PRIME VR2

NEWSLETTER

VR for Rehabilitation

WELCOME TO OUR QUARTERLY NEWSLETTER

PRIME-VR2 HUMAN-CENTRED DESIGN

The project is based on a Human-Centred Design (HCD) approach that has been taken with respect to the initial collection of users' needs made by the Living Labs and definition of the VR Platform requirements, as well as with respect to the testing of the systems and controllers developed, which has been performed on iterative versions of mock-ups and prototypes.

Therefore, target users, including patients and therapists, have been central in the whole activities of the project.

Living Labs in PRIME-VR2

The Living Labs incorporate the end-users' thoughts, experiences, and ideas into the PRIME-VR2 project. They facilitate the exchange of ideas between end-users, clinicians, and designers to help co-design bespoke controllers, virtual environments, and games for a virtual reality system (VR-HABIT). The design is now developing in two streams, depending on the user group.

The **Global Disability Innovation Hub** and Evelina Children's Hospital in London are working with young people with a Hyperkinetic Movement Disorder to investigate the feasibility of a virtual environment which reacts to movements and gestures. These novel interfaces would allow our users to play games, perform tasks and practice skills in a virtual world with visual feedback on their achievements, helping them to set and meet their goals. Users' recorded movement and gesture data will inform the development of the electronic sensor designs from the University of Oulu, which will, in turn, be converted into interactions in the virtual world. The London Living Labs are also working with UCL to explore how young persons with dystonia interact with the virtual environment. Testing off-the-shelf VR controllers and games, and investigating how collaboration (co-piloting) could enhance user-experience and motivation to help users meet their in-game goals.

The other two Living Labs, **Saint James Hospital** (Malta) and **Kinisiforo & NicoMed Rehabilitation Center** (Cyprus) are exploring how bespoke controllers and virtual reality could improve the users' motivation and the intensity of rehabilitation therapy sessions for people who have had a stroke or a musculoskeletal injury. They believe that the VR-HABIT system will translate therapeutic movements into the virtual world by doing exercises that interact with a game or virtual environment with real-time feedback. This system could help users meet their goals and potentially allow for rehabilitation at home.

Hyperkinetic Movement Disorders
London - UK

Stroke Rehabilitation
Pathos - Cyprus

Musculoskeletal Injury
Sliema Malta

The Living Labs are working closely with the PRIME-VR2 designers at the University of Strathclyde, Loud1 Design, and the University of Malta, who are developing the bespoke VR controllers; and the University of Pisa, who are researching whether anatomical data could tune the system to an individual. By exchanging ideas between engineers, designers, users and clinicians, they test the feasibility of concepts and the usability of prototypes to make sure they will work in real-world environments. This exploration allows for iterative improvements and facilitates a user-centred co-design approach.

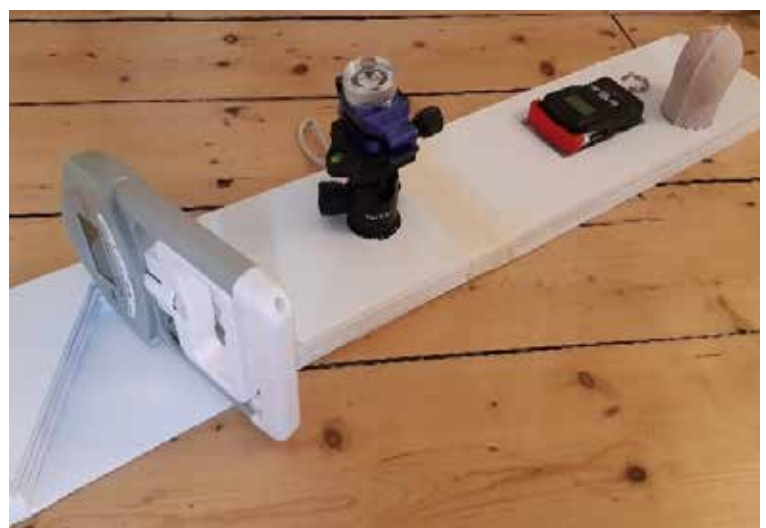# Preliminary tests of data assessment with patients at Living Labs

One of the objectives of PRIME-VR2 is to produce bespoke controllers that are designed to replicate particular therapeutic and clinical exercises. To this end, the anatomy and capabilities of each patient must be understood.

Three systems have been developed in the first year of the project to create a comprehensive biomechanical profile: anatomical scanning, motion capture and force assessment.

These different systems have been amalgamated into one specially designed assessment rig in which all the devices are mounted and can be used for data capture. The rig was designed to be adaptable and accessible to both clinicians facilitating the scanning process and participants, meeting their needs for comfort and a non-invasive procedure.

After a training session on the use of the rig, the Living Labs proceeded to measure actual patients. The three systems were shown to work successfully – they could be assembled and operated at all of the Living Labs. The initial patients' reporting and feedback provided significant insight and indications for further development of the assessment rig.

