

Smart Clothing

With the rise of ubiquitous computing and sensor technology, smart devices are increasingly helping us manage our well-being. For example, smartwatches can measure a wide range of physiological parameters such as heart rate, heart rate variability, saturation, respiration rate, skin temperature, ECG, and steps. However, despite their convenience, these devices still require the conscious effort of wearing an extra accessory. Technology constantly evolves, and so do our ideas. What if we told you that you no longer need to remember to wear anything additional, but simply the clothes you would wear anyway? Furthermore, imagine integrating high tech into shoes and insoles, making it possible to measure movements and detect health issues like foot misalignments, prevent chronic pain, and manage weight without extra devices. That is exactly the goal of this project.



Figure 1: This image illustrates the future of smart clothing technology. On the left, a shoe with a high-tech insole integrates sensors to monitor the wearer's movements and health metrics. On the right, a hoodie is embedded with sensors in the sleeves and hood, designed to track various physiological parameters and enhance user experience. This combination of fashion and technology represents the next step in wearable technology, aimed at improving comfort, health monitoring, and overall functionality.

What We Want to Achieve and What You Will Learn

This project aims to explore integrating cutting-edge sensor technology into everyday clothing. Imagine a world where your shoes and hoodie can monitor your health and provide real-time feedback without needing extra devices. This is what we strive to achieve: developing smart clothing that seamlessly enhances your well-being and convenience, as shown in Figure 2. Our goals are ambitious but come with a sense of adventure and discovery. We want to provide you with hands-on experience in designing, prototyping, and testing wearable technology. You will learn valuable technical skills, from working with sensors and electronics to programming and data analysis, while collaborating in a dynamic team environment. While we are excited about this project's potential, we also recognize that innovation comes with challenges.

Things might not work out as planned. However, this is part of the learning journey. Every step, whether it leads to success or teaches us a valuable lesson, is a step forward in smart technology. Join us in this fun and challenging project, where creativity meets technology. Let us give it our best shot and see how far we can go in making our vision of smart clothing a reality!



Figure 2: This image showcases the future of wearable technology. On the left, an insole with integrated sensors provides detailed pressure distribution data, visualized as a thermal image. Below, a hoodie equipped with sensors monitors various health parameters. On the right, a smartphone app displays the collected data, offering valuable insights into both the pressure patterns of the insole and the health metrics tracked by the hoodie. This seamless integration of technology into everyday clothing aims to enhance user comfort and health monitoring effortlessly.

What You Should Bring

This is an interdisciplinary project with a broad spectrum in connected healthcare. Specifically, it comprises different topics like sensor technology, clothing, hardware integration, data (pre-)processing, and app development. Therefore we expect the following from you:

- Motivation to develop an app
- Enjoyment in working with people from the textile industry and hardware developers
- Willingness to learn new things
- Willingness to work in a team and do independent research
- Interest in latest developments

Who You Will Be Working With

We are collaborating with the Maker Universe, experts in hardware and sensor integration. You will also work with AMOHR GmbH, renowned specialists in innovative textile solutions. We are also currently seeking partnerships with clothing manufacturers.

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