ICVR Podium / Poster Sessions

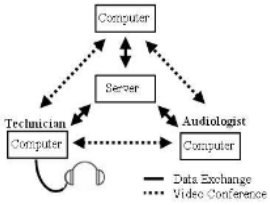
Podium Session 1, Room HPV G5 — Monday, 13h15-14h00 — Sensory Impairment

Virtual Environment Support Orientation Skills of Newly Blind
Orly Lahav, David W. Schloerb and Mandayam Srinivasan

- Integrate VE in traditional rehabilitation program
- BlindAid aimed to serve as an O&M simulator
- Performance on orientation tasks in VE and real

Paper 1

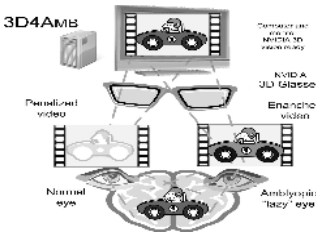
Remote Hearing Screening as Part of Auditory Telerehabilitation; a Preliminary Report
Pasin Israsena



- Teleaudiometry for universal hearing screening
- A low-cost software audiometer is proposed
- With extra features such as video conferencing
- Preliminary trial results are reported

Paper 2

Using 3D for Rebalancing the Visual System of Amblyopic Children
Angelo Gargantini, Mariella Bana and Flavia Fabiani

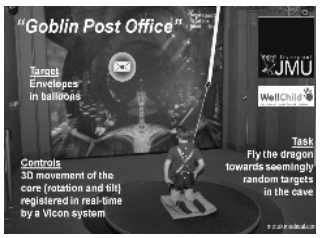


- 3D
- amblyopia
- vision rebalancing

Paper 3

Podium Session 2, Room HPV G5 — Monday, 14h00-15h15 — Posture and Balance

Playing the Goblin Post Office game improves movement control of the core: A case study
Gabor Barton, Richard Foster, Gill Holmes, Penny Butler and Malcolm Hawken



- cerebral palsy
- movement training
- core control
- virtual rehabilitation

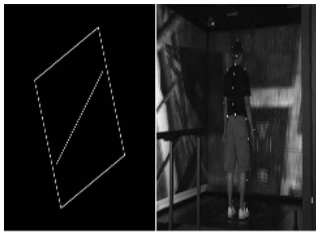
Paper 1

Postural responses of adults with cerebral palsy to combined base of support and visual field rotation
Jill Slaboda, Richard Lauer and Emily Keshner

- Cerebral palsy
- visual flow
- visual dependence

Paper 2

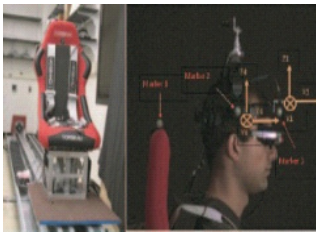
Visual Sensitivity Modulates Postural Sway in a Virtual Environment in Healthy Elderly and Individuals with Stroke
Emily Keshner and Jill Slaboda



- visual dependence and balance
- Rod and Frame Test
- Stroke and aging
- visual-vestibular conflict

Paper 3

Head stabilization shows multisensory dependence on spatiotemporal properties of visual-inertial passive stimulation
W. Wright, Mobin Agah, Kurosh Darvish and Emily Keshner



- Visual-vestibular integration
- Head-stabilization
- Postural adaptation

Paper 4

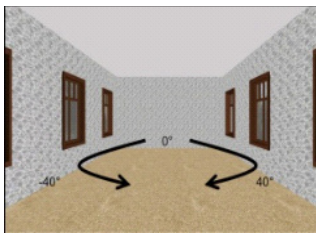
BioTrak: a comprehensive overview
Roberto Lloréns , José Gil-Gómez, Patricia Mesa-Gresa, Mariano Alcañiz, Carolina Colomer and Enrique Noé

- virtual rehabilitation
- balance recovery
- acquired brain injury
- virtual therapy
- neurorehabilitation