During the project, PRIME-VR2 partners will gather new strategies on how the VR environment can support the healthcare field. The most important information will be gathered from the Living Labs in the form of 'best practices', which will be used as a baseline for guidelines and methodologies. Furthermore, usage of deliverables such as VR serious gaming environment, digital platform, various rehabilitation cases and controllers will be covered in the capacity building programme.

Each section will start off with a tutorial video which gives in depth information on the features, configuration, usage and operation. After watching this tutorial video, participants can test their knowledge via a quiz that is also available in the section. Furthermore, for a period of two months after the tutorial video is uploaded people have the opportunity to fill in questions in the contact form, these questions will be analyzed and clustered to 4-6 categories. Then, questions guided by the 4-6 categories will be answered in a Q&A video.
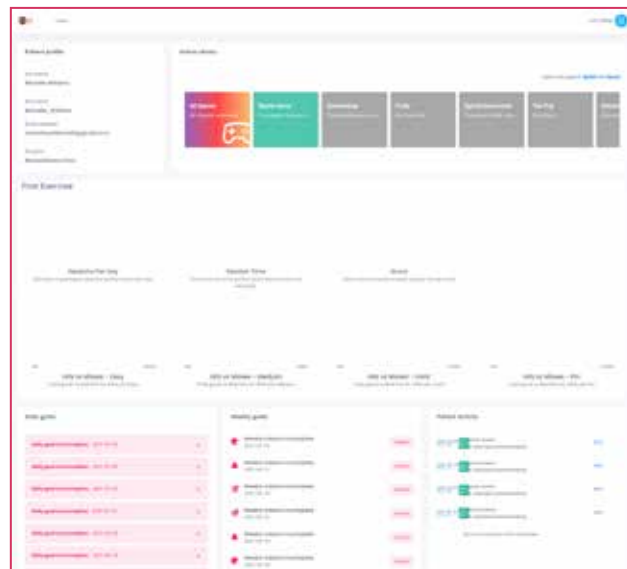

Training Module 1 Digital Platform
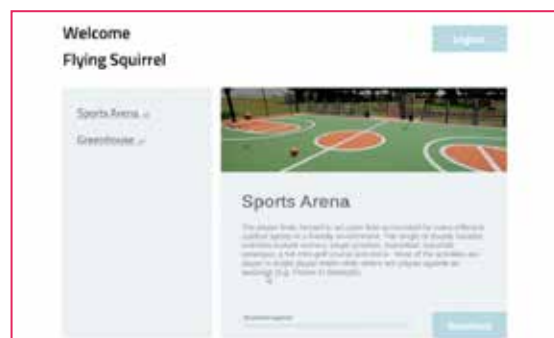
The first training module covers the usage of the Digital Platform. In the training module the user flow is explained from a therapists and patients perspective. Part of this flow is setting up an account, adding a new patient, receiving an email invitation, downloading the platform loader to the PC and starting a game. Participants of the Training Module 1 are motivated to fill in the questionnaire, testing their knowledge of the Digital Platform and giving them the opportunity to give feedback and ask questions. The results will be used for a follow-up Q&A video.

PRIME-VR2 presenting young researchers

Lewis Urquhart - University of Strathclyde

Hi, I'm Lewis and I've worked as a Research Assistant on PRIME-VR2 since the start of the project in 2019. I work primarily on work package three, which is focused on the design and development of the controllers but have also been involved in work packages two and seven, helping to define the scanning procedure and the therapeutic goals.

In work package two I helped to develop the force assessment module which is a suite of devices that can provide details of a patient's hand strength capabilities – important to consider when designing bespoke controllers! Prototyping was challenging due to the restrictions, but we managed to get it mocked-up and evaluated by the project's Living Labs.

My work package three duties have been supporting roles in the design development work and leading the mechanical testing strategy. This included both simulation efforts and physical testing with the deployment of a specially designed rig for exploring the mechanical properties of additively manufactured auxetic componentry.
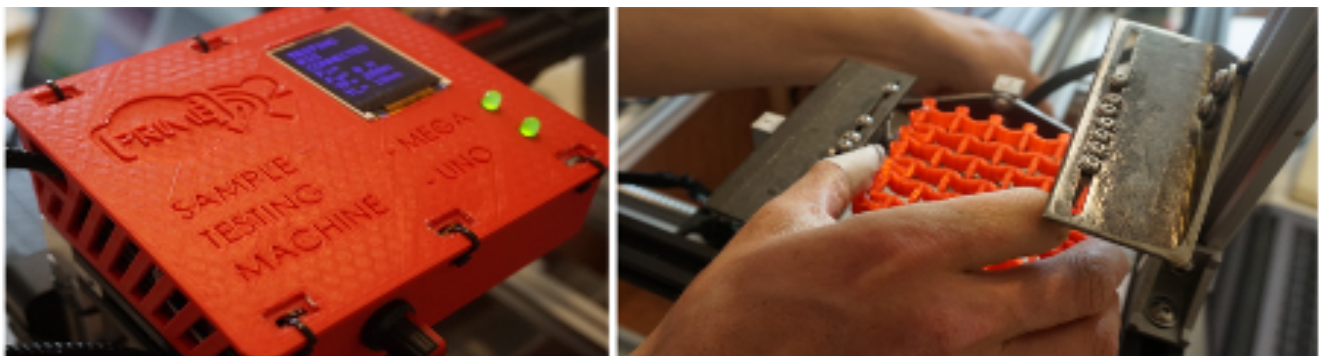
Although some of my research interests lie further afield in design emotion and aesthetics, the project has given me the opportunity to explore exciting new technologies and areas of research. Additionally, meeting and working with so many talented people from home and abroad has been incredible rewarding!

