International Society for Virtual Rehabilitation

ISVR

NEWSLETTER

NUMBER 4 | APRIL 2015

Editorial

As the new President of the International Society for Virtual Rehabilitation, it gives me great pleasure to communicate all the exciting news and upcoming events of the Society. But first, I would like to take this opportunity to welcome 3 new members to the Board of Directors of ISVR, Philippe Archambault from McGill University, Roberto Lloréns Rodriguez from the Universitat Politècnica de València and Sergi Bermudez i Badia from the University of Madeira. At the same time, we would like to sincerely thank the following Board members for their past years of service whose terms of office have come to an end: Joyce Fung, Albert (Skip) Rizzo and Daniel Thalmann.

This year has seen the expansion of our VR family by the formation of new collaborations between ISVR and sister societies at the regional and international level. These now number 6 with the addition of the International Industry Society in Advanced Rehabilitation Technology (IISART) (www.iisartonline.org) and Laval Virtual. In particular, in April, two of our members (Mindy Levin, Tamar Weiss) made virtual presentations at the "Journée scientifique Handicap et Réalité Virtuelle (JHRV)" organized by ISVR member Evelyne Klinger. The increasing participation at conferences and events by our members highlights the growing worldwide interest in virtual reality as a promising rehabilitation intervention.

The newsletter team has put together another excellent issue of the ISVR newsletter to highlight the activities of our members and to keep our membership informed of new developments in the field of virtual rehabilitation. In this issue, the Technology Profile spotlight is on Labhuman, located in Valencia whose scientific coordinator is Dr. Roberto Lloréns Rodriguez. Roberto's lab includes a multidisciplinary team of specialists with an interest in using digital technologies to enhance human mobility and quality of life, through motor and cognitive rehabilitation. Labhuman's low-cost rehabilitation systems for balance retraining are now becoming available to the world market. The Clinical Profile section of the newsletter highlights the Innovation Technologies Department and Information Center of the International Clinic of Rehabilitation in Truskavets, Ukraine, headed by Oleh Kachmar. This clinic mainly services clients with cerebral palsy and other neurological disorders using both commercial and custom-made virtual applications for balance rehabilitation. They have also been involved in small scale clinical research projects with this technology. The article points out some of the barriers to the use of virtual rehabilitation in home settings that will be of interest to many of you. In our Contributed Article section, authors Jorge Hernández Franco, Felipe Orihuela-Espina, Ron Leder and Luis Enrique Sucar have contributed a thought provoking article about the need for virtual rehabilitation technologies to be adaptive to patient needs. They describe their own system, called Gesture Therapy, as an example of such adaptive technology that incorporates reinforcement learning using a Markov decision-making process. They argue for the need to incorporate adaptive algorithms into virtual rehabilitation applications in particular for home-based tele-rehabilitation, in addition to algorithms for monitoring patient progress.

As a recurring feature of our newsletter, in this issue you will also find links to two new publications written by Paul Sharkey and Joav Merrick as well as a call for contributors for a new book focusing on rehabilitation technologies to be published by Springer in July 2016 and edited by Sheryl Braham, Anthony Brooks, Bill Kapralos, Lakhmi Jain.

Finally, it is with great anticipation that we look forward to meeting from June 9-12 in Valencia, Spain for the ICVR 2015 bi-annual meeting during the RehabWeek event. We are hoping for a large member turnout so come out and get involved in your Society!

Mindy Levin President, ISVR

IN THIS ISSUE

Editors:
Belinda Lange
Kynan Eng
Sergi Bermudez i Badia
newsletter@isvr.org

TECHNOLOGY PROFILE

Labhuman

Roberto Lloréns Rodríguez
Scientific coordinator at Labhuman in Valencia, Spain
www.labhuman.com

Where is your lab located?

Labhuman or the Human Centered Technology Laboratory is located in the sunny city of Valencia, in the Spanish east coast.

How did it start, how long has it been around?

Labhuman started near 25 years ago, in 1993. However, the interest for rehabilitation was in 2004.

Who are the members?

Labhuman is a multidisciplinary team involving specialists in psychology, computer science, telecommunications, ergonomics, physics, mathematics, etc.

What research interests does your lab have?

Our current interests are to understand and classify the relevant significance of each aspect of the human activity and how to use this information in computer mediated technologies for enhancing human abilities and quality of life.