Paper 5

Podium Session 3, Room HPV G5 Monday, 15h45-17h00 Post-stroke Rehabilitation

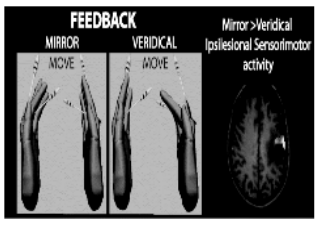
Optic flow in a virtual environment can impact on locomotor steering post stroke
Jessica Berard, Joyce Fung and Anouk Lamontagne



- Steering in response to optic flows while walking
- Visuomotor control altered after stroke
- History of neglect associated with poor steering

Paper 1

Mirror feedback in virtual reality elicits ipsilesional motor cortex activation in chronic stroke patients
Eugene Tunik, Soha Saleh, Hamid Bagce, Alma Merians and Sergei Adamovich



- MRI-compatible virtual reality system
- Paretic hand model controlled by nonparetic hand
- Facilitation of ipsilesional sensorimotor cortex
- Chronic stroke subjects

Paper 2

Rehabilitation Robot for Unimanual and Bimanual Training of Hemiparetic Subjects
Matic Trlep, Matjaž Mihelj, Urška Puh and Marko Munih

- bimanual post-stroke robot rehabilitation
- assistance control adepts to individual subjects
- unimanual vs. bimanual training
- tested with 4 chronic hemiparetic subjects

Paper 3

Integrative Motor, Emotive and Cognitive Therapy for Elderly Patients Chronic Post-Stroke - A Feasibility Study of the BrightArm™ Rehabilitation System
Bryan Rabin, Grigore (Greg) Burdea, Jasdeep Hundal, Doru Roll and Frank Damiani

- VR system used for integrative rehabilitation.
- Clinical study with 5 elderly chronic post-stroke.
- Rated an overall 4.1 out of 5 on subjective evals.
- UE Fugl-Meyer increases of 11+ by 2 participants.
- Supported arm reach increased an average 634%.

Paper 4

Neurorehabilitation of Poststroke Cognitive Impairments with the Use of Computed Programs

Semyon Prokopenko , Elena Mozheyko, Tatyana Koryagina, Marina Petrova, Darya Kaskayeva, Tatyana Chernyh and Era Arakchaa

- The present research was aimed at efficiency estim
- We have developed a method of restoration of 4 asp
- The method of training of the visual-spatial gnosi
- Training of visual-spatial memory with the use of
- The first experience of inclusion of the training

Paper 5

Podium Session 4, Room HPH G3 Tuesday, 10h50-11h50 Games for Rehabilitation

An Investigation of User Acceptance and Flow Experience Using Video-Capture Gaming Technology for Exercise

Gillian Barry, Paul Van Schaik, John Dixon, Alasdair MacSween and Denis Martin

- User Acceptance and Flow Experience Using Video-Ca
- Balance based Exercise VR verse Normal
- 38 Sedentary Participants.
- Results show IREX™ to be an acceptable alternative

Paper 1

The Effects of Visual Feedback in Therapeutic Exergaming on Motor Task Accuracy

Julie Doyle, Daniel Kelly, Matt Patterson and Brian Caulfield

- Therapeutic exergaming
- Visual Feedback
- Sensors
- Exercise quality

Paper 2

Usability of Technology Supported Social Competence Training for Children on the Autism Spectrum

Patrice (Tamar) Weiss, Eynat Gal, Sue Cobb, Laura Millen, Tessa Hawkins, Massimo Zancanaro, Leonardo Giusti, Sigal Eden and Tony Glover

- To improve social competence skills in autism
- Use collaborative technologies to implement CBT
- Usability studies to evaluate technologies

Paper 3

Podium Session 5, Room HPH G3 Tuesday, 11h50-12h35 Upper Limb Rehabilitation

Virtual Rehabilitation of Upper-Limb Function in TBI: A Mixed-Approach Evaluation of the Elements System

