AI-Enhanced Medical Training
Closed-Loop Communication Annotation Tool

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https://theisclab.com/team.html

Closed-Loop Communication (CLC)

[1] Initiate Message
[2] Repeat Message
[3] Verify Message

➤ Communication failure is a threat to patient safety.
➤ CLC is a vital medical practice.
➤ It facilitates effective information exchange.

Design

VR Simulation for medical Training

➤ **Proposed pipeline:**
A. Use VR to capture simulation videos
B. Extract relevant features
C. Use NLP models to classify the conversations

Output

Execute the instructions to the following dialogue. Do not provide any additional explanation:

index: 1; name: Jim; speech: 1 - [Stable V-Tach.], 2 - [Alright, so they're saying unstable V-Tach.], 3 - [Now, we don't have a pulse.], 4 - [Okay, go ahead.], 5 - [Vitaliy, start compressions.]
index: 2; name: Vitaliy; speech: 1 - [Marked.], 2 - [I'm doing compressions.]
index: 3; name: Jim; speech: 1 - [Okay, and we need airway.], 2 - [Vitaliy, can you hand ambu-bag to Scott?]
index: 4; name: Vitaliy; speech: 1 - [Yeah.], 2 - [Scott, here's the bag.]
index: 5; name: Scott; speech: 1 - [Okay, so 30 and 2.], 2 - [Since we don't have intubated yet.]
index: 6; name: Vitaliy; speech: 1 - [Got it.], 2 - [30 to 2.]
index: 7; name: Jim; speech: 1 - [Anthony, next is unsynced charge.], 2 - [Energy select 200.], 3 - [And now we definitely have V-Fib.], 4 - [So energy select 200.], 5 - [Going charge when you're ready?]
index: 8; name: Anthony; speech: 1 - [Charge, charging.]
index: 9; name: Jim; speech: 1 - [When it's charged we will go ahead and shock.], 2 - [So you guys will have to clear in a second.]

ChatGPT Prediction

Q: [1 - 5]; A: [2 - 2]; R: True
Q: [3 - 2]; A: [4 - 2]; R: True
Q: [7 - 2]; A: None; R: N/A
Q: [7 - 5]; A: [8 - 1]; R: False
Q: [9 - 1]; A: [11 - 1]; R: False
Q: [14 - 2]; A: [15 - 1]; R: True

Grouping Categories:
1. **Call Out:** Initial message directed to the team members
2. **Check Back:** Acknowledgment and verification of that message
3. **Inadequate Response:** Doesn't adequately address the initial message
4. **None:** When none of the above apply

Evaluation

➤ Collaborating with the **Michigan Medicine** professionals to evaluate:
  ○ Effectiveness of the tool
  ○ Acceptance of AI generated results

Problem

➤ Healthcare professionals face the following problems:

1. **Hard to Quantify CLC Instances**
2. **Information Overload and Time Pressure**
3. **Human Errors and Lack of Attention**
4. **Language Barriers**

➤ Human assessment of CLC skills can be
1. **Challenging**
2. **Subjective**
3. **Expensive**
4. **Time-consuming**

➤ Those result in miscommunications and are the motivation to build a tool that simplifies the task.