What problem does your system solve?

We have developed different systems for rehabilitation. In the motor domain, we have developed systems for balance recovery, through the training of the ankle and hip strategies (using the Wii balance Board) and of the stepping strategy (using the Kinect), and for upper limb rehabilitation, using a tabletop system that allows interaction with tangible objects. In the cognitive domain, we have developed a collaborative multitouch system to train, on one hand, the self-awareness and social skills disorders, and, on the other hand, attention.

What makes them unique?

We have always had a clinical orientation, in such a way that research is not our last goal, but the way to find new therapies to improve deficits after a brain injury. For this reason all our systems whose effectiveness has been proven are integrated in the clinical practice and are prescribed to patients according to their needs and prognosis.

How are they better than other existing systems?

All our systems are designed not only to be effective but also usable by patients and therapists, and this is something that we all should have in mind.

Can tell us about the development process?

Labhuman has an ISO9001 certification, which guarantees "meeting the needs of clients while meeting statutory and regulatory requirements related to the systems". It implies that all our systems have documented requirements, planning, and monitoring, which ensures that,

Training exercises with Biotrack and kinect integration
http://www.youtube.com/watch?v=emn6vvyluNw

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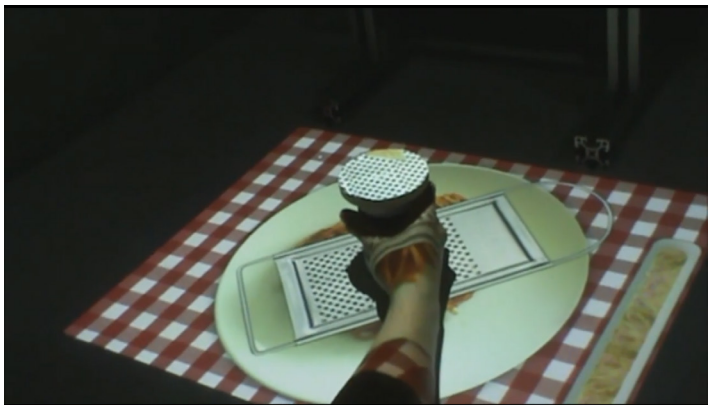
in the final stage, the systems meet the criteria. It is important to highlight that during the process all our systems pass ergonomics and usability tests involving patients, which grant that the systems can be used in practice.

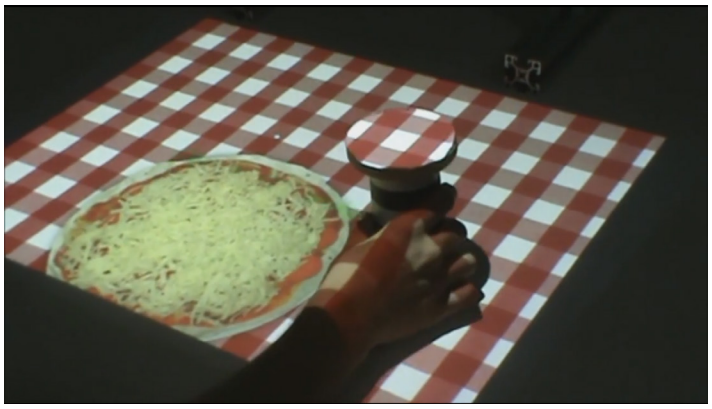
At what level of readiness is the technology now?

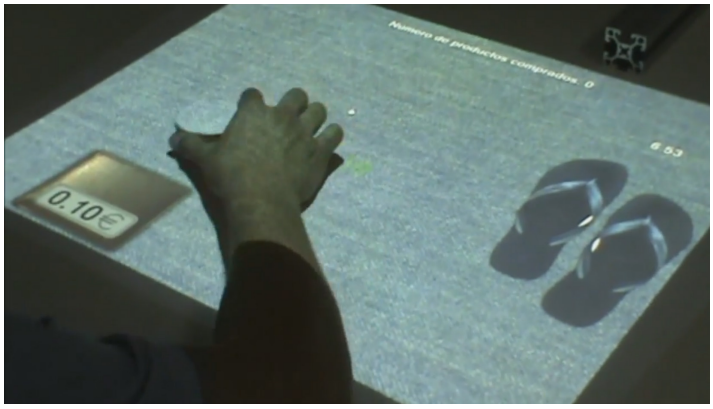
All our systems with proven effectiveness are being used in the clinical practice.

