Becoming a Reliable AI Agent for COVID-19

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With the rapid increase in confirmed COVID-19 cases, patients who do not have underlying conditions are often under home treatment rather being treated in a hospital. Under home treatment, patients are required to contact a doctor to receive a diagnosis and care plans. However, due to the rapid increase of patients, medical service providers are having difficulty providing services in a timely manner. To remedy this, a conversational AI agent can play an important role in not only handling simple inquiries but also monitoring and triaging calls to help classify patients according to their symptoms. However, it is worth discussing the reliability of the information that the AI agents receive from patients. This paper discusses the reliability issue of AI agents used for supporting COVID-19 care.

CCS Concepts: • **Human-centered computing** → **Natural language interfaces**.

Additional Key Words and Phrases: AI ethics, conversational user interfaces(CUIs), reliable AI

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1 INTRODUCTION

As confirmed cases of COVID-19 increase, many countries are implementing home treatment for patients who do not have underlying conditions. During home treatment, patients need to contact a doctor when their symptoms become severe. In such a situation, a doctor must deal with numerous calls from patients, and patients may wait a long time to reach a doctor. To relieve this issue, a number of countries, along with big tech companies, have introduced AI virtual agents, such as chatbots or call agents, for handling simple inquiries and monitoring and triaging COVID-19 cases[1] [1, 5, 11].

Currently, using AI to answer users' questions is useful because many of the calls are simple questions. For example, in South Korea, three-quarters of the calls from COVID-19 patients who are under home treatment are about simple questions[2]. However, as the patients under home treatment must treat their symptoms on their own, they need basic COVID-19 knowledge but also, they must receive an official diagnosis by doctors. In fact, patients can obtain information on COVID-19 through various media platforms such as web searches, but they are only able to receive a diagnosis and treatment for their specific symptoms through phone calls or video calls with doctors. This means that the burden on doctors to provide the diagnosis and treatment for specific symptoms of COVID-19 patients over the phone will increase. The role of COVID-19 virtual agents should become focused not just on the answering of simple questions but also on other interactions such as monitoring and triaging patient care and communication.

[1]https://www.oecd.org/coronavirus/policy-responses/using-artificial-intelligence-to-help-combat-covid-19-ae4c5c21/
[2]https://youtu.be/zbeYhU1IpdA

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2 INFORMATION RELIABILITY FROM THE AI MONITORING AND TRIAGING OF CALLS

The monitoring and triaging of patient communication and care by AI agents can help to relieve the burden on doctors who are in charge of providing diagnosis and treatment for COVID-19 patients[2]. Both tasks focus on the specific symptoms of the patients, and AI agents can report the results of patients who need urgent care. In this process, the AI agent asks a series of questions to gather information about a patients' symptoms, and the doctors check the information to determine the patients who need specific medical care.

The information collected from the AI agent is an important source for doctors, and it helps to prioritize the care of patients. Well-designed questions used by AI agents can provide useful information about the patients' current symptoms. However, there is a possibility that the AI agent may miss important information about current symptoms as told by the patient.

In the situation of COVID-19 home treatment, patients need to be able to take care of themselves. Although they already know that they have COVID-19, they may not know how to handle their current symptoms. Dealing with known medical symptoms such as a sore throat or a fever may be more convoluted to patients with COVID-19 as it is new to them in this context. In medical interactions between a doctor and a patient, the patient tends to explain their medical problems underscoring their uncertainty and doubt[7, 8]. Therefore, they tend to use narratives to explain these problems (See Extract 1)[6].

```
1    PAT:    (.hh) I have ah- ah little swelling here.
2            (0.3)
3    DOC:    Oka:y,
4    PAT:    an:d ah (.hh) I don't know whether its ah (hh)
5            ah hernia, (0.4) or (a) (.) something inside
6            there causing it ((cough)) but ah ((cough)) it-
7            is- ah little lop sided (.) maybe I'm just
8            growing that way.
9    DOC:    Hm hmm,=
10   PAT:    But I think maybe its something ought ah be
11           looked at.=
```

Extract 1. An interaction between a doctor('DOC') and a patient('PAT') with unknown medical problems.

A conversational interaction between AI agents and patients will not be the same as a doctor-patient interaction. There is always the possibility that the patient will not clearly respond to the AI agent's question, which means that the agent will not fully understand what the patient is trying to say (See lines 9-11 from Extract 2)[10]. In this case, the reports by the AI agents are likely based on incomplete information about the patient. Furthermore, the report is a source for doctors to understand the patients' medical conditions, so the incompleteness of the information will be problematic.

3 HOW CAN AI AGENT BECOME MORE RELIABLE AND DEPENDABLE?

Conversational AI agents can play an important role in the fight against COVID-19, but their role should be expanded to handle more difficult problems such as understanding the patients' specific symptoms more accurately to help both COVID-19 patients at home and medical service providers. Perfection cannot be expected from AI agents, human agents, or medical providers, so the best we can do is to focus on the challenges we have to tackle to support the fight against COVID-19.

```
1     CAI:    Hello, I am calling to check your symptoms
2             regarding to COVID-19 today. (.) Have you
3             got a minute to talk?
4     CON:    Yeah::, oh (.hh) you have already called
5             me earlier today huh? (0.2) yes::, go ahead.
6     CAI:    Hello again, (.) is this a good time to talk?
7     CON:    Yes,
8     CAI:    Do you have a fever now?
9     CON:    Yeah::, (.hh) uh- nothing like that. (.) I'll let you
10            know if there is anything like that. (.) oh:: (.hh)
11            too stressful.
```

Extract 2. A conversation between an AI agent(Clova CareCall, 'CAI') and a close contact('CON'). (This extract has been translated from Korean to English)

First, conversational AI agents need to understand narratives and unclear symptom presentations from patients. As mentioned earlier, unknown symptom presentations from a patient can be unclear and cause assumptions. To enable AI agents in handling this, utterance design for conversational AI agents and the technology for handling narratives need to be developed and improved. The use of foundation models such as GPT-3 can be a promising solution because the model can recognize users' conversational context based on what they say[3, 4, 9]. Of course, this is not a concrete solution for handling this issue, but the approach would be worth considering.

Secondly, the information that the conversational AI agent collects will need to be checked by patients. Recent AI monitoring and triage call systems have been unable to get explicit feedback from users. However, patients should be able to verify that the AI agent understands what they have said. This may be burdensome work for the patient, but without this process, the patient may have more difficulty receiving feedback from the medical service providers in a timely manner. This information checking process would not be welcomed by tech companies providing the AI agents because this could reveal the performance setbacks of conversational AI technology. However, from a long-term perspective, this process would help ensure the reliability of their conversational AI agents.

4 CONCLUSION

As COVID-19 continues to be prevalent, medical service providers are struggling with a heavy caseload. COVID-19 patients also can experience difficulties in reaching out to doctors and receiving diagnoses and treatment. AI agents are playing an important role in the fight against COVID-19 and if they are able to become more reliable resources for medical services providers and patients, then the efficiency of home treatment care will increase.

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