

## **Locust Vision-Inspired Silver Nanowire-Based Printed Near-Infrared Image Sensor Label for Collision Avoidance**

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As robot arms are utilized in workplaces to collaborate with humans, collision accidents between the robot arm and humans are often encountered. However, to avoid those accidents, a computer vision system should be integrated into the robot arm, which will exponentially raise the cost. Here, we develop a roll-to-roll gravure (R2Rg) printed silver nanowire (Ag-NW)-based Near-infrared image sensor (NIRIS) label by inspiring the locust vision system, which has compound photoreceptors and a neuron system to efficiently avoid collisions with approaching objects. By utilizing localized surface plasmonic resonance of printed Ag-NWs, NIRIS can be formed like the compound photoreceptors by embossing the array of printed Ag-NW sheets. The detected NIR image will be assessed to determine whether it will collide or not by a simple R2R printed neuromorphic controller, which consists of a single-walled carbon nanotube-based thin film transistor. This NIRIS will serve as a collision-free vision label, allowing the robot arm can cooperate with humans in the workplace without any accidents of collision with extremely low cost.

### References

1. Hyejin Park *et al.*, *Adv. Electron.*2020,6,2000770.