Labeling Interface
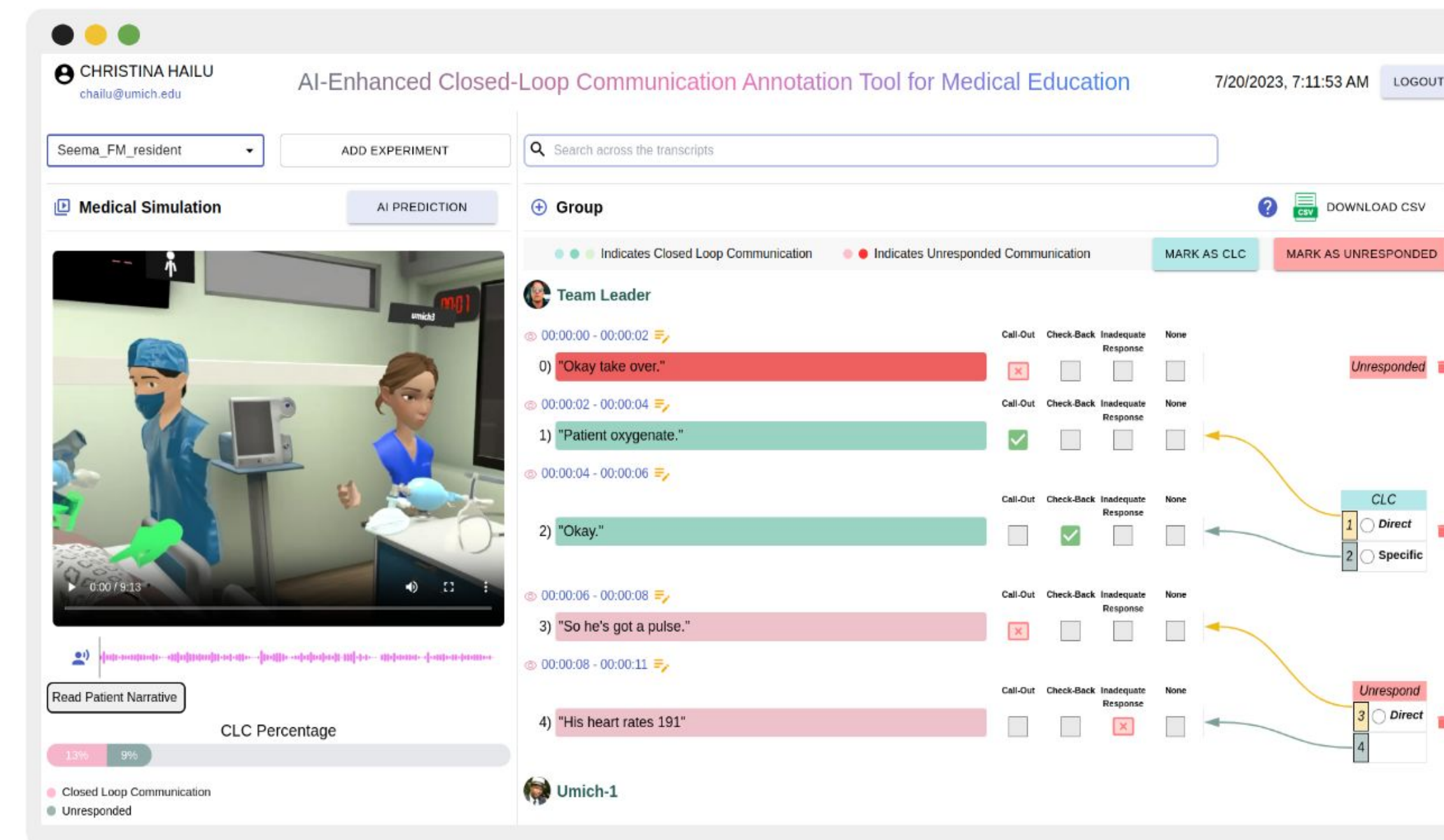
Summary

➤ In summary, our project presents a **novel application of AI and prompt engineering to enhance Closed-Loop Communication.** Having this tool is beneficiary to:
  ○ Improve patient safety
  ○ Cost and time savings
  ○ Real-time Feedback
  ○ Error-free enhanced communication training
➤ By leveraging the capabilities of **NLP and GPT, we aim to make communication more efficient and error-free across various domains.**

Future Work

➤ Performance metrics
➤ Integrate real time medical visualizations
➤ Suggestion of improvements for medical trainees