Peter Wilson, Nicholas Mumford, Jonathan Duckworth, Patrick

- Traumatic Brain Injury
- Virtual Reality
- Motor rehabilitation

Paper 1

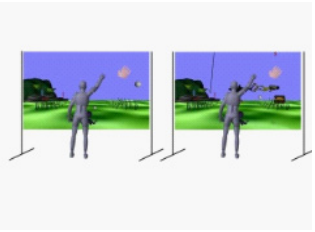
Arm motor rehabilitation in chronic stroke: Effects of two training environments

Sandeep Subramanian, Christiane Lourenco, Heidi Sveistrup and Mindy Levin

- comparison of virtual and physical environments
- enhanced therapy improves upper limb motor outcome
- stroke patients benefit from enhanced training

Paper 2

Short-Term Practice with Customized 3D Immersive Videogame Improves Arm-Postural Coordination in Patients with TBI
Ksenia Ustinova, Christopher Ingersoll and Nick Cassavaugh

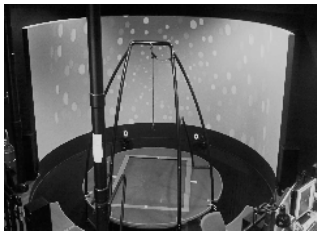


- 3D immersive game Octopus
- Patient with TBI practicing the game
- Improvement in arm-postural coordination

Paper 3

Podium Session 6, Room HPH G3 Tuesday, 14h45-16h00 Gait, Locomotion and Navigation

Influence of moving visual surroundings on walking
Agali Mert, Laura Hak and Willem Bles



- Vestibular functioning
- vection
- falls
- rehabilitation
- gait stability

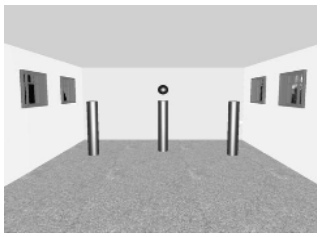
Paper 1

The effect of differing optic flow on steering behaviours during goal-oriented locomotion
Andrei Garcia Popov and Anouk Lamontagne

- Control of goal-oriented locomotion
- Effect of changing optic flow and target location
- Normative data from healthy young individuals

Paper 2

Perceptual and navigational strategies for obstacle circumvention in a virtual environment
Anuja Darekar, Gayatri Aravind, Anouk Lamontagne and Joyce Fung



- Obstacle circumvention strategies during locomotion
- Perception of time and distance to collision
- Effect of aging on locomotor strategies

Paper 3

Treadmill Training with Virtual Reality to Decrease Risk of Falls in Idiopathic Fallers: a Pilot Study
Anat Mirelman, Noa Raphaeli-Beer, Moran Dorffman, Marina Brozgul and JM Hausdorff

- VR for idiopathic fallers is feasible
- Improvements in both motor and cognitive abilities
- Fall mediators improved

Paper 4

Axis of visual field rotation and order of presentation differentially affect postural responses in virtual environment
Ravi Buddharaju, Lois Lanaria and Emily Keshner

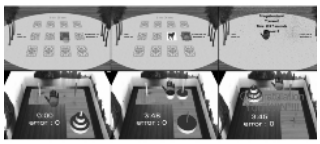
- perception
- posture
- muscle activity
- axis of optic flow

Paper 5

Podium Session 7, Room HPH G3 — Tuesday, 16h30-17h30 — Rehabilitation for Brain Injuries

Emotive, Cognitive and Motor Rehabilitation Post Severe Traumatic Brain Injury – a New Convergent Approach

Grigore (Greg) Burdea, Bryan Rabin, Aurélien Chaperon and Jasdeep Hundal



- Two case studies chronic post-severe TBI
- Custom virtual reality games on Rutgers Arm II
- Cognitive gains in focusing and executive function
- Emotive gains in reduced depression
- Gains in shoulder strength and hand dexterity

