MONASH University

MONASH INNOVATION

# ADVANCED MACHINE VISION SYSTEM

A novel fully-integrated 3D image sensor capable of simultaneously imaging depth, motion and intensity from a single optical path. Our system uses advanced hybrid imaging techniques to significantly increase the utility of image data, whilst decreasing the image latency and data rate. This system has the potential to be the sensor platform for a broad range of machine vision applications.

- **Simultaneous depth and intensity imaging**
- **Low latency event-based temporal contrast capture**
- **High dynamic range**
- **Advanced machine vision and autonomous vehicle applications**

## THE CHALLENGE

The increase in machine vision systems (such as self-driving cars and drones) requires imaging devices capable of acquiring low latency depth and intensity data in high dynamic range environments.

Machine vision requires high speed data capture to maximise system performance. Current high speed imaging techniques produce huge volumes of data, which increases the required computing complexity.

Current commercial 3D imaging systems are bulky and expensive limiting their broader use.

Operation in photon-starved applications requires extremely high sensitivity sensors. Commercial