



# A PLATFORM TO PROMOTE A MORE ACTIVE LIFESTYLE BETWEEN STUDENTS

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- Due to the current lifestyle, people in general and adolescents in particular are not physically active enough which put at risk their health.
- Immediate actions are needed to promote a more active lifestyle.

### Europeans

50%

The "2018 Eurobarometer on sport and physical activity" shows that only half of Europeans exercise or play sports.

### Informal Settings

The report illustrates that the biggest part of physical activities of Europeans takes place in informal settings.

40%

Parks/Outdoor

32%

Home

### School-Going Adolescents

80%

A recent study led by researchers from the World Health Organization shows that the majority of school-going adolescents are not sufficiently physically active (worldwide).

## General Characteristics

- The proposed platform aims to encourage students to have more physical activities in their everyday life.
- It can be accessed from any device.
- The platform is multilingual, it supports Romanian and English languages with the possibility of being extended easily to support other languages.
- The users can interact with the platform through:
  - voice commands,
  - touch-based commands,
  - touch-free gestures.

## Adaptive & Customizable Features

- It integrates different adaptive and customizable features:
  - adaptation of the game level according to the users' previous performances and health condition using a fixed set of rules,
  - the avatar can be customized by the user,
  - the user can activate or deactivate the avatar outside the game,
  - the user can activate or deactivate any module of the interface with the exception of the graphical user interface.
- During the free time of the user, the platform suggests the execution of some physical activities/exercises based on different parameters such as:
  - users' health condition,
  - users' physical activity during the day,
  - duration of the sleep.

## The Game

- The platform integrates a game that requires from the user the execution of different physical exercises (indoor) or activities (indoor/outdoor) in real life.
- During the execution of the physical exercise, the platform monitors the performance of the user to ensure the correct execution of the exercise.
- For each accomplished physical exercise or activity, the platform rewards the user with points that can be used within the platform to:
  - unlock new levels in the game,
  - to unlock help-hints for home assignments,
  - to erase a single absence for some classes,
  - to get extra grades for the sport class.

## Game Description (1)

- The platform integrates the “Treasure Hunter” game.
- The game is formed from different episodes, in each episode the user should find a treasure.
- The road to the treasure becomes more difficult as the user reaches higher episodes within the game.
- In order to discover the road that lead to the treasure, the user should collect different clues.
- For each clue, the user should execute a task in real life such as:
  - search a specific thing inside the campus of the university,
  - execute a physical exercise.

## Game Description (2)

- In the case in which the user should search for a specific thing:
  - The thing that should be found by the user will be displayed on the left part of the screen.
  - The user can ask for hints, each hint will reduce the final score.
  - Once the user finds the thing, he/she should take a photo of it then the right part of the screen will display the view of the devices' back camera and the user will be instructed to orient the device toward a specific direction.
  - The avatar will jump then into the augmented-reality scene and it will ask the user to collaborate together to resolve what is requested such as in the case in which the avatar has to collect different objects from the scene, the user will have to help the avatar to collect the objects by walking and/or jumping.
  - After collecting all the objects, the user should execute a final task using the collected.

## Game Description (3)

 Student 1
 Treasure Hunter








Next Target

Find and take a photo of the following structure to unlock your next clue.




Get a Hint
Get map Position



Date and Time

Once you successfully take the photo, we will help each other to solve the level!



8 Figure 1. The user should find the target illustrated on the left part of the screen. Once the user finds the target, the right part of the screen will display the augmented reality scene.



## Game Description (4)

- In the case in which the user should execute a physical exercise:
  - The left part of the screen will ask the user to go inside and specify the exercise that should be performed.
  - Once the user is inside and in front of the RGB camera the right part of the screen will display the exercise that should be performed. When the user wants to start the exercise, the user should raise his/her right hand with open palm for four seconds.
  - The user should execute the requested physical exercise by reproducing the trainer avatar movements that are shown on screen.
  - The movements of the user will be mirrored on the screen by the users' avatar.
  - The platform will track and score the evolution of the user by determining the degree of similarity between the movements made by the trainer avatar with the ones made by the user.

## Game Description (5)

 Student 1
 Treasure Hunter

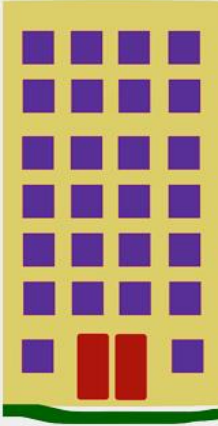






Next Target

Go and perform the arms movement exercise.





Date and Time

Figure 2. The user should find the target illustrated on the left part of the screen. The physical exercise is on the right part of the screen.

## Interface (1)

- The interface integrates four modules: Graphic User Interface, voice commands, touch-based commands and touch-free gestures.

