An Ultra-Low Power Biomimetic Collision Detector



ID# 2020-5048



LGMD geometric considerations

Technology Summary

This technology is an ultra-low power collision detector inspired from the collision detection neuron inside a locust called the Lobula Giant Movement Detector (LGMD). The device consists of a monolayer MoS2 photodetector stacked on top of a non-volatile and programmable floating gate memory architecture, both combined, imitates the escape response of the LGMD neuron, to an approaching object. This is achieved at a frugal energy expenditure of a few nano-joules and at the same time offers orders of magnitude benefit in device footprint.

Application & Market Utility

Neuromorphic computational devices are able to offer a low cost, low energy alternative to supercomputing by mimicking components of a biological nervous system. By taking inspiration from nature, such technology can enable high-performing functionality at a fraction of the cost (energy, component size/number, computational steps/complexity, etc.) of traditional methods. This type of efficiency will become ever more important as vast numbers of sensors are deployed to any number of devices, including IoT, autonomous vehicles, micro-devices, and defense applications.

Next Steps

This technology is patent pending. The research team seeks collaboration for further development and licensing opportunities.

TECHNOLOGY READINESS LEVEL 1-3

Seeking

Licensing | Research

Keywords

- Collision Detector
- Biomimetic
- Low PowerPhotodetector
- Programmable Non-volatile Memory

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