Online Proceedings

POSTER SESSION 1

Commons West, Easel 22

11:00 AM to 1:00 PM

Force Myography Matrix for Prosthetic Devices

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Advancements in the design of robotic prostheses have provided promising new prototypes as well as highlighted the need for continued development in myographic sensors essential for fine control of prosthetic limbs and other assistive devices. Force myography (FMG) sensor matrices have the potential to improve upon the granularity of motion control present in current non-invasive robotic prostheses. FMG utilizes pressure sensors to detect flexion and extension of muscle fibers, requires no complex signal processing, and has the potential for improved accuracy and robustness over other myographic interfaces, which have known issues of data clarity. In this study, FMG was investigated through sensor matrix design and data collection. A matrix of force sensors was constructed for use in human-computer interaction, using the open-source prototyping platform Arduino for data collection and mechanism control. The sensors were constructed from pressure-sensing material (Velostat) layered between conductive foil, arrayed in a grid, and housed in an adjustable sleeve. Data collection was focused on identifying force patterns which correspond to the eight classes of motion critical to a robust transradial prosthesis. Preliminary prototyping and data analysis indicate that simple, widely-available materials provide sufficient pressure sensitivity for prosthetic applications when compared to more common, prohibitively expensive sensors. The matrix returns pressure data regardless of radial position on a user's arm, such that pattern recognition algorithms will likely be sufficient to translate user intent into action. This approach will provide a framework for further development of low-cost prosthetic control alternatives, of particular interest for developing countries with limited funds for healthcare.