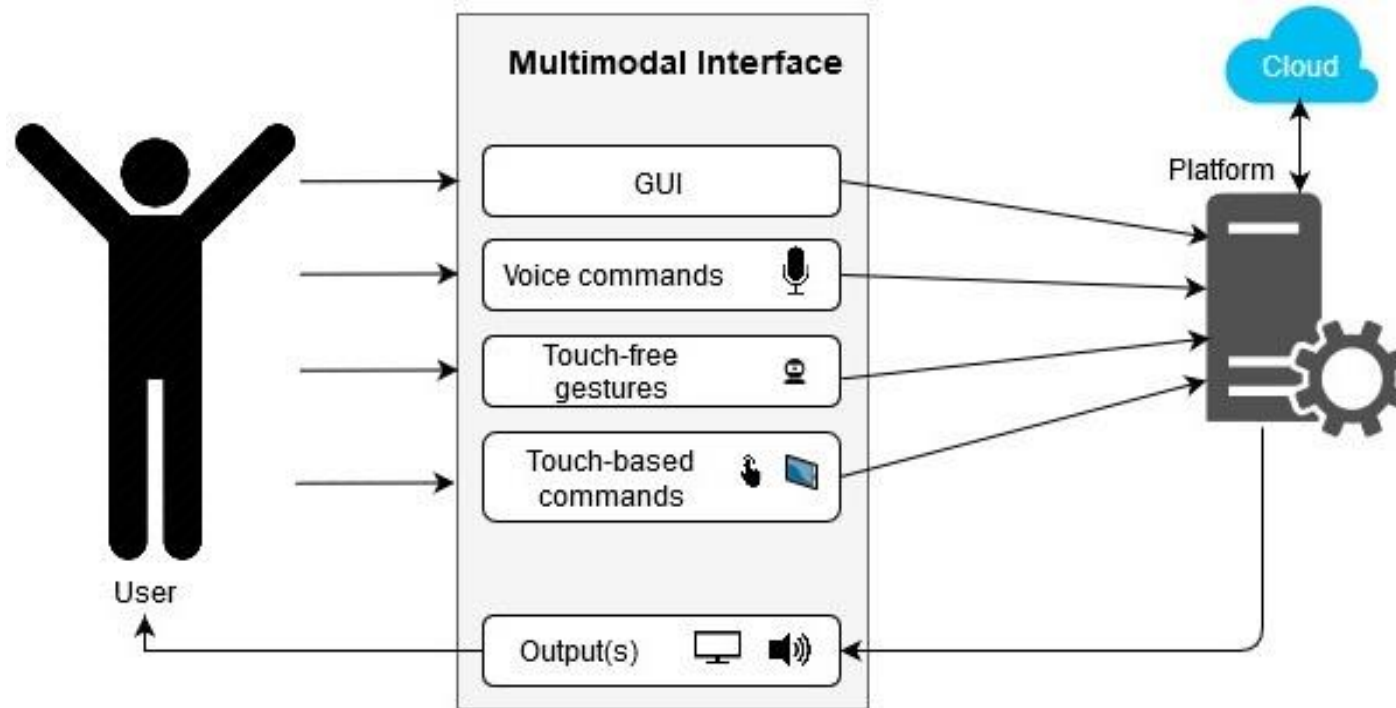


Figure 3. The four modules of the multimodal interface.

## Interface (2)

### LANGUAGES

The interface is developed using HTML5, CSS3 and JavaScript.

The interface is multilingual.

### RESPONSIVE

GUI is responsive, it adapts itself to the screen size of the device that the user uses to access the platform.

### CUSTOMIZABLE FEATURES

Different elements of the GUI are customizable such as: the icons, the colors, the fonts, the sizes of fonts, the character of the avatar and its status.

### SOLUTIONS INTEGRATED IN THE VOICE MODULE

ASR: Google Speech-to-text

NLU & DM: RASA-X

TTS: Google text-to-speech & ResponsiveVoice.JS

### SOLUTIONS INTEGRATED IN THE TOUCH-BASED & TOUCH-FREE MODULES

Touch-based: Hammer.JS

Touch-free: Handtrack.JS

## General

### GUI

The users appreciated much the design of the graphical user interface on the different devices.

They appreciated the default-used colors, fonts, fonts sizes, icons.

The users appreciated much the possibility to customize them along with the other customizable elements.

They found that the navigation through the interface is smoothly across the different devices.