Is it available to the community? How can one get access to it?

We have started to make our systems worldwide available. We have started this exciting project liberalizing a low-cost system to perform posturographic assessments using the Wii Balance Board (http://goo.gl/ABiALS).
We will follow this trend making other systems available for the community.







Umbrella - virtual rehabilitation system for the paretic upper limb in patients with acquired brain injury
https://www.youtube.com/watch?v=GHVi6t_XMyc

CLINICAL PROFILE

International Clinic of Rehabilitation

Oleh Kachmar
Head of Innovative Technologies Department and Information Center of the International Clinic of Rehabilitation in Truskavets, Ukraine
www.reha.lviv.ua
www.elita.ua

International Clinic of Rehabilitation in Truskavets, Ukraine

Where is your clinic located?

The International Clinic of Rehabilitation is the largest facility in Ukraine treating patients with Cerebral Palsy and other neurological disorders. It is situated in the west part of Ukraine near the Carpathian Mountains in the resort city of Truskavets. It has a smaller branch named the Elita Rehabilitation center in the city of L'viv.

What patient populations do you serve? How many per year?

Our clinic provides intensive rehabilitation treatment for patients with Cerebral Palsy, consequences of stroke, brain injury and other motor disorders. About 90% of the patients are children, adolescents and adults with Cerebral Palsy. The intensive treatment course lasts for two weeks with 3.5 to 4 hours of rehabilitation activities daily. About 200 children are in the clinic at any one time and more than 4.500 patients are treated here per year.

What VR rehab system(s) do you have installed?

We are using both commercial Nintendo Wii Fit games, Xbox 360 with Kinect games and our own in-house rehabilitation gaming systems for motor training.
One of our systems, available at www.game.reha.lviv.ua, is for training balance and body posture in clinical and home settings. There are six rehabilitation games with different difficulty levels played using a Nintendo Wii Balance board connected to PC. Gaming statistics are available for the therapist for remote supervision. The diagnostic game "Stabilometry" measures the displacement of the center of pressure of the patient while standing /sitting on the board.
The second rehabilitation gaming system, available at www.RehaGame.com, has Unity3D games using the Kinect sensor and Dance Mat as controllers. Five Kinect games have been developed for training hand movements, plus seven stepping games using the Dance Mat. All the games can be individually adjusted to patient's motor developmental level. Gaming statistics are available for the therapist working with the child.

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What benefits do you gain from using this VR rehab system?

Motivation and interest of the child. Motor training by means of typical physical therapy is often boring for children with Cerebral Palsy. Rehabilitation computer games combine therapy and games. The majority of children are happy to attend the training sessions.

Possibility to train certain specific movement. Children with Cerebral Palsy have different motor disorders. Rehabilitation computer games can be used for training specific required movements.
By automating the delivery of multiple repetitions, these movements can be effectively trained.

Possibility to use at home. In our clinic patients come for two weeks of intensive treatment and after that they go back home to continue treatment. Low cost rehabilitation gaming systems can be used at home with minimal therapist effort for remote supervision.

A child using the VR gaming system

What problems did/do you have with using these systems?

Nintendo Wii Fit and Xbox 360 with Kinect have interesting and exciting games, but they can be used by patients with only minor motor disorders (Level I according to the Gross Motor Function Classification System) that form less than 15% of our patients.
Rehabilitation games have limited number of possible movements that can be trained. So it is not always possible to select a proper gaming activity for every child.
Every game that is played for a longer time becomes boring. Therefore it is important to have a large number of games.
In some cases, there are difficulties in connecting the balance board to the PC over Bluetooth in home settings due to incompatibilities in some Bluetooth stacks.

Are you involved in clinical research using VR rehab systems?

We have conducted several small research studies aimed at evaluation of our games. In one study six children were evaluated before and after two weeks of daily balance training using rehabilitation games with Balance board. These results were presented at the ICDVRAT meeting in Laval in 2012, "Web-based home rehabilitation gaming system for balance training" and published in the Journal of Accessibility and Design for All (http://www.jacces.org/index.php/jacces/article/view/46).
Another small study evaluated the stepping games. Five patients were evaluated before and after two weeks of home training with Dance Mat games. The results were presented as a poster at the ICVR conference in Philadelphia in 2013 ("Stepping Games on Dance Mat for Motor Rehabilitation").
We also participated in the 7th Framework Program in the research project "Game-Abling" - creation of accessible games with the aim of improve physical activity of disabled people. http://game-abling.eu/
Our first experience in using humanoid robots in rehabilitation was presented at the Rehab2014 workshop in 2014 in Oldenburg ("Humanoid social robots in the rehabilitation of motor disorders").

