

**Dr. Ing. Alex Awada** | Contact: [alex.awada@upb.ro](mailto:alex.awada@upb.ro)

## **A system to reduce the risk of a human to human transition of the COVID-19 virus for indoor spaces**

### **Coordinators/Contacts:**

dr. ing. Alex Awada ([alex.awada@upb.ro](mailto:alex.awada@upb.ro)),  
prof. dr. ing. Irina Mocanu ([irina.mocanu@cs.pub.ro](mailto:irina.mocanu@cs.pub.ro))

### **Description:**

The purpose of this project is to develop a system that helps to reduce the risk of a human to human transition of the COVID-19 virus. The system will use AI techniques to check if the person is wearing a mask and to check if the recommended physical distancing between people is respected. The system will integrate a telepresence module that allows an easy communication between a person and an operator. In case that the system detects anything wrong is detected, it will inform an operator about the situation and launch an alarm or warn the person (according to the situation).

**Poate fi folosită ca stagiu de practica.**

## **A simplistic multimodal web-based interface for elderly people with advanced chatbot integration**

### **Coordinators/Contacts:**

dr. ing. Alex Awada ([alex.awada@upb.ro](mailto:alex.awada@upb.ro)),  
prof. dr. ing. Irina Mocanu ([irina.mocanu@cs.pub.ro](mailto:irina.mocanu@cs.pub.ro))

### **Description:**

The purpose of this project is to develop a simplistic multimodal web-based interface that targets elderly people as its main users. The interface should work across platforms and it should support touch-based and touch-free gestures as well as speech interactions. It should be multilingual and should integrate a chatbot and some customizable/adaptive features. The project can be decomposed in 3 main subprojects (1 subproject/student):

1. A Chatbot that its able to learn new skills without the intervention of a developer: During the last few years, chatbots have become more and more sophisticated and complex. They already provide basic assistance to humans on different online platforms but also in other places. The vast majority of chatbots have been designed to excel in a well-defined use case (with well-defined functionalities), such as in providing customer assistance or in offering basic information on a requested topic. Any extension of those chatbots requires the intervention of a developer. The purpose of this subproject is the development of a chatbot which can extend its knowledge by learning from users or even automatically. Consider a scenario in which a user is asking from the bot about the weather in a specific city. If the bot will recognize the city a request will be sent to

the weather service and the user will obtain the information that he/she needs. However, if the bot will not recognize the city, an error message will be displayed. In this last case, instead of the error message, the bot should verify from the user if he/she provided the city name, obtain the confirmation from the user (together with the country/region names), will add the city to his knowledge and then it will send a request to the weather service and the user will obtain the information that he/she needs if that service know the city, if not the bot will get the cities that the service know in the specific country/region, then ask the user to choose from those cities, the city that is nearest the desired city. The bot will learn the association between those 2 cities and it will inform the user about the weather of the selected cities. In future interactions, the bot will benefit from the learned knowledge and answer the request directly. For those cases the user will be able to rate the bots' answers.

2. A simplistic multimodal web-based interface for elderly people: in this subproject, a simplistic multimodal interface that targets elderly people should be implemented. The developer will elaborate an ontology for the interface. He/she will get use of different existing libraries/web APIs for the development of the different input modalities (touch-based gestures, touch-free gestures, speech). Moreover, the development of a fusion engine that helps to better understand the multimodal inputs of the user (traditional, touch, speech) and the development of a fission engine that separates the different types of outputs, are required.

3. Chatbots collaboration: as mentioned earlier, the vast majority of chatbots have been designed to excel in a well-defined use case, with well-defined functionalities. The purpose of this subproject is the development of a chatbot that can recognize different topics/intents, then, according to the recognized topic/intent, it communicates with another chatbot (that has knowledge over that topic/intent) to pass the request of the user and to get the answer, the finally the bot will provide the obtained answer to the user. To validate this subproject, multiple chatbots should be developed together with the main chatbot, each specialized on a specific topic/intent.

**Poate fi folosită ca stagiu de practica.**