Paper 1

Effectiveness of executive functions training within a virtual supermarket for adults with Traumatic Brain Injury

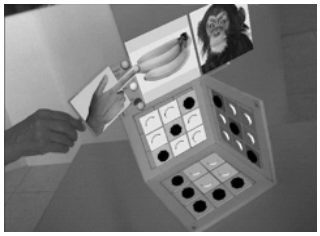
Michele Jacoby, Sara Averbuch, Yaron Sachar, Noomi Katz, Patrice (Tamar) Weiss and Rachel Kizony

- Executive functions important for daily function
- Virtual reality treatment may improve EF
- Overall, VR treatment better than conventional OT

Paper 2

Development of an Interactive Artifact for Cognitive Rehabilitation based on Augmented Reality

Claudio Kirner and Tereza Kirner



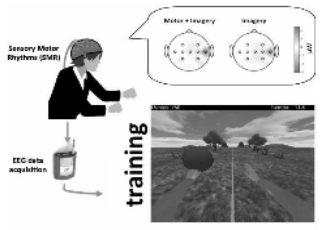
- Interactive artifact based on augmented reality
- cognitive disabled people and therapists
- low cost and easy customization
- user-friendly interface
- multi-sensory input/output

Paper 3

Podium Session 8, Room HPH G3 — Wednesday, 10h50-12h35 — Virtual Reality Training for Pain and Disability

Exploring the Synergies of a Hybrid BCI – VR Neurorehabilitation System

Sergi Bermudez i Badia, Andrés García Morgade, Hani Samaha



- Hybrid BCI - VR system
- Exploits combined motor execution and imagery
- Personalized training in a VR environment

Paper 1

Development of virtual environments for patient-centered rehabilitation

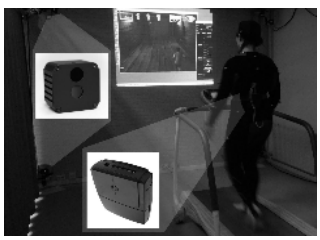
Sebastian König, Andreas Duenser, Christoph Bartneck, John Dalrymple-Alford and Gregory Crucian

- individually designed virtual environments
- relevant training tasks for neurological patients
- rapid workflow to build environment in few hours
- realistic virtual environments easily recognizable
- effortless integration in clinical practice

Paper 2

Chronic Pain Rehabilitation with a Serious Game using Multimodal Input

Christian Schönauer, Stephanie Jansen – Kosterink, Hannes Kaufmann, Miriam Vollenbroek-Hutten and Thomas Pintaric

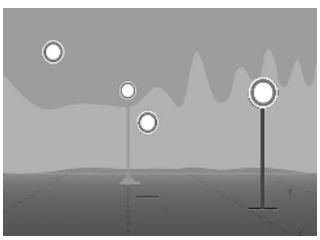


- Chronic pain rehabilitation
- Serious games
- Full body interaction

Paper 3

Effects of Shading and Droplines on Object Localization in VR for Patients with Neurological Conditions

Wouter van den Hoogen, Peter Feys, Ilse Lamers, Sofie Notelaers, Katrien Baeten, Lore Kerkhofs, Karin Coninx and Wijnand IJsselsteijn



- Neurorehabilitation
- Shading and Droplines
- Optimising Virtual Environments
- Movement quality

Paper 4

Virtual reality rehabilitation system for neuropathic pain and motor dysfunction in spinal cord injury patients

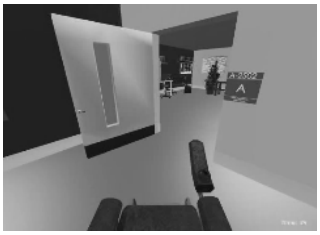
Michael Villiger, Jeremy Spillman, Bruno Meilick, Daniel Kiper, Pawel Pyk, Natalia Estevez, Spyros Kollias, Armin Curt, Marie-Claude Hepp-Reymond, Sabina Hotz-Boendermaker and Kynan Eng

