**Detection of Mild Traumatic Brain Injuries: Need for Data**

**Abstract**

The Center for Disease Control and Prevention reports that approximately 1.7 million traumatic brain injuries (TBI) occur each year with 75% of those cases belonging to the mild (mTBI) category. Many go undetected and are therefore predispose many as highly susceptible to the now-known cumulative effects of multiple concussions. These numbers are especially alarming considering that TBI is a contributing factor to a third of all injury-related deaths in the United States. Also the need for fast and accurate mTBI detection techniques has become an is- sue of increasing urgency, affecting people in sports, recreation and frequently in other everyday activities. PI Komogortsev is already working on the algorithms in the area of automated detec- tion of mTBI based on an ocular biometric framework originally created from a project funded by a NSF CAREER award. Preliminary work indicates that existing eye movement data availa- ble from external research groups are inconsistent; employ several differing data collection pro- tocols, and use hardware which make it extremely challenging to develop a set of biomarkers able to detect the presence of mTBI in a reliable manner.

Therefore, this proposal aims to first create a standardized data collection protocol that al-

lows reliable and consistent collection of mTBI data. Second, we propose to collect a longitudi- nal database (i.e., consisting of repeated recordings during recovery) following a developed pro- tocol from mTBI patients and use it in ongoing research to facilitate fast and accurate detection of mTBI using the new ocular biometric framework developed by the PI. A longitudinal data-

base will allow further development of ocular biometric metrics for robust and reliable mTBI detection, therefore providing a much stronger case for future grants and commercialization of this groundbreaking technology. Proposed work will support grant applications for **substantial** amounts of funding, e.g., multi-million R01 NIH funding mechanism and large grants from the Department of Defense (DoD) and DARPA.

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