Biomedical instrumentation is a rapidly growing field where signals emanating from a human body can be analyzed non-invasively and processed. The data that is interpreted from these signals and how it is used varies from product to product. The goal of our project is to utilize these signals to give a diagnosis of the user and even offer a human-computer interface (HCI) capability. The neurons and muscles of the eye store small electrical charges within their cells. The Electro-ocular gram is a method to measure this net electrical charge between the cornea and the retina. Thus, horizontal and vertical movements of the eye correspond to a potential that can be measured and correlated. Imagine an interface that lets you use a blink of an eye instead of a mouse click or a thought instead of a keystroke. What you are imagining is a neural interface. EOG is a prime example of a HCI that provides a seamless link between human and machine while increasing efficiency and productivity. By harnessing this signal, not only can the information be used for eye tracking, but also for eye diagnosis. The resting potential of the eye is proportional to the illumination of the light that it receives. Exploiting this relationship, one can diagnose the eye for diseases such as Best’s disease. In addition, another signal that is acquired from the head is the temperature emanating directly from the hypothalamus, the temperature regulator in the human body. The discussion of the theory, design, and experimental results of this project will be presented.

Key words: electrooculography, EOG, human-computer interface, HCI, alternative computer input, hands-busy, assistive device, remote-monitoring, thermistor, Best’s disease, Stargardt’s disease, butterfly-shaped dystrophy, Biomuse, Cyberlink