









immediately before the imagery period.

## CONCLUSION

We studied EEG source activity of visual motion imagery via comparison with visual motion perception. We found brain activity particular to visual motion imagery in the posterior cingulate, precuneus, cuneus, inferior parietal lobule, and supramarginal gyrus. Based on these results, we will analyze functional connectivity between brain regions related to visuospatial information processing in the future work. In addition, visual motion imagery may be a useful new approach to BCI. Therefore, we hope to investigate the possibility of classification of imagined directions focusing on the brain areas where increased activity was observed during visual motion imagery.

## REFERENCES

- [1] Sousa T, Amaral C, Andrade J, Pires G, Nunes UJ, Castelo-Branco M. Pure visual imagery as a potential approach to achieve three classes of control for implementation of BCI in non-motor disorders. *J. Neural Eng.* 2017;14(4): 046026.
- [2] Koizumi K, Ueda K, Nakao M. Development of a Cognitive Brain-Machine Interface Based on a Visual Imagery Method, in Proc. EMBC'18, Honolulu, HI, USA, 2018, 1062-1065
- [3] Mullen T, Kothe C, Chi YM, Ojeda A, Kerth T, Makeig S, ... & Jung TP. Real-time modeling and 3D visualization of source dynamics and connectivity using wearable EEG, in Proc. EMBC'13, Osaka, Japan, 2013, 2184-2187
- [4] Pascual-Marqui, RD, Lehmann D, Koukkou M, Kochi K, Anderer P, Saletu B, ..., Biscay-Lirio R. Assessing interactions in the brain with exact low-resolution electromagnetic tomography. *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences.* 2011;369(1952):3768-3784.
- [5] Mulert C, Jäger L, Schmitt R, Bussfeld P, Pogarell O, Möller HJ, Juckel G, Hegerl U. Integration of fMRI and simultaneous EEG: towards a comprehensive understanding of localization and time-course of brain activity in target detection. *Neuroimage.* 2004;22(1): 83–94
- [6] Worrell GA, Lagerlund TD, Sharbrough FW, Brinkmann BH, Busacker NE, Cicora KM, O'Brien TJ. Localization of the epileptic focus by Low-Resolution Electromagnetic Tomography in patients with a lesion demonstrated by MRI. *Brain Topography.* 2000;12(4): 273–282
- [7] Zumsteg D, Wennberg RA, Treyer V, Buck A, Wieser HG. H215O or 13NH3 PET and electromagnetic tomography (LORETA) during partial status epilepticus. *Neurology.* 2005;65(10): 1657–1660
- [8] Jatoi MA, Kamel N, Malik AS, Faye I. EEG based brain source localization comparison of sLORETA and eLORETA. *Australas. Phys. Eng. Sci. Med.* 2014;37(4): 713-721.
- [9] Nichols TE, Holmes AP. Nonparametric permutation tests for functional neuroimaging: a primer with examples. *Human Brain Mapping.* 2002;15(1): 1-25
- [10] Mellet E, Petit L, Mazoyer B, Denis M, Tzourio N. Reopening the mental imagery debate: lessons from functional anatomy. *Neuroimage.* 1998; 8(2): 129–139.
- [11] Ishai A, Haxby JV, Ungerleider LG. Visual imagery of famous faces: effects of memory and attention revealed by fMRI. *Neuroimage.* 2002; 17(4): 1729–1741.
- [12] Cavanna AE, Trimble MR. The precuneus : a review of its functional anatomy and behavioral correlates. *Brain.* 2006;129(3): 564-583
- [13] Gallese V. The “conscious” dorsal stream: embodied simulation and its role in space and action conscious awareness. *Psyche.* 2007;13(1): 1-20
- [14] Maddock RJ, Garrett AS, Buonocore MH. Remembering familiar people: the posterior cingulate cortex and autobiographical memory retrieval. *Neuroscience.* 2001;104(3): 667-676.
- [15] Sutherland RJ, Hoising JM. Posterior cingulate cortex and spatial memory: A microlimnology analysis. In *Neurobiology of cingulate cortex and limbic thalamus.* Birkhäuser, Boston, MA 1993, pp. 461-477