located at Cedar Foundation in Belfast and at the University of Würzburg.

Preliminary experiments have been performed in Belfast at Cedar Foundations premises, a total of N=5 end users with a varying degree of cognitive impairments were involved in the evaluation. We calculated the accuracy (as percentage of correctly chosen symbols) and therefore, asked users during every trial, which cards they wanted to uncover. Results showed an average selection accuracy of 78%. Those users, who had no or low control over the games, had no or low control over the BNCI in general. This was either caused by the severity of their physical impairment or bad EEG signals due to problems with data acquisition.

5 Conclusions and Future Work

In this paper, we presented a framework that provides a backdrop to cognitive rehabilitation tasks performed using a BNCI system. The framework is part of the BackHome project and, according to the cognitive skills that it defines, two serious games have been defined and implemented. The corresponding system is currently under testing by people with traumatic brain injury.

As for the future work, we are currently implementing a daily-life-activity game aimed at improving perception. Moreover, apart serious games, we are also considering defining and implementing cognitive rehabilitation tasks relying on an e-puck robot, which might become especially engaging to users.

Acknowledgments

References

[1] David Braddock, Mary C Rizzolo, Micah Thompson, and Rodney Bell. Emerging technologies and cognitive disability. *Journal of Special Education Technology*, 19(4), 2004.

[2] Keith D Cicerone, Cynthia Dahlberg, Kathleen Kalmar, Donna M Langenbahn, James F Malec, Thomas F Bergquist, Thomas Felicetti, Joseph T Giacino, J Preston Harley, Douglas E Harrington, et al. Evidence-based cognitive rehabilitation: recommendations for clinical practice. *Archives of physical medicine and rehabilitation*, 81(12):1596–1615, 2000.

[3] J. Daly, E. Armstrong, F. Miralles, E. Vargiu, G.R. Müller-Putz, C. Hintermller, C. Guger, A. Kuebler, and S. Martin. Backhome: Brain-neural-computer interfaces on track to home. In *RAatE 2012 - Recent Advances in Assistive Technology & Engineering*. 2012.

[4] P. Rego, P.M. Moreira, and L.P. Reis. Serious games for rehabilitation: A survey and a classification towards a taxonomy. In *Information Systems and Technologies (CISTI), 2010 5th Iberian Conference on*, pages 1–6, June 2010.

[5] Marcia J Scherer. *Assistive technologies and other supports for people with brain impairment*. Springer Publishing Company, 2011.

[6] David J Schretlen and Anne M Shapiro. A quantitative review of the effects of traumatic brain injury on cognitive functioning. *International Review of Psychiatry*, 15(4):341–349, 2003.

[7] Eloisa Vargiu, Juan Manuel Fernández, Sergi Torrellas, Stefan Dauwalder, Marc Solà, and Felip Miralles. A sensor-based telemonitoring and home support system to improve quality of life through bnci. In *Assistive Technology: From Research to Practice, AAATE 2013. Encarnao, P., Azevedo, L., Gelderblom, G.J., Newell, A., Mathiassen, N.-E. (Eds.)*, 2013.