KERUBIEL

MEET THE TEAM: KERUBIEL

KERUBIEL (KRL), founded in 2017, is a 100% privately owned company specializing in the provision of ICT, Security and Privacy services and tailored IT Developments. KRL's team has a variety of disciplines and career paths, ensuring that our approach considers all angles. KRL continues to make every effort to ensure it stands for uncompromising quality, expertise and state-of-the-art equipment. KRL established to provide leading-edge intelligent technical solutions and consulting services to businesses, organisations, and government to allow efficient and effective secure access and communication with various heterogeneous information resources and services, anytime and anywhere.

KRL's main role in the project to lead the platform implementation whilst providing its expertise in identifying the platform requirements, contributing to the development of new knowledge within the work packages, and dissemination as the findings spread through the VR ecosystem.

László Dellei

Laszlo Dellei is one such inclusive, adaptable, innovative, and exemplary leader. He has led and delivered many successful projects in Security and ITC in the last 20 years. Mr. Dellei believes that innovation and adaptability are essential to make an impact on the world of business. Mr. Dellei is member or managing board member of several national and international professional organisation.

Gabor Vadasz

Gabor Vadasz has a passion for driving transformation and delivering solutions. He has a wide range of expertise in Cloud, Security, DevSecOps and Lean/Agile. He brings a broad background in IT Development, Security, Financial, IoT, Service Provider and Systems Integrator markets, with extensive experience in multiple Information Technology disciplines.

Robert Sarkozy

Robert Sarkozy is a senior VR Architect, besides that he is a graduated media designer. He gathered thorough knowledge in nodejs, c++, c#, and various web frontend frameworks like Angular.

MEET THE TEAM: FLYING SQUIRREL GAMES

Flying Squirrel Games (FSG) is one of the leading independent video game studios in idyllic Malta. Founded in early 2015, the team at FSG specialises in Mobile Free to play, Premium video games and entertainment content for PC and consoles. The most popular titles developed by the studio are the popular Dirt Trackin® series of top-rated racing games. Other games developed by the studio over the years include Airside Andy, Nothing to Declare and Forged in Fire® for the History Channel®.

The team at Flying Squirrel Games are responsible for various tasks within the PRIME-VR2 project. FSG will support other teams developing the bespoke controllers and meeting therapists to help identify the needs and wants in their daily activities. This knowledge will in turn be used for their leading task - game implementation. Given their experience in game design, development, and testing this is where FSG will help shape the VRHAB-IT to be a state-of-the-art platform for rehabilitation games using Virtual Reality.

Anthony Demanuele

Anthony Demanuele is the founder and lead developer at Flying Squirrel Games, a game development studio based in Malta. Anthony has shipped more than 15 titles over the last 10 years on platforms like Android based devices, on Apple's ecosystem and on the Nintendo Switch.

Matthew Azzopardi

Matthew Azzopardi is the lead Quality Assurance person at Flying Squirrel Games. His role in the project is to provide expertise in the design, implementation, and testing procedures of the VR rehabilitation multi-player games in different settings.

Ashley Potter

From an early age, Ashley was curious how video games were created which led to a deep dive into software development. Ashley holds a bachelor's degree in game graphics and Visual Design and joined Flying Squirrel Games to improve and further his current skills.

PRIME-VR2
Personalised recovery through a multi-user environement
VR for Rehabilitation

NEXT ISSUE: September '21

In the next issue, we will discuss about sensors and their use within the PRIME-VR2 platform. We will meet one more young researcher and share our progress.

DEFINED

March 17–18 2022

WORKSHOP

NEXT EVENTS

November 2021: PRIME-VR2 is planning on working closely together with the internationally well-known event VR-Days. This year, the 3-day virtual event will take place from 17 - 19 November.

March 2022: The Workshop 'Design for Additive Manufacturing (DfAM): Future Interactive Devices (DEFINED)', will be held on the 17th and 18th of March, 2022. We have a number of keynote invited speakers and a special session during which participants can disseminate their research interests and network to potentially form consortia for Horizon Europe proposals.
Registration is free of charge. Further details are available here.

CHECK THE WEBSITE REGULARLY FOR MORE NEWS, DOWNLOADABLE CONTENT AND INFORMATION!

ADDRESS

PRIME-VR2 Project Manager
Dipartimento di Ingegneria Civile e Industriale,
Università di Pisa.

CONTACT

+39 5022 18064
info@prime-vr2.eu
www.prime-vr2.eu

PRIME-VR2 is on the **Virtual Reality Helix**

powered by: Crowdhelix

This Project is being co-ordinated by:

UNIVERSITÀ DI PISA