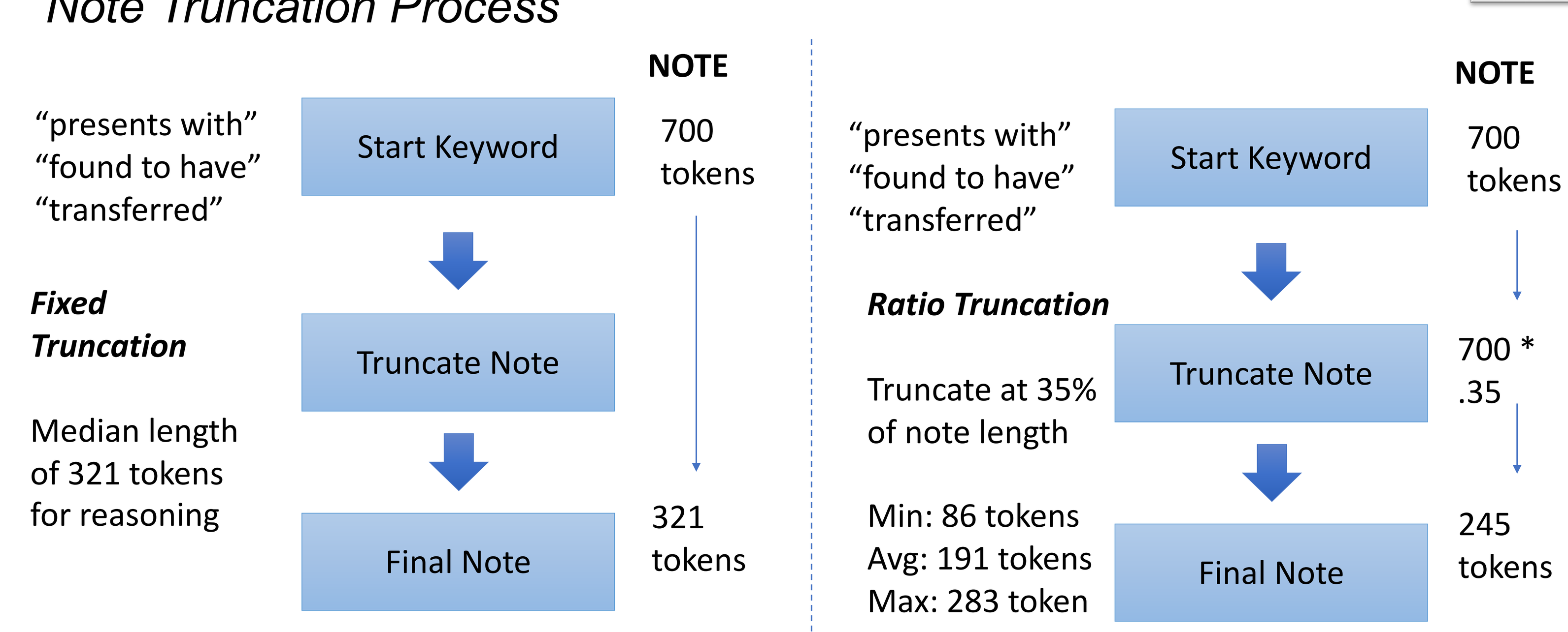
Figure 2. Model Development Process

Differences Between Sites

Note Extraction Process



Note Truncation Process



Advice for Second Sites

1. **Carefully define appropriate note set**
   - Institutional differences in note structure and request process required careful consideration and adjustment to the pipeline
2. **Choose educationally relevant thresholds**
   - Optimizing metrics like sensitivity, specificity, positive and negative predictive value, etc., should be done with a focus on the educational value of the model's results.
3. **Align model choice with available technical resources**
   - At the time of this work, UC and NYU had vastly different technical resources (e.g., high performance computing). We chose models that worked with our infrastructure (GatorTron at UC vs NYUTron at NYU)
4. **Treat annotation and fine tuning as an iterative process**
   - Models will need to be retrained iteratively after transferring to the new institution. You may have to change your annotation and fine-tuning processes, compared to the original site, to get the best results.
5. **Prioritize clear communication with residents**
   - Although outside of the model development pipeline, we suggest thinking how you will share and communicate model results with residents to ensure they have "buy in" and understand (at a base level) what the model is doing.