INTERACTIVE CPR INSTRUCTIONAL DIALOGUE SYSTEM: LEARNING LIFESAVING SKILLS

THE WANNA-BE CPR INTERACTIVE DIALOGUE SYSTEM: LEARNING LIFESAVING SKILLS AND THE ART OF FRUSTRATION MANAGEMENT

INTRODUCTION

Motivation

- Forcing myself to finally learn CPR instruction!
- A fun project which could "potentially" become something useful.

Goal

- Building a system able to provide CPR instruction.
 - First checking some previous information that is relevant for proper instruction: responsiveness, breath and CPR knowledge.
 - o Multimodal system: it shows visual aid to support instructions.

INTRODUCTION

- Started looking for an API organizations such as Red Cross or similar
- No API for CPR instructions, sadly.

Performing CPR

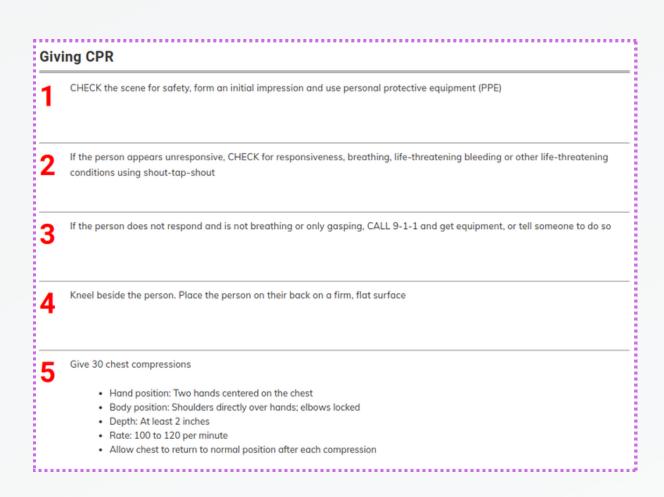
Hands-Only CPR For Adults

Adult CPR Steps

What Is CPR?

CPR For A Pet

CPR For A Baby Or Child



- Adding instruction manually?
- Why not using ChatGPT prompts?

DATA COLLECTION

Scenario:

• PARTICIPANT A - User:

You have just walked into a room and found your {family_member_placeholder} lying on the ground. Let's assume you quickly move close to them and check if they answer when you call their name. Unfortunately, they don't respond. Then, you check if they are breathing, and you can't find any sign of breathing either. Next, you ask the system for CPR assistance.

• PARTICIPANT B - System:

The user will ask for help regarding CPR instruction. You first need to ask three main questions that are relevant to determine the CPR steps:

- Responsiveness (is the victim reacting when calling their name?)
- Respiratory status (is the person breathing?)
- User's level of CPR knowledge

[CPR steps]

DATA COLLECTION

CARLOS - User: Hola, necesito que me digas cómo hacer la RCP. Es una emergencia.

MAMÁ - System: No te preocupes, estoy aquí para ayudarte. Primero, vamos a evaluar la situación. ¿Tu padre reacciona cuando le llamas por su nombre?

User: No, no responde.

System: Vale, gracias por la información. Ahora, eh... ¿puedes mirar a ver si está respirando? Pon tu oído cerca de su boca y de la nariz y dime si ves que se mueve o respira.

User: No se mueve, y creo que no respira.

System: Vale, vale. Pues... sí, vamos a empezar con la RCP entonces. ¿Tienes algún conocimiento de RCP, o es la primera vez que la haces?

User: Hice un curso básico hace tiempo, pero no me siento muy seguro ahora.

System: Ok. No importa, tranquilo que yo te ayudo. Lo primero es, eh... poner tus manos en el pecho de tu padre, por el medio, y tienes que utilizar tu peso para presionar fuerte y rapidito. Tienes que presionar al menos 5 centímetros de profundidad y a un ritmo de 100 a 120 compresiones por minuto. ¿Quieres que te ayude contando las compresiones?

User: Sí, porfa, mejor si cuentas.

System: Venga, vamos. Uno, dos, tres, cuatro...

User: Hi, I need you to tell me how to perform CPR. It's an emergency.

System: Don't worry, I'm here to help you. First, let's assess the situation. Does your father respond when you call his name?

User: No, he doesn't respond.

System: Okay, thanks for the information. Now, um... can you check to see if he's breathing? Place your ear near his mouth and nose and tell me if you see any movement or if he's breathing.

User: He's not moving, and I don't think he's breathing.

System: Alright, alright. So, we're going to start with CPR. Do you have any knowledge of CPR, or is this your first time doing it?

User: I took a basic course a while ago, but I don't feel very confident now.

System: Okay. No problem, take it easy, and I'll guide you. The first thing is to, um... place your hands on your father's chest, in the center, and you need to use your body weight to press down hard and quickly. You should press at least 2 inches deep and at a rate of 100 to 120 compressions per minute. Do you want me to help by counting the compressions for you?