- VR for incomplete spinal cord injury patients
- Lower limb motor dysfunction and neuropathic pain
- Training addresses both motor dysfunction and pain
- Single-case series patient testing
- Improved motor function and reduced pain

Paper 5

Comparison of powered wheelchair driving performance in a real and in a simulated environment

Philippe Archambault, Jodie Ng Fuk Chong, Gianluca Sorrento, François Routhier and Patrick Boissy



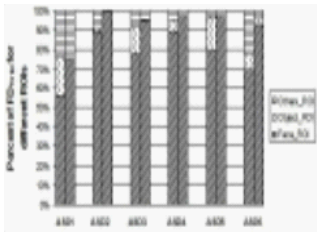
- simulator
- power wheelchair
- driving skills

Paper 6

Podium Session 9, Room HPH G3 Wednesday, 16h45-17h30 Rehabilitation for Children

Dynamic Gaze Measurement with Adaptive Response Technology in Virtual Reality based Social Communication for Autism

Uttama Lahiri, Zachary Warren and Nilanjan Sarkar



- virtual-reality
- eye-tracking
- fixation counts
- fixation duration

Paper 1

Validation of the Elements/RE-ACTION System for use with Children: Evaluation of performance across developmental stages

Dido Green and Peter Wilson

- Feasibility/construct validity of assessment mode
- Subjective data showed enjoyment and satisfaction
- System documented age related changes
- Results reflect system's validity for children

Paper 2

Describing the Attention Deficit profile of Children with Neurofibromatosis Type 1 Using a Virtual Classroom Environment

Yafit Gilboa, Sara Rosenblum , Aviva Fattal-Valevski , Hagit Toledano-Alhadef, Albert (Skip) Rizzo and Naomi Josman

- The attention profile of NF1 children
- Diagnosis of attention deficits
- The Virtual Classroom

Paper 3

Poster Session

Virtual Reality Games for Rehabilitation of People with Stroke: Perspectives from the Users

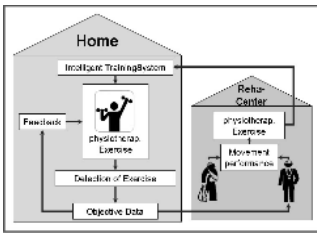
Gwyn Lewis, Claire Woods, Juliet Rosie and Kathryn McPherson

- Stroke
- Upper limb
- Virtual reality games

Poster Session - B1

Introducing an user-tailored rehabilitation system for patients in their home and work environment

Michael Hennes, Fabian Kohler and Catherine Disselhorst-Klug



- user-tailored home rehabilitation
- cost effective, movable and easy to use system
- patient guidance by visual feedback

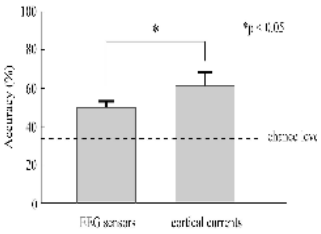
Poster Session - B2

Improving dexterity in children with cerebral palsy
Huub van Hedel, Karin Wick, Kynan Eng and Andreas Meyer-Heim

- Children with CP trained arm and hand function
- A glove-based VR system was compared to PC games
- Grip strength and manual dexterity were evaluated
- Improvements were larger in the VR-system group

Poster Session - B3

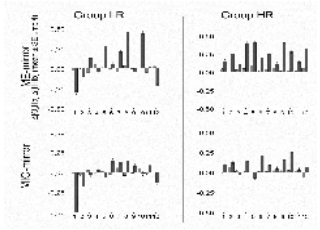
Usability of EEG Cortical Currents in Classification of Vowel Speech Imagery
Natsue Yoshimura, Aruha Satsuma, Charles DaSalla, Takashi Hanakawa, Masa-aki Sato and Yasuharu Koike



- A BCI to discriminate imagery speech of vowels.
- EEG cortical currents were estimated using EEG.
- Classification accuracy was improved.

