Toward developing a smart wheelchair for user physiological stress and physical activity monitoring

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Abstract: The article presents a smart wheelchair characterized by embedded sensors and an acquisition, processing and communication platform based on a multifunction I/O module an... **View more**

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Abstract:
The article presents a smart wheelchair characterized by embedded sensors and an acquisition, processing and communication platform based on a multifunction I/O module and an embedded PC for monitoring of physiological stress parameters and motion activity of the wheelchair user in unobtrusive way. The embedded sensors include E-textile electrodes attached to the wheelchair arms and a 3D MEMS accelerometer used to extract the motion activity information. Additional sensing channels, expressed by piezoresistive flexible force sensors are used to optimize the measurement of contact ECG and skin conductivity. A server application, developed in LabVIEW and hosted on the embedded computer, delivers information about the digital processed signals to the client application installed in mobile platforms such as tablet PC or smartphones. The mobile platform provides interface for nurses, physiotherapists or physicians as well as for the wheelchair user or informal caregivers.

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