### Interactions

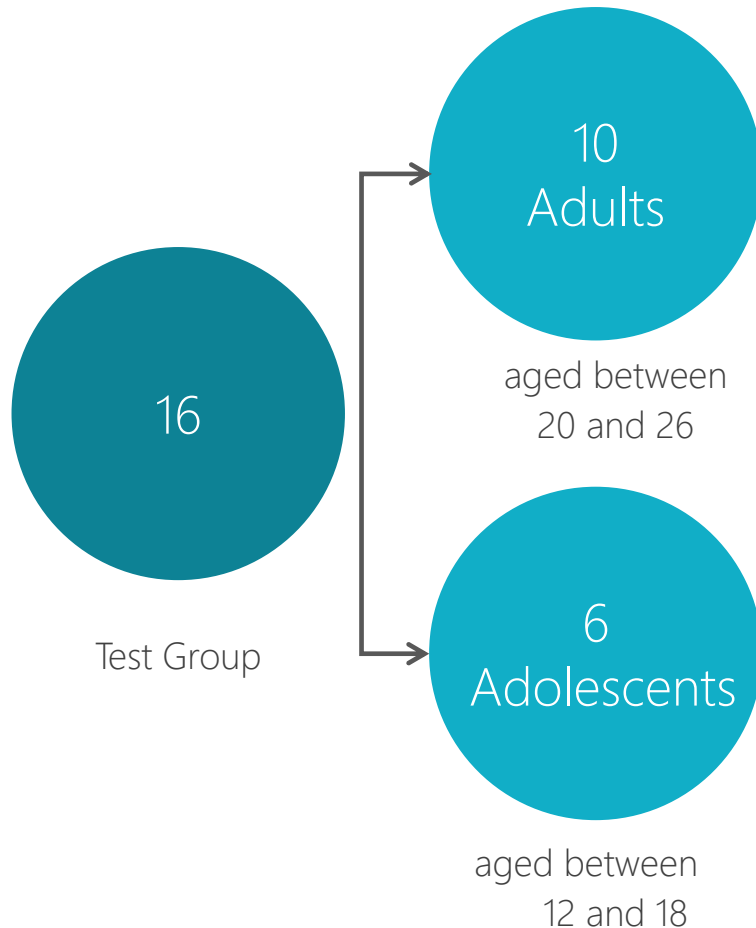
The uses appreciated much the possibility to interact through the voice commands and touch-based commands.

They also appreciated much the possibility to interact through the touch-based commands, with a big preference to use the single-touch commands over the multi-touch commands.

### “Treasure Hunter” Game

The users found the game very attractive, they appreciated its design and the necessity of doing real life physical activities to progress within the game.

The game performed well with the different users and it made them being more physically active.



## Touch-free gestures Module

- The users evaluated the touch-free gestures module.
- Each user executed five simple commands in front of an RGB camera: toward up, toward down, toward left, toward right and circle.
- Each command was repeated ten times by each user. A total of 800 interactions were recorded and the obtained results are satisfying.






Gesture	Toward Up	Toward Down	Toward Left	Toward Right	Circle
					
True Detection (number of)	157	155	153	156	146
False Detection (number of)	3	5	7	4	14
Detection Percentage (%)	98.13	96.88	95.63	97.50	91.25

Table 1. Part of the touch-free gestures tests results.

## Voice commands Module

- The users evaluated the voice commands module.
- For each language, each user gave sixteen voice commands for the platform and they repeated it twice. A total of 1024 interactions were recorded (512 for each language). The obtained results are very satisfying.

Language	Command Number	Users' command	Average Recognition Percentage (%)	Command Number	Recognized intent (% of recognition)	Recognized entity(ies) (% of recognition)	RASA X Output and TTS (TTS User Satisfaction %)
Romanian	Ro1	Vreau să fac un exercițiu fizic	87.50	Ro1	do_activity (94)	activity: exercițiu fizic (97)	87.50
	Ro2	Dă-mi un indiciu	93.75	Ro2	get_help (88)	aid: indiciu (97)	93.75
	Ro3	Care este următoarea țintă?	90.63	Ro3	get_target (84)	target: următoarea (94)	90.63
	Ro4	Afișează-mi harta	96.88	Ro4	get_help (91)	aid: harta (100)	96.88
English	En1	I want to do a physical exercise	93.75	En1	do_activity (97)	activity: physical exercise (97)	93.75
	En2	Give me a hint	96.88	En2	get_help (97)	aid: hint (97)	96.88
	En3	What is the next target?	93.75	En3	get_target (91)	target: next (100)	93.75
	En4	Display the map	100.00	En4	get_help (94)	aid: map (100)	100.00

Table 2. Part of ASR tests results.

Table 3. Part of NLU, DM and TTS tests results.

- The proposed platform encourages students to have a more physically active life.
- It integrates different adaptive and customizable features.
- The platform supports both Romanian and English languages with the possibility to support additional languages, it integrates a multimodal interface that makes the interaction user more attractive, natural and easy.
- It integrates a game that stimulates the physical activity of the user and motivates him/her by offering useful rewards for being physically active.
- The platform can be accessed from any device that the user prefers to use.



- Extend the languages that are supported by the platform.
- Improve the adaptive features of the platform by making the platform capable to learn the whole profile of the user then to adapt itself according to the profile of each user.
- Extend the targeted users of the platform to target the general public and not only the students.
- Extensive field trials are planned for the near future and the final test will evaluate the platform together with its features as an integrated solution.

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# Thank You



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