What do you see as the most important challenge for VR rehab research and development?

From one side, therapists and doctors often make very little effort in implementing new rehab systems in the daily practice. They expect high quality research and randomized clinical trials proving the benefits of VR rehabilitation before making a commitment. Very often, they have a limited information about existing systems.
From the other side, developers of VR technologies do not always work in close cooperation with the practicing doctors and therapists, and the systems do not always fit the needs of the patients.
Efforts should be aimed at establishing closer cooperation and information exchange between rehabilitation practitioners and VR specialists.

CONTRIBUTED ARTICLE

The understated importance of therapy adaptation

Jorge Hernández Franco, Felipe Orihuela-Espina, Ron Leder and Luis Enrique Sucar

When asked about the major pillars of neurorehabilitation upon which virtual rehabilitation should build specific solution platforms, it is likely that we will quickly think of repetition, intensity, and specificity perhaps as the most prominent. Analogously, when asked about the most salient benefits of virtual rehabilitation, we will almost certainly mention enhanced patient motivation, potential for feedback and customizable learning environment. At times it seems, we almost take therapy adaptation either as a secondary need or as a granted feature. However, if virtual rehabilitation is to succeed in home environments, and is to reduce the dependency on clinical experts, suddenly therapy adaptation comes to the center of the stage.

Therapy adaptation refers to the capability of the virtual rehabilitation platform to dynamically match the patient's transient needs whilst abiding by the therapy requirements. Adaptability is closely related but not synonymous to customizability. The latter refers to the static ability of the virtual environment to present a training experience harmonizing the user tastes and the demands of neurorehabilitation. Customizability allows virtual rehabilitation to fit feedback, abstraction levels, and scenery art to make the most of its advantages. Instead, adaptability works more subtly by adjusting challenge levels to always maintain adequate patient safety, effort requirement and degree of entertainment. Note that this actually may imply dynamically customizing the environment. In this understanding, it is adaptability which will ultimately be required for a virtual rehabilitation platform to be autonomously deployed to patients' homes and trusted by clinicians to be used by the patient in-between therapeutic sessions.

Accepting that rehabilitation tasks in virtual rehabilitation are generally delivered in the form of a chain of serious games, adaptation will come in different flavours. Depending on the scope of the adapting action it may only focus on keeping within-game challenge working at game level, or it may attempt to optimize results at therapy level by ruling therapy task scheduling. Moreover, for the therapy level type of adaptation, a second dimension further shapes the adaptation policy depending on whether it aims to regulate difficulty across games, or whether it drives optimal selection of game sequence. In this sense, adaptation is clearly a much more elaborated concept than it is goal attainment-based challenge adjustment or plain therapy progress.

Incorporating adaptation into VR

It is no longer uncommon that virtual rehabilitation platforms incorporate one form or another of adaptation, although within-game adaptation has seen better success thus far. Incorporating an adaptation regulatory module in our platforms involves monitoring patient progress in real time as well as keeping track of therapists' considerations. The adaptation mechanism can be as naive as a simple threshold over observed performance variables, or as sophisticated as advanced artificial intelligence (AI) decision theoretic-based solutions, perhaps over non-observable cognitive and psychological variables, incorporating affective computing strategies.

Primitive solutions to the problem of adaptation will only be guided by patient behaviour and perhaps deployed with an adaptation policy which is only optimal for a priory assumed knowledge, perhaps arising from clinical experience, or from experimental medicine. On the other hand, more elaborate solutions will also take on board reinforcing feedback from the therapists when available, and further keep improving the adaptation policy throughout the therapy, reasoning the optimal decision policy as new knowledge becomes available. Among the latter we pride ourselves to count our Gesture Therapy platform, addressed for the upper limb. Gesture Therapy incorporates a strong adaptation module, capitalizing on well established principles of reinforcement learning fed by a Markov decision process initialization to guarantee optimal decision making from previous knowledge at start, and later convergence with expert decisions within a time frame suitable for a real therapy.