Poster Session - B4

Trial-to-trial variability differs between low versus high responders in motor imagery: near-infrared spectroscopy study
Lisa Holper, Martin Wolf, Nagisa Kobashi, Daniel Kiper and Kynan Eng



- motor imagery
- Trial-to-Trial Variability
- Near-Infrared Spectroscopy

Poster Session - B5

Development of a Virtual Reality Leg-Cycling Training System for Stroke Patients
Hsin-Chang Lo Lo, Chun-Yu Yeh, Ya-Hsin Hsueh and Sin-Lin Chen

- virtual reality
- leg-cycling
- stroke

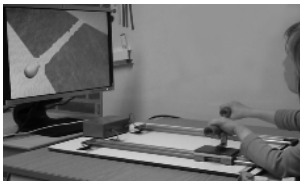
Poster Session - B6

The contribution of an online VR-based programme in cognitive rehabilitation following stroke
Pedro Gamito, Jorge Oliveira, Jose Pacheco, Nuno Santos, Diogo Morais, Tomaz Saraiva, Fábio Soares and Catarina SottoMayor

- Stroke
- Rehabilitation
- VR

Poster Session - B7

Serious gaming to improve bimanual coordination in children with spastic cerebral palsy
Edwin van Loon, Anke van der Rijt, Annelie Salverda and Lieke Peper



- Computer games to loosen bimanual coupling
- Fun therapy for children with CP
- Lissajous plane as basis for computer games

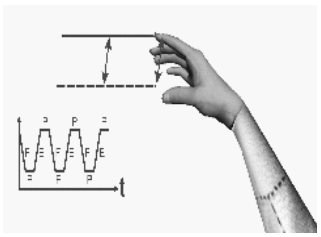
Poster Session - B8

Energy Demands During Interactive Video Gaming of Individuals Post-Stroke
Michal Kafri, Mary Jane Myslinski and Judith Deutsch

- Energy Expenditure during interactive video gaming
- for individuals post stroke was feasible
- and comparable to mild-moderate exercise

Poster Session - B9

The Effects of Manipulation of Visual Feedback in Virtual Reality on Cortical Activity: A Pilot Study
Johannes Brand, Olivia Geisseler, Lisa Holper, Marie-Claude Hepp-Reymond, Manfred Morari, Daniel Kiper and Kynan Eng



- VR-mediated visual feedback
- Finger flexion-extension movement
- Matching and mismatching conditions
- Functional near-infrared spectroscopy (fNIRS)

Poster Session - B10

ImAble System for Upper Limb Stroke Rehabilitation
Kimberlee Jordan, Michael Sampson, Juha Hijmans, Leigh Hale and Marcus King

- An integrated upper limb rehabilitation system
- Used with computer games and virtual reality
- Can be tailored to patient's strength and abilit
- Low cost, designed for home use
- Results show rehabilitation and motivation benefit

Poster Session - B11

Is Use of the Nintendo Wii Fit in Physiotherapy as Effective as Conventional Physiotherapy Training?
Maria Crotty, Kate Laver, Stacey George and Julie Ratcliffe

- A Randomised Controlled Trial with older people
- Compared conventional and WiiFit based therapy
- The Wii Fit was effective in retraining balance

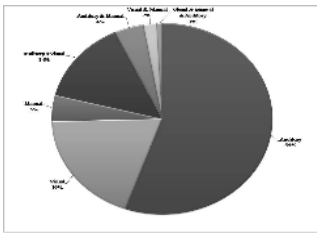
Poster Session - B12

Web Service for Cognitive Remediation in Depression
Ouriel Grynszpan, Odile Komano, Pierre Leboucher, Julie Guertault, Franck Tarpin Bernard and Roland Jouvent

- We present a web service for cognitive remediation
- The web application is specialized for depression
- The patient conducts sessions at home
- The therapist can remotely monitor the patient
- Preliminary observations show high acceptance rate