Solution
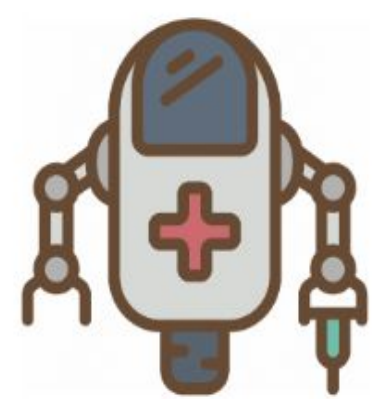
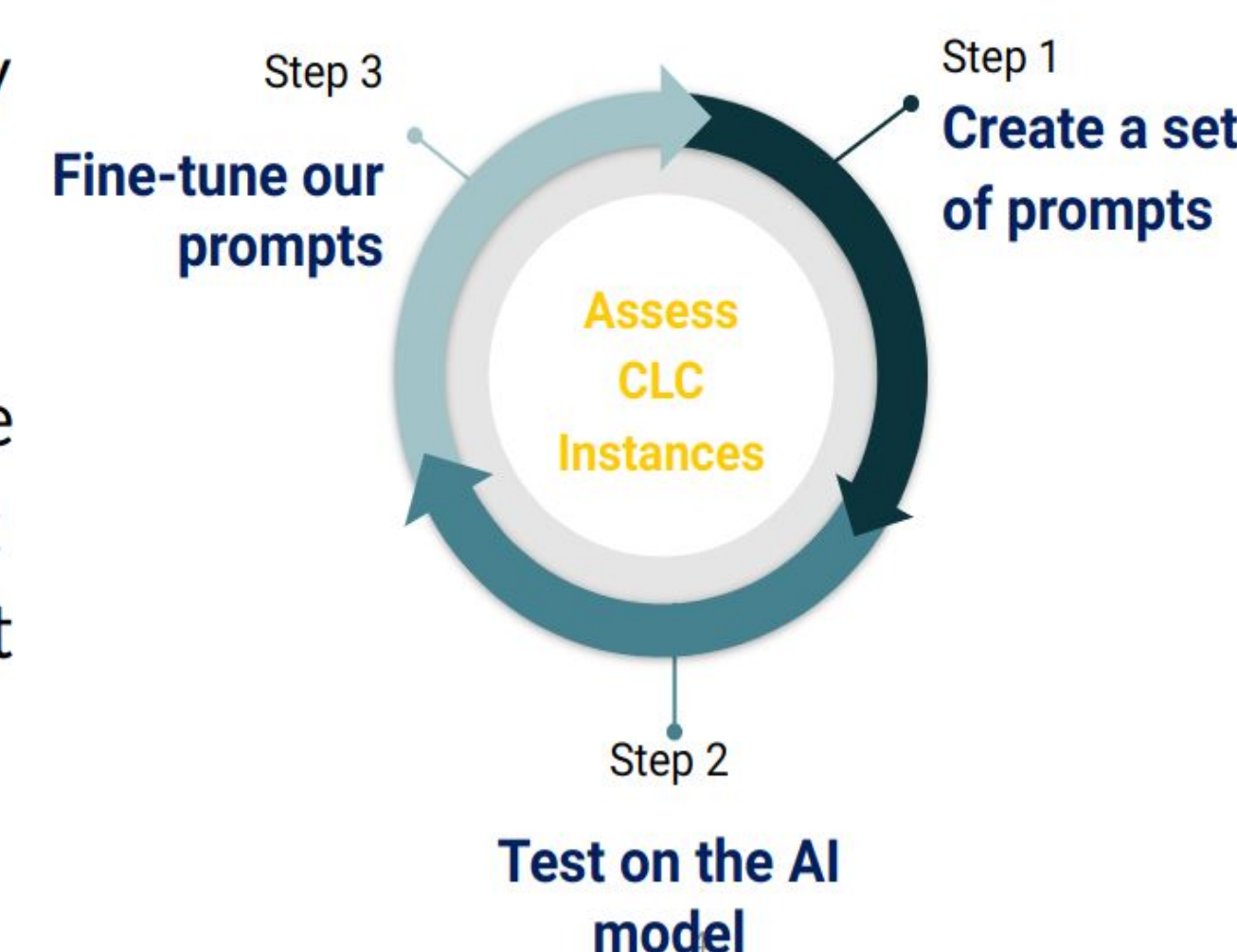**Automate** the assessment of CLC skills of medical students.
Here is where AI comes in!

Goal

➤ Develop a training tool that helps doctors and medical students easily evaluate and improve their CLC skills.

➤ Integrate the tool with **AI-Technology and Prompt Engineering** to assist medical professionals in training these skills.

Prompt Engineering

● In recent years, **GPT** has gained tremendous popularity across various industries and research domains.

● By applying AI, we can analyze communication patterns, spot discrepancies, and ensure that the intended messages are accurately understood

Step 1 **Create a set of prompts**
Step 2 **Test on the AI model**
Step 3 **Fine-tune our prompts**
Assess CLC Instances

AI-Driven Innovation Training Tool Enhancing Closed-Loop Communication

Promising **Seamless**, **Efficient**, and **Error-free** Conversations in Medical Field.

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