An important judgement to be made by the designer of the adaptation module is what is it that the adaptation decision policy is going to favour. Obvious

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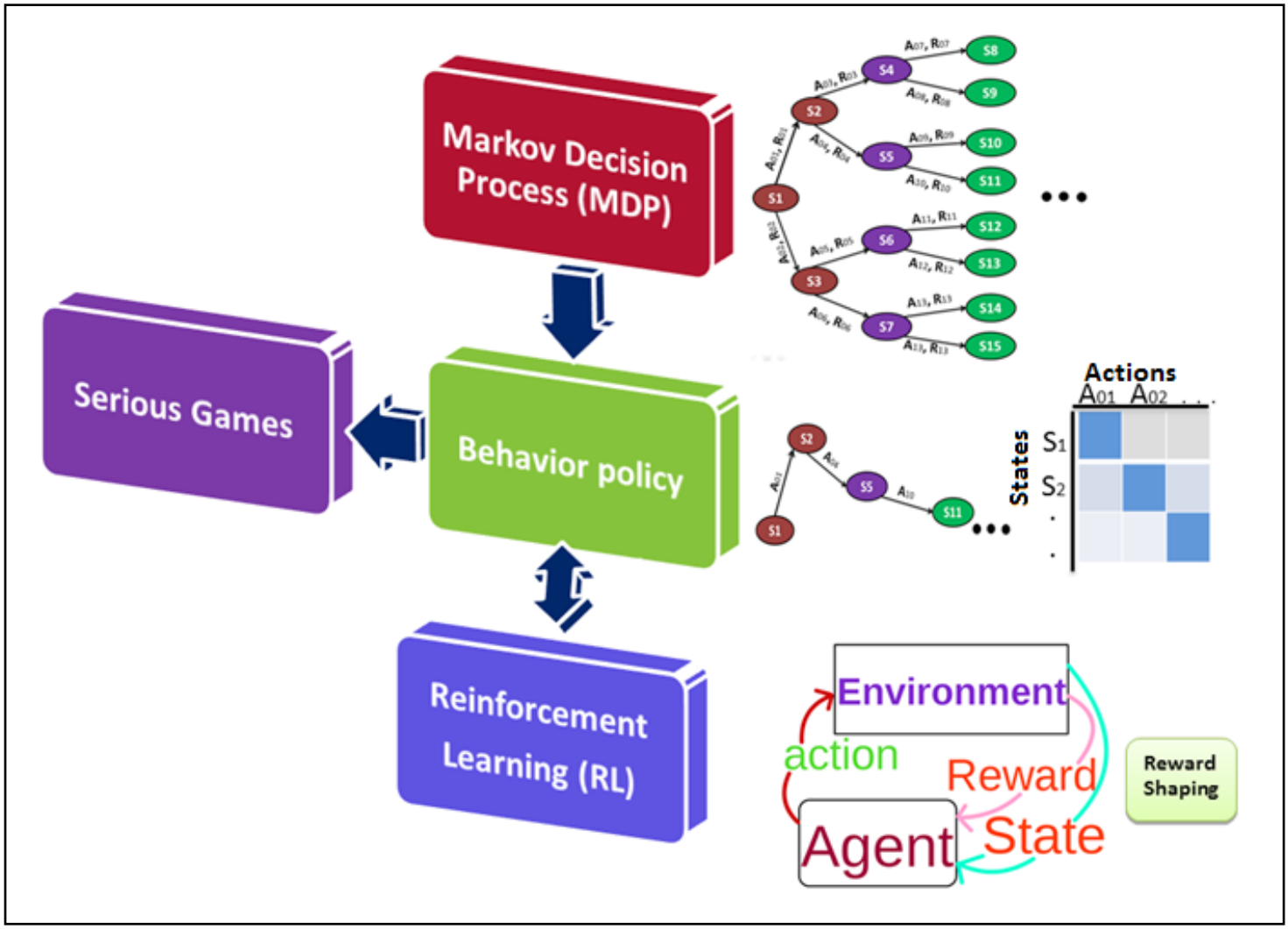

Overview of therapy adaptation framework

candidates are increasing motor dexterity, perhaps achievable by balancing speed and control of movement, but also motor functionality to promote patient independence. Of course, the prognosis of the patient also is an important consideration to decide on what compensatory strategies are to be penalized and what are to be tolerated. Moreover, when neurorehabilitation scientists fully decode the brain's neuroplastic reorganization strategies benefitting the most favourable prognosis, it is not inconceivable, that the adaptation policy will be designed to promote optimal reorganization.