Poster Session - B13

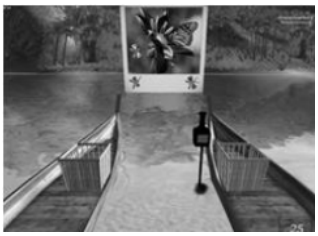
The role of visual feedback in conventional therapy and future research
Birgit Molier, Gerdienke Prange and Jaap Buurke



- Clinical practice mainly verbal feedback
- Research combined visual and sensory/auditory
- Application of simple experiments in clinic

Poster Session - B14

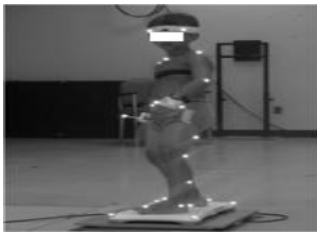
Cognitive demand in a VR-enriched arm training and its relation to performance, motivation and cognitive abilities
Katharina Volkening , Jeannine Bergmann, Jaka Ziherl, Domen Novak, Matjaž Mihelj, Marko Munih and Friedemann Müller



- VR-enriched arm training
- Scenarios with varying cognitive complexity
- Effects on performance & arousal?
- Influenced by cognitive abilities & motivation?

Poster Session - B15

Active Video Games and Children with Cerebral Palsy: the Future of Rehabilitation?
Laurent Ballaz, Maxime Robert, François Prince and Martin Lemay



- Cerebral palsy
- Active video game
- Rehabilitation

Poster Session - B16

Spatial orientation decline in elderly population
Francesca Morganti and Giuseppe Riva

- VR Maze test
- Wayfinding
- Alzheimer

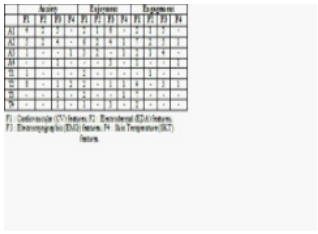
Poster Session - B17

User-Acceptance and Flow in Two Gaming Platforms Used for Exercise
Jonathan Robinson, Paul Van Schaik, Alasdair MacSween, John Dixon and Denis Martin

- Four week balance training with 33 healthy persons
- Virtual reality gaming (IREX™ and Nintendo Wii)
- Recording users' acceptance and flow experience
- No significant differences between gaming platform
- Significant increases in acceptance and flow

Poster Session - B18

Understanding Psychophysiological Response to a Virtual Reality-based Social Communication System for Children with ASD

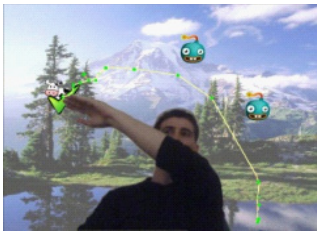


- ASD
- virtual-reality
- physiology
- affective states

Poster Session - B19

A reliable low-cost platform for neglect Virtual Rehabilitation

Nunzio Alberto Borghese, Anna Sedda, Renato mainetti, Marco Ronchetti, Fabrizio Pasotti and Gabriella Bottini



- virtual reality rehabilitation
- hands free tracking
- neglect rehabilitation

Poster Session - B20

10 Years Experience in the Application of the Reinforced Feedback in Virtual Environment (RFVE) for Neurorehabilitation

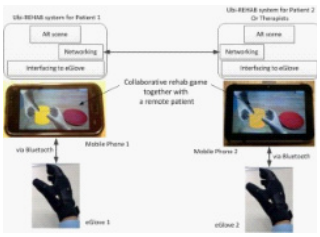
Andrea Turolla, Michela Agostini, Carla Zucconi, Pawel Kiper, Andrea Vendramin, Mauro Dam, Paolo Tonin, Laura Ventura, Michela Dalmartello and Lamberto Piron

- Stroke
- Upper limb
- Reinforced Feedback in Virtual Environment

Poster Session - B21

Ubi-REHAB: An Android-Based Portable Augmented Reality Stroke Rehabilitation System using the eGlove for Multiple Partic

