

Smart Jewellery: The Future of Health Monitoring

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ABSTRACT

The project has revolved around developing a responsive, wearable prototype object that creates playful interactions by sensing bodily and environmental stimuli, and expresses these through activating elements that consist of colour changing chromic smart materials and through light interactions facilitated by electronic sensing means. Embedded heartrate and temperature sensors provide instant biofeedback to users, who are encouraged to explore the prototype tactilely. The use of the newly developed material “Selvedge PLA”, offers novel textural sensations as well as utilising end-of-life waste byproducts of the textiles and leather industries in conjunction with PLA to create a fully compostable material. This increases the sustainability of the wearable by utilising bioplastics for creating structural components where previously oil based plastics may have been used. The smart jewellery thus designed is the first step towards addressing smart medical sensing in elderly and children with special needs, especially in a manner that is convenient and simple. The thus obtained data could be transmitted wirelessly to a smart device, such as a mobile phone, so that appropriate medical attention can be provided by the carers when necessary.

The project focuses on the design of Smart Jewellery that can be worn by children with disabilities to continuously monitor their heart rate and temperature. The design of the jewellery itself is inspired by nature, i.e. the jewellery looks like a sea creature typically seen in cartoons, and is fabricated using recycled material. The heart rate and temperature sensors are embedded in a manner that is not evident to the user, i.e. “disguised,” and the heart rate is made visible through the use of fibre optics which is embedded as part of the jewellery design. The data obtained from the sensors could then be transmitted wirelessly to a smart device, such as a mobile phone, so that appropriate action can be taken by the carer.

Aim of the paper and urban challenge it addresses:

The need for autonomous means to monitor health conditions of the elderly and children with disabilities has initiated research on smart monitoring systems to address this issue. One of the major challenges is the requirement to have

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personnel dedicated to each individual that is required to be monitored and to achieve data in a manner that does not affect the mental stability of the patient. The research, thus, addresses two key elements of the aforementioned issue through the (1) design of a smart sensor scheme that would continuously monitor the medical condition of a person while (2) the said device is embedded, and therefore “disguised,” in an aesthetically pleasing piece of jewellery, i.e. smart jewellery, that can be worn by the patient. This would not only reduce the anxiety of the patient by avoiding the usage of typical medical equipment used in a care home or hospital environment, but also would encourage children with disabilities to access them in a playful and interactive manner. The aim of the project, therefore, is to design smart jewellery that are targeted to be used by the elderly and children with disabilities and who struggle with conventional methods of monitoring health conditions.

KEYWORDS

Keyword 1	Arts and creative industries
Keyword 2	sustainable materials
Keyword 3	electronic engineering

WORKSHOP

Workshop II: Health and Wellbeing in Urban Environments