Exploiting adaptation to deliver confident telerehabilitation

It is easy to envisage the intelligent virtual rehabilitation platform keeping track of the patient exercising and adherence to the therapist's advice while at home. Whether simply real time feeding summary reports to the remotely located clinician, or more sophisticatedly, managing the task schedule maybe affording advice based upon learned therapeutic knowledge until the next visit to the hospital, or a combination of both, telerehabilitation programs can greatly benefit from a robust adaptation policy. The key to reduce the dependence on continuous expert supervision, and thus truly opening the door to home-based rehabilitation, is to intelligently imitate the expert decision making when operating under routine conditions and only relying on expert human intervention when truly needed, or on occasional regular hospital visits for aligning artificially intelligent regulation of the therapy with new guidelines arising from in-situ assessment of the patient on the rehabilitation ward.

Since the AI will for short periods alleviate the expert presence, coherence between AI decisions

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and human expert decisions ought to be demanded not as an additional ancillary feature, but as a fundamental necessity demonstrable by exhibition of convergent behaviour between the AI output and the expert supervision. Achieving convergent criterion to a target decisions sequence, may be a minor issue for nowadays AI algorithms. However, to do so within a strictly constrained time frame e.g. perhaps during a single hospital session where the AI is only informed vaguely of just a few adjustments by the expert, and moreover without overfitting to the sessional particulars –note that the hospital environment is necessarily different from the home environment-, that is still an open challenge for platform engineers.

How smart shall the adaptation be?

In attempting to make the adaption as smart as possible, it is tempting for the designer to ubiquitously monitor a myriad of variables helping to define the adaptation policy search space conformed by the patient present biomechanical and cognitive information and the therapy current status. It may then come as no surprise that an overzealous adaptation module may breach the patient's privacy. But the opposite is neither a pleasant scenario; if the adaptation policy is not well informed of the patient and therapeutic program up-to-date situation, it may fail to be smart enough and in consequence, end up arriving at erroneous decisions, and then liability issues further need to be considered.

Keeping track of the therapy programme is cheap and unobtrusive. However, elaborating an accurate, verifiable and updated profile of the patient may prove trickier. It is not enough for the adaptation to take the best decision assuming that all information about the patient and the therapy is available and known, but to take optimal decisions when information describing the patient status is incomplete, unverifiable, and overall uncertain. Ideally, the monitoring of the patient ongoing advances needs to be as intelligently designed as the adaptation decision algorithm itself. Alternatively, a more plausible option is the current trend to rely on Bayesian solutions, which often excel at managing uncertainty.

Conclusions

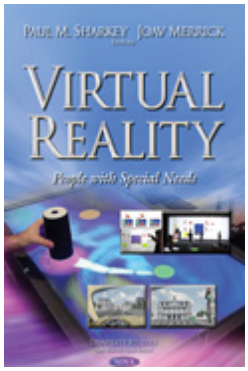
Adaptation is often an understated feature in virtual rehabilitation. However, adaptation will play a critical role when telerehabilitation programs become mature enough to be dependable. Incorporation of adaptation capabilities into virtual rehabilitation is hence not a bonus, but rather a necessity. Incorporating adaptation capabilities to our platforms requires consideration of the intended scope of the adaptation decisions. The solution is likely to capitalize on knowledge representation for capturing the patient's physical and mental state and on AI to afford the optimal decision. Thoughtful design of the adaptation solution necessitates deliberation regarding timely mimicking expert decisions during unsupervised operation, adequate sensing of the patient profile and appropriate modelling of uncertainty. None of these are trivial to be overcome posing ahead of us an exciting time to be involved in the development of the adaptation algorithms.

Call for Contributed Articles

- If you are a technology expert in virtual rehabilitation or you have experience in the clinical use of virtual rehabilitation technologies, and would like to be featured in an upcomming ISVR newsletter issue
- If you would like to submit a contributed article relevant to the ISVR community
- If you have any news, summaries of recent conferences or events, announcements, upcoming events or publications

We are looking forward to your contribution! Please contact us at newsletter@isvr.org.