Young Geun Choi



- Wireless portable rehabilitation glove
- AR rehabilitation game with a smart phone
- Collaborative rehab training with a remote patient

Poster Session - B22

The effect of social gaming in performance and mood in virtual reality based rehabilitation of stroke patients

Belén Rubio Ballester, Sergi Bermudez i Badia and Paul Verschure

- Motor rehabilitation
- rehabilitation gaming system
- stroke neurorehabilitation

Poster Session - B23

Development of a Haptic Keypad for Training Finger Individuation after Stroke

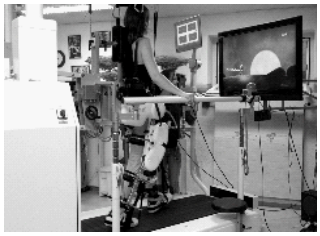
Thomas Lord, Diana Keefe, Yu Li, Nikolay Stoykov and Derek Kamper

- Visual and audial feedback of performance
- Pneumatic glove provides variable assistance
- Level of difficulty controlled by therapist

Poster Session - B24

A Virtual Reality System for Robot-Assisted Gait Training Based on Game Design Principles

Ulrich Götz, Karin Brütsch, René Bauer, Florian Faller, Reto Spoerri, Andreas Meyer-Heim, Robert Riener and Alexander Koenig

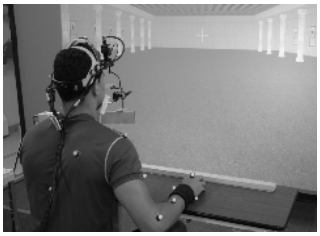


- Currently no gameplay principles in rehabilitation
- Game design principles maximize motivation
- Gabarello combines therapy with gameplay
- Questionnaire on motivation among 45 children
- Gabarello increases rehabilitation motivation

Poster Session - B25

Altered steering strategies for goal-directed locomotion in stroke

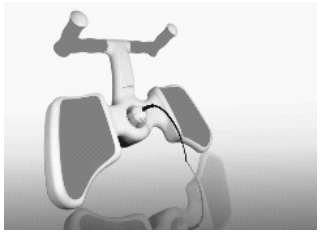
Ala' Aburub



- Goal-directed locomotion in a virtual environment
- Effects of changing optic flow and target location
- Effects of stroke

Poster Session - B26

Computer-Aided Arm Rehabilitation
Mike Hartwig, Alexander Kollreider and David Ram



- Arm-Rehabilitation
- Computer-Aided Neurorehabilitation
- Fun and Evidence based Therapy

Poster Session - B27

Use of Novel Virtual Reality System for the Assessment and Treatment of Unilateral Spatial Neglect: a Feasibility Study
Heidi Sugarman, Aviva Weisel-Eichler, Riki Brown and Arie Burstin

- SeeMe, a novel virtual reality system
- Potential tool for detection and treatment of USN
- Affordable and easy to use

Poster Session - B28

Low-Cost Motion Interactive Video Games in Home Training for Children with Cerebral Palsy: a Kinematic Evaluation
Marlene Sandlund, Erik Domellöf, Helena Grip, Louise Rönnqvist and Charlotte Häger

- Home training for children
- Low-cost games
- Kinematic analysis
- Movement control

Poster Session - B29

Virtual Reality Enhanced Balance Training for Service Members with Amputations
Vanessa Everding and Sarah Kruger

- CAREN virtual buoy course for balance training
- Three Service Members with traumatic amputations
- Combined data characterized with power curve fit
- Performance improved over several weeks

Poster Session - D1

Cycling Rate Is Modulated by Optic Flow In a Virtual Bicycle Environment
Vengata Gade, Inbal Maidan, Rosemary Gallagher, Carina Torres and Judith Deutsch

- Optic Flow Modulates Cycling Rate
- Modulation Requires High Gain Contrast
- Cycling Modulation Differs from Walking

Poster Session - D2