Engineering a New Internet of Things (IoT) Device with Sustainably Produced Smart Materials

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Paintable Internet of Things (IoT) is an emerging field of research with wide implications for interactive, human-centric technology. Electrically Conductive Paint is a material that becomes conductive when dry and has the key advantage of being applicable onto a wide array of substrates from paper to metal and objects with irregular 3D geometries such as car handles. The interactive paint-on sensor can be used to trigger switches, activate sounds and detect the presence of the human hand. Existing sensors utilize expensive filler materials such as silver and gold to achieve high conductivities but suffer from high cost. A sustainably produced, solvent-free and low-cost, electrically conductive graphene-acrylic paint is used to create a paintable and scalable IoT device capable of detecting the human hand from a distance. This IoT device is engineered by using an Arduino Uno loaded with CapSense software and the graphene-based paint is used as the interface to interact with both touch and proximity. Experimentation shows that 20 Mohm of resistance is optimal for detecting the presence of a human hand and the experimental sensing rig is capable of sensing up to twelve inches away. The fabricated sensor shows promise for sustainably produced, low-cost and scalable sensing systems applicable on a wide array of substrates and irregular geometries.

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