RECENT BOOKS ON VIRTUAL REHABILITATION

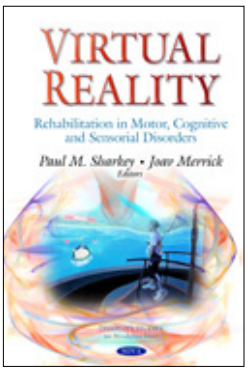


Virtual Reality: People with Special Needs

Paul M. Sharkey and Joav Merrick

https://www.novapublishers.com/catalog/product_info.php?products_id=51055

The use of virtual reality for learning, training, and rehabilitation for people with special needs has been on the rise in recent years. Virtual reality allows the user to be trained, to gather information and to perform rehabilitation tasks in the virtual reality space. It allows the user to perform independently, safely, and efficiently, in a combined product of sensory, motor, and cognitive skills. The design, development, and evaluation of such virtual reality environments is a multidisciplinary work, the integration of medicine, physical therapy, occupational therapy, neuroscience, psychology, education, engineering, computer science, and art. In this book we cover a broad range of topics from virtual reality-augmented therapy in the development of cognitive neuroscience perspectives on motor rehabilitation, the potential of virtual environments to improve orientation and mobility skills for people who are blind, virtual reality for people with cerebral palsy, haptic virtual reality technologies for visual impairment and blindness, perception of space and subsequent design changes needed for accessibility, autism spectrum disorder to improving cognitive and intellectual skills via virtual environments in a range of different topics such as mathematical performance or prospective memory.



Virtual Reality: Rehabilitation in Motor, Cognitive and Sensorial Disorders

Paul M. Sharkey and Joav Merrick

https://www.novapublishers.com/catalog/product_info.php?products_id=51221

Over the past twenty years, groups of therapists, researchers and engineers have seized the potential of virtual reality (VR) and its associated technologies to work together on designing and testing a great variety of rehabilitation devices and systems with the objective of improving the support for people with disabilities. Virtual reality technologies offer new paradigms for human exploration, understanding and support by providing participants a safe setting in which they can interact and develop goal-oriented activities within functional-virtual environments, especially when they find themselves in situations of cognitive, behavioral or motor disabilities. The solutions built from these technologies reduce patients' limitations of activity and participation by promoting the recovery of capabilities. The current diversification of VR technology can also lead to tools used at home so that the patient can pursue the training that was initiated with the therapist in the care center. In this book you will find research on the rehabilitation in motor, cognitive and sensorial disorders.

Call for Chapters For a Springer book

Recent Advances in Technologies of Inclusive Well-Being: Wearables, Virtual Interactive Spaces (VIS)/Virtual Reality, Emotional Robots, Authoring tools, and Games (Serious/Gamification)

Sheryl Braham, Anthony Brooks, Bill Kapralos, Lakhmi Jain

The goal of this (second) Springer book is to share interdisciplinary research (inside and outside of academia) related to Technologies of Inclusive Well-Being. Authors who believe they have a worthy contribution to share are encouraged to submit an abstract of a proposed chapter. We invite original contributions that address theoretical, artistic, professional, and practical aspects of progress in this area.

Topics of interest include, but are not limited to the following:

Wearables, Authoring tools, Emotional Robotics, Virtual Interactive Spaces (VIS), Virtual Reality (VR), Augmented Reality, Mixed Reality, Play, Games. Serious Games, Gamification, Alternative games, Software Platforms, Alternative controllers, Theories, User Experience Design, Works in Progress, Case studies, Collaborations, Novel well-being applications, Models.

Important Deadlines:

Chapter Proposal (Abstract)	First Submission	Chapter Notification of Acceptance	Final Revisions Due	Tentative publication
March 20, 2015*	August 30, 2015	November 15, 2015	January 15, 2016	July 2016

*(Send your abstract to all four editors - late submissions may be accepted)

ISVR Society News

The website at http://www.isvr.org acts a portal for information about the society. We are keen to to enhance the community aspects of the site as well as to to make it the first port of call for people wanting to know what is going on in the field of virtual rehabilitation and its associated technologies and disciplines. Please do visit the site and let us know details of any upcoming events or conferences or news items you would like us to feature on the site. We intend to add further features in the coming year including member profiles; a directory of journals who publish virtual rehabilitation related work; and a list of Masters and PhD level theses completed or currently being undertaken in the field. As well as sending us details of events and news for display, we would welcome suggestions from members about what else they would like to see on the site, or ideas for how we can further develop the virtual rehabilitation community through it.

