Personal Wearable Arduino-Based UV Index Detector Integrated With a Mobile IoT App Data Analyzer for UV Radiation Exposure Monitoring and Medical Research

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The major risk factor of skin cancer, one of the most common types of preventable cancers, is exposure to UV radiation, which has recently increased as an effect of global warming. This research consisted of the design and development of a UV-Index Detector and Tracker, integrated with a mobile IoT application. The hypothesis indicated that the sensor would accurately read the local UV-Index despite the climate or time of day; the device could be used in medical research, doctor-patient interaction, and workplace rotations, providing personalized warnings according to users' skin type. The device's hardware was composed of a microcontroller, a UV sensor, a Bluetooth antenna, and a solar rechargeable battery. The microcontroller was programmed to send its measurements to the mobile application in real-time, displaying the UV-Index received and storing readings on a cloud-hosted database. After calibrating it, a total of 104 readings were used to assess the device's reliability through a Two Factor ANOVA, obtaining a p-value of 4.52E18 for readings' independence of collection time of day, weather, and climate. When compared to a ground truth, a certified UV-Index detector, the accuracy of the device was found to be 99.79%. With a cost of 7.5% of the market price of a comparable UV-Tracker and with the added feature of being able to share its data and being specially designed to be worn on the head for added reading reliability, the prototype is proven to be cost-effective. Future improvements to the device include the usage of PCB board technology.

Awards Won:
Fourth Award of $500