PALMIO: Assistive Insole with Reading and Monitoring of Orthopedical Information

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Our way of walking is directly related to postural defects, deviations in joints and muscular imperfections. It is known that, when treading, we can apply up to eight times our weight on the foot, and if this weight is poorly distributed, unnecessary pressures are applied on the joints and consequently entail postural problems. The podoposturology has been studying this relationship between the tread and the human posture, developing insoles for the correction of this plantar imperfection. However, the orthopedical ones, already existing in the market, only serve to alleviate the pressures applied in specific points of the feet, not correct them. The present work aims to provide a way to solve postural problems by correcting the human footprint. As a solution, our project aims at an insole composed of sensors, those developed by the pair in an innovative way, that from a flexible material (a rubber, for example), we have on one side a light emitter and on the other a light receiver. When the material is untouched, the light arrives completely at the receiver, but when we deform it, it arrives partially to the other side. The reading of this data is done by the analog-to-digital converter present in the microcontroller STM32F411RE. The user uses it, and through an Android application, it informs, with a color map, the footprint situation. Having a follow-up with the physiotherapist, he is able to perfect it until reaching the objective of having a neutral walk, improving the distribution of weight on the feet.

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