Please mail r.j.mccrindle@reading.ac.uk with any information/ideas using ISVR INFO in the subject header.

Membership information

Membership of ISVR is open to all qualified individual persons, organizations, or other entities interested in the field of virtual rehabilitation and/or tele-rehabilitation. Membership (regular or student) entitles the member to receive a reduced registrations at ISVR sponsored conferences (the next is ICVR, to be held in 2015 in Valencia, Spain) and affiliated meetings (see webpages for more details). There is also an active ISVR facebook page, which is another source of useful information, currently with 1023 members.
We have now a Linkedin group which we hope will develop into a vibrant forum for all interested in virtual reality applications in rehabilitation: research/industrial collaborations, jobs, current issues of interest, etc.

UPCOMING EVENTS

European Stroke Conference
May 13 - 15, 2015
Vienna, Austria
http://www.eurostroke.eu/

International Congress on NeuroRehabilitation and Neural Repair
May 21 - 22, 2015, The Netherlands
http://wfnr.co.uk/

9th International Conference on Pervasive Computing Technologies for Healthcare
May 21 - 23, 2015, İstanbul, Turkey
http://pervasivehealth.org/2015/show/home

Rehab Week 2015
Recent Advances in Neurorehabilitation (ICRAN) / International Neurorehabilitation Symposium (INRS) / International Conference on Virtual Rehabilitation (ICVR)
June 9 - 12, 2015, Valencia, Spain
http://www.rehabweek.org/sys/

9th World Congress of the International Society of Physical and Rehabilitation Medicine
June 19 - 23, 2015, Berlin, Germany
http://www.isprm2015.org/

20th Anniversary CyberPsychology, CyberTherapy & Social Networking Conference (CYPSY20)' on iACToR!
June 29 - July 2, 2015, San Diego, California
http://tinyurl.com/qcea5e9

RehabWeek 2015 - June 9 - 12, 2015

We are in the midst of a challenging revolution. Over the last decade, use of advanced technologies in the field of neurorehabilitation has grown in acceptance, earning its place as a valuable supplement to conventional therapy. The next step in this revolution is to focus on the optimal ways to combine these technologies to further benefit all healthcare system stakeholders.

In-depth clinical trials demonstrating effectiveness of current technologies will lead to a deeper understanding of the ways in which technology impacts on neuronal recovery thereby facilitating the integration of advanced technology-based approaches, such as interventions based on robotic assist, virtual reality, functional electrical stimulation and transcranial direct-current stimulation. Many of these approaches have been shown to be effective and efficient when used in combination with conventional rehabilitation.

Recent developments are now focusing on merging different technologies to provide cutting-edge treatment to further improve the recovery of people with disabilities. Intervention paradigms that combine virtual reality with sensor technology or robotics with functional electrical stimulation are just two examples of the ways in which novel technologies can lead to clinical success. Rehabilitation clients are now afforded the advantages that each new technology contributes to increased mobility, strength, coordination and, ultimately, improved quality of life.

There is power in numbers, as demonstrated by the successful Rehab Week 2011 in Zurich. We have again adopted a strategy of combining three international conferences in the field of rehabilitation science and engineering: Rehab Week 2015 to be held from June 9th to 12th, 2015 in Valencia, Spain. It will include the Conference on Recent Advances in Neurorehabilitation (ICRAN), the International Neurorehabilitation Symposium (INRS) and the International Conference on Virtual Rehabilitation (ICVR). These events will feature intensive, cross-disciplinary knowledge transfer by focusing on the challenges and benefi ts of combining different new technologies. Rehab Week 2015 will provide a pivotal platform for scientists, clinicians and engineers to share their experiences, expand their knowledge in the field of neurological rehabilitation, and create a fusion of new technologies to enhance clinical outcome.

Location & Venue

The Rehab Week 2015 will take place in the Valencia Conference Centre, a unique building (see picture above) conceived as a melting pot for the exchange of knowledge. It provides the very best conference services, environment and space requirement in an exclusive venue.