

MIRA

Andrei Cantea, Cosmin Mihaie, Andrei Dascălu, Alina Călin*
MIRA Rehab Ltd
7 Stratford Place
London, W1C 1AY
UK
www.mirarehab.com
contact@mirarehab.com
*alinacalin@cs.ubbcluj.ro

1. AUTHOR'S BIO



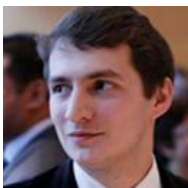
Cosmin Mihaie – Chief Executive Officer, holds Bachelors degrees in Information Engineering and International Business, as well as a Master's degree in Software Engineering from Babes-Bolyai University in Cluj-Napoca, Romania. Cosmin has a passion for

technology and the ways it can be creatively used to improve day-to-day activities. He is also passionate about improving health and well-being.



Andrei Cantea - Chief Product Officer, graduated in Computer Science from Babes-Bolyai University in Cluj-Napoca and is currently following a Master's degree in Distributed Systems in Internet at the same University. Besides a technical background and with

a keen interest in User Experience and Product Design, he is responsible for how the user interacts with MIRA, how the product is visually represented and how MIRA measures up to its specifications.



Andrei Dascălu - Chief Technology Officer, graduated in Information Engineering from Faculty of Mathematics and Computer Science at Babes-Bolyai University in Cluj-Napoca and also obtained a Masters Degree in Software Engineering at the Faculty men-

tioned earlier. With a passion for technology and with a strong background, he is the driving engine in the technical department, with an eye for innovation and efficiency of the development process.



Alina Călin - Chief Research Officer, holds a Bachelors degree in Computer Science and a Master's degree in Distributed Systems in Internet at the Faculty of Mathematics and Computer Science from Babes-Bolyai Univer-

sity in Cluj-Napoca, Romania. With a focus on medical research, Alina makes sure that MIRA measures up to the requirements imposed by strict health standards. Her dream is to improve people's lives through her work in all aspects possible.

2. OVERVIEW OF MIRA

Developed in conjunction with physiotherapists, patient groups, academics and NHS providers, MIRA transforms evidence-based exercises into video-game exergames.



Figure 1: MIRA is a software (eHealth) telerehabilitation tool for physicians, which improves the effectiveness and convenience of physiotherapy for patients in recovery.

Facilitating patient rehabilitation at home, it uses remote interaction sensors like Microsoft Kinect, creating an engaging interaction, direct feedback, performance tracking and detailed motion analysis.



Figure 2: Bert (90) in his flat, doing hip abductions to move the submarine in Atlantis exergame, using one chair as balance support.



Figure 3: Mary at the shelter home, performing knee flexion Catch exergame, using two chairs for support.

MIRA is based on serious games technology which enables physical recovery and cognitive training exercises to engage patients in their recovery and monitor their health. The platform offers an interactive way of exercising based on gestures, increasing motivation and adherence to treatment. This way, patients perform their rehabilitation in a new way, in the comfort of their homes, being able to monitor their performance and keep remotely connected to their therapist.

The system has been designed and clinically validated to engage older people in keeping active and preventing falls, by improving their balance, mobility and addressing their fear of falling, as in Stanmore (2015); Meekes (2015). The therapist creates a schedule of exergames tailored to the patient's need, which the patient will play.



Figure 4: A 7-year-old boy with brachial plexus performing active-passive coordination movements.



Figure 5: Laura, suffering from dementia, exercising on MIRA with her therapist.

Each exergame is composed of an exercise/movement and a game requiring a specific task. For the users to succeed in the exergame tasks, they must perform the required movement correctly, which the sensor will detect and analyse using artificial intelligence, providing direct feedback.

3. REFERENCES

- Meekes, W. M., Stanmore, E. (2016). Older Peoples Motives to Use Falls Prevention Exergames. In WIN Conference e-Proceedings. 29-31.
- Stanmore, E. (2015). Acceptability and Usability of Evidence Based Exergames Designed to Improve Function in Older People. In Gerontologist (55). 772-773.

4. TECHNICAL DESCRIPTION

MIRA runs on a Windows 7, 8 or 10 PC/laptop and requires a Microsoft Kinect sensor. According to which version of Kinect is used (Kinect 1 - for XBox 360 or Kinect 2 - for XBox One), the hardware requirements of the unit will slightly differ. For optimum performance a large TV/monitor or projector is required, with a resolution higher than 1280 x 800.

As for space requirements, a 2 X 3 meters space is necessary, away from sunlight or other IR sources. The Kinect should be placed at least 1 meter above the ground (e.g. on a table). There should be no other objects between the Kinect and the user which could obstruct the sensor's field of view.

Necessary equipment for demo/interaction: laptop (provided by MIRA), Kinect (provided by MIRA), TV/monitor (to be provided by the conference).

Online resources and videos:

Falls prevention in older people

- SBRI project for falls prevention
- BBC News Featuring Bert and Joy

Rehabilitation of children

- MIRA – Play your way to recovery
- A smile with MIRA