Abstract: Movement Measurement System for fMRI Motion Studies

Hyung-Sik Kim[1], Hong-Won Yeon[1], Mi-Hyun Choi[1], Jong-Rak Park[2],
Dae-Woon Lim[3], Jeong-Han Yi[1], Soon-Cheol Chung[1*]
[1]*Department of Biomedical Engineering, Research Institute of Biomedical Engineering, College of Biomedical & Health Science, Konkuk University, Chungju, South Korea*
[2]*Department of Photonic Engineering, Chosun University, Gwangju, South Korea*
[3]*Department of Information & Communication Engineering, Dongguk University, Seoul, South Korea*
{hyungshikkim}@gmail.com, {yhwman}@kku.ac.kr, {mhchoi0311}@gmail.com,
{ejrpark}@chosun.ac.kr, {dwlim01}@dgu.edu, {jeong2yi}@kku.ac.kr
*corresponding author; scchung@kku.ac.kr

Abstract

In this study, functional Magnetic Resonance Image (fMRI) compatible movement measurement system was developed, which can measure motion signals without deteriorating the fMRI. The movement measurement system consisted of a sensor module with a three-axis accelerometer and a two-axis gyroscope, a modulator that amplifies the motion signal and converts it to an optic signal, and a demodulator that converts an optic signal to an electric signal. Various kinematic variables, such as angle, acceleration, and jerk, can be measured and calculated by using the movement measurement system. Therefore, this system can be used for the study of the relationship between various kinematic variables and brain function.

Acknowledgements

This research was supported by the Pioneer Research Center Program through the National Research Foundation of Korea funded by the Ministry of Education, Science and Technology (2011-0027920).