User: Yes, please, it's better if you count.

System: Alright, here we go. One, two, three, four...

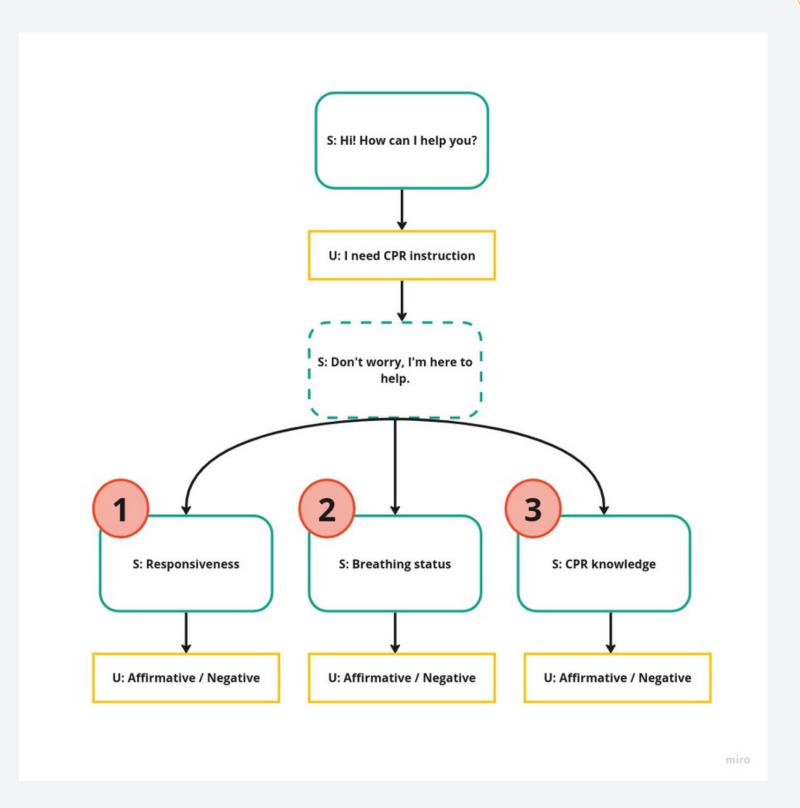
HowCanlHelp

Assessing the situation:

- Responsiveness:
 - o Is the person conscious?
- Breathing status:
 - o Is the person breathing?
- CPR knowledge:
 - O Do you have training in CPR?

User's answer:

Affirmative / Negative



ChatGPT prompt:

const gptData = await fetchFromChatGPT(`I need you to provide concise CPR instructions regarding making an emergency call, the surface where the victim is located, the placement of hands for performing CPR, compressions and rescue breaths. Before providing instructions you should know that the victim is an adult and the person's status is \${input.responsiveness} and \${input.breathing}. My level of experience with CPR is \${input.cpr_knowledge}, so the instructions should be more detailed for someone with no or little experience and just a reminder of the steps for a trained person. I need the instructions in JSON format, including the following entities: emergencyCall_JSON, firmSurface_JSON, placingFingers_JSON, startingCompressions_JSON and rescueBreaths_JSON. For example: "emergencyCall_JSON": "Call 911 or your local emergency number. If someone else is present, ask them to do this".`, 350);

Multimodality:

- JSON entities:
 - emergencyCall_JSON, firmSurface_JSON, placingFingers_JSON, startingCompressions_JSON and rescueBreaths_JSON
- JSON data:

```
"firmSurface_JSON": {
    "instruction": "Ensure the person is on a firm, flat surface such as the floor or ground.",
    "mediaUrl": "https://media.giphy.com/media/xT5LMKKlg8MK5g24Wk/giphy.gif"
}
```

Multimodality:

- JSON entities:
 - emergencyCall_JSON, firmSurface_JSON, placingFingers_JSON, startingCompressions_JSON and rescueBreaths_JSON



```
index.ts:73
  "emergencyCall JSON": "Call 911 or your local emergency number. If
someone else is present, ask them to do this.",
  "firmSurface JSON": "Place the victim on a firm, flat surface. Ensure
there are no objects or obstacles around that may hinder CPR.",
  "placingFingers JSON": "Kneel beside the victim. Place the heel of one
hand on the center of the victim's chest, between the nipples. Place the
other hand on top of the first hand, interlocking the fingers.".
  "startingCompressions JSON": "With straight arms, position your
shoulders directly above your hands. Push hard and fast in the center of
the chest, aiming for a depth of at least 2 inches. Perform compressions
at a rate of 100-120 compressions per minute.",
  "rescueBreaths JSON": "After 30 compressions, give 2 rescue breaths.
Tilt the victim's head back slightly and lift the chin. Pinch the victim's
nose shut, take a normal breath, and cover the victim's mouth with yours,
creating an airtight seal. Give 2 one-second breaths, watching for the
chest to rise with each breath."
```



Multimodality:

- States:
 - emergencyCall -> When you're ready for the next step, say "next" or "ready"
 - o firmSurface
 - placingFingers
 - startingCompressions
 - rescueBreaths

Next:

RepeatStep:

- target: "firmSurface" (if "next" or "ready")
- target: "RepeatStep"

RepYesOrNo:

- target: "emergencyCall" (if "yes")target: "firmSurface" (if "no")

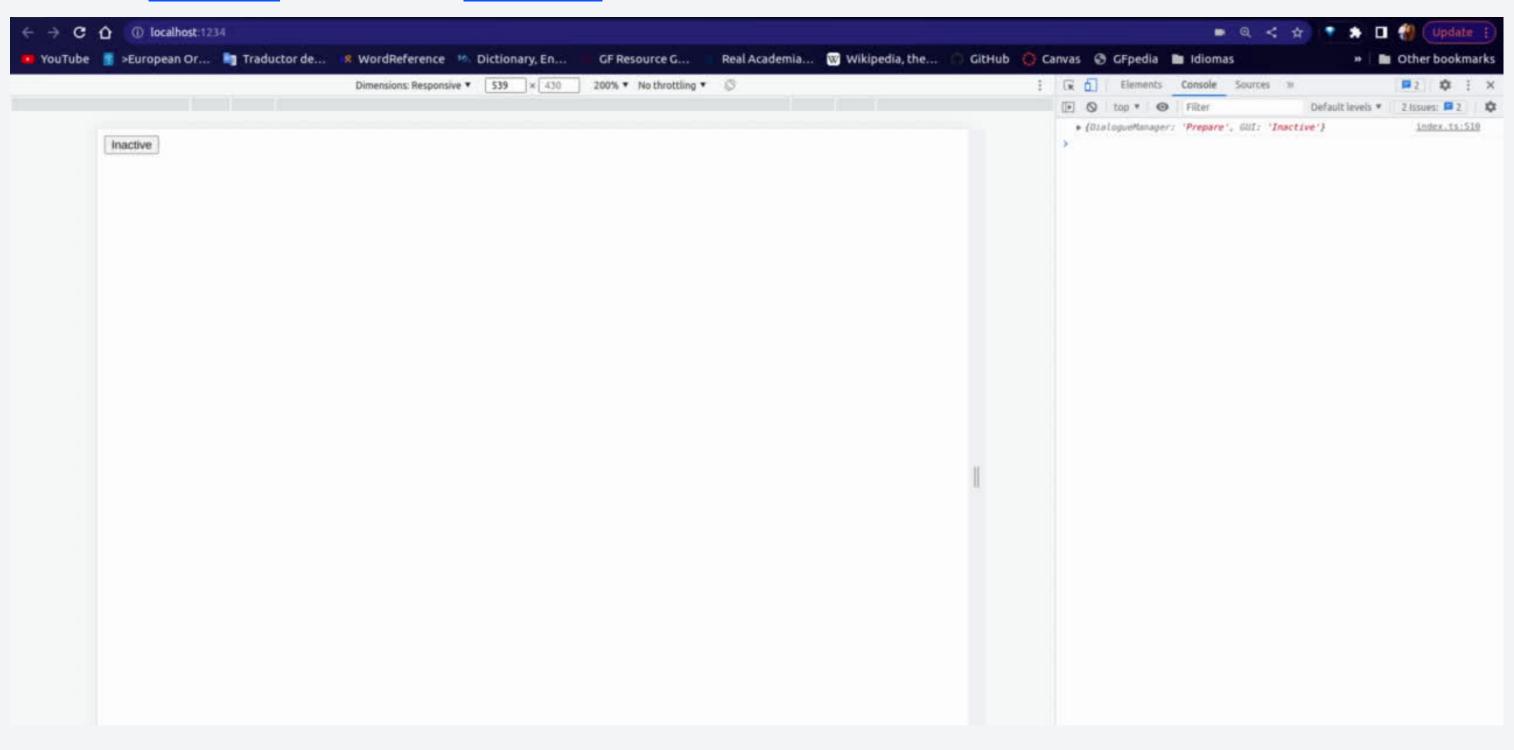


• Do you want me to repeat the step?

Say "yes" or "no"

DEMO

Link to <u>demo 1</u> | Link to <u>demo 2</u>



DISCUSSION

Capabilities:

- Asking for three factors to take account before providing CPR instruction
- Showing visual aid (GIFs) while providing steps

Problems:

- Limited to adults at the moment
- ChatGPT prompt is taking way too long
- Serious question: the original idea was to provide "customized" instructions by using the prompt, but are the steps really adapted?
- Undefined error when providing information!
- Repeating states aren't working at the moment!