Project Title: Eye Movement Prediction in the Development and Evaluation of the Eye Guided Computer Interfaces

Investigator: Oleg Komogortsev

Department: Computer Science

Project Summary:
First a Horizontal Plant Oculomotor Plant was developed and validated through the integrated with Kalman Filter eye movement prediction algorithm. Later a mathematical model was developed for the two dimensional oculomotor plant was developed. Several papers were submitted and published as a result of this grant. Several grants were submitted as a result of this grant. Collaboration with Lawrence Berkley Labs was established as result of this grant. Currently one journal and one conference paper is being worked on as a result of this grant.

Publications:
Koh, D., Gowda, S., Komogortsev, O. Input Evaluation of an Eye-Gaze-Guided Interface: Kalman Filter vs. Velocity Threshold Eye Movement Identification. To appear in the Proceedings of the ACM SIGCHI symposium on engineering interactive computing systems (EICS 2009), July 2009.

Komogortsev, O., Khan, J., "Eye Movement Prediction by Oculomotor Plant Kalman Filter with Brainstem Control", Journal of Control Theory and Applications, Vol. 7, Issue 1, February 2009.

Komogortsev, O., Jayarathna, U., "2D Oculomotor Plant Mathematical Model for Eye Movement Simulation", In Proceedings of the 8th IEEE International Conference on Bioinformatics and Bioengineering (BIBE08), October 2008, pp 1-8.

Komogortsev, O., Khan, J., "Eye Movement Prediction by Kalman Filter with Integrated Linear Horizontal Oculomotor Plant Mechanical Model", In Proceedings of the Eye Tracking Research & Applications Symposium (ETRA 2008), March 2008, pp. 1-8.

Presentations:
Komogortsev, O., Jayarathna, U., "2D Oculomotor Plant Mathematical Model for Eye Movement Simulation", Presented at the 8th IEEE International Conference on Bioinformatics and Bioengineering (BIBE08), October 2008, pp 1-8.

Komogortsev, O., Khan, J., "Eye Movement Prediction by Kalman Filter with Integrated Linear Horizontal Oculomotor Plant Mechanical Model", Presented at the Eye Tracking Research & Applications Symposium (ETRA 2008), March 2008, pp. 1-8.

External Grant:
ARRA: Gender-specific Recovery in Veteran Students after mTBI, NIH, March 2009, $977,753, [Under Review]

Characterizing Cognitive, Oculomotor and Sleep Function in Persons with Mild Traumatic Brain Injury in Response to Exercise Training, NIH, October 2008, $150,000, [Under Review]

Human Oculomotor Plant Signature Modeling: are there unique and person specific

physiological and behavioral features in oculomotor plant eye movement parameters? Sigma Xi Grant-in-Aid of Research program, awarded March 2009, $960 (this is a student grant).

Human Oculomotor Plant Modeling: Is there a significant change or deficit in oculomotor function of mTBI patients compared to normal vision? Sigma Xi Grant-in-Aid of Research program, awarded December 2008, $1330 (this is a student grant).

External Grants Award:
Human Oculomotor Plant Signature Modeling: are there unique and person specific physiological and behavioral features in oculomotor plant eye movement parameters? Sigma Xi Grant-in-Aid of Research program, awarded March 2009, $960 (this is a student grant).

Human Oculomotor Plant Modeling: Is there a significant change or deficit in oculomotor function of mTBI patients compared to normal vision? Sigma Xi Grant-in-Aid of Research program, awarded December 2008, $1330 (this is a student grant).

Student Number: 3