

Millimeter-Scale Neuromorphic Vision System

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Abstract:

Millimeter-scale sensing semiconductor devices offer a unique combination of features, including wireless communication, energy harvesting, and ultra-compact form factors. These capabilities enable non-invasive and secure deployment in next-generation Internet-of-Things (IoT) applications across biomedical, ecological, surveillance, and infrastructure domains. Significant progress in miniaturization has advanced the vision of “smart dust” at the millimeter scale. Meanwhile, emerging artificial intelligence (AI) technologies are enhancing the intelligence, accuracy, and reliability of traditional sensing systems. Motivated by these advances, I am investigating how to integrate advanced machine learning (ML) techniques to further expand the capabilities of millimeter-scale sensing platforms.

In this talk, I will highlight the key challenges involved in developing ultra-small sensing systems and introduce a millimeter-scale platform recognized as the world’s smallest computer. I will also present recent research advances in digital circuit design for implementing Dynamic Neural Fields (DNF) and Convolutional Neural Networks (CNN), enabling bio-inspired dynamic vision sensing (DVS) for low-power object classification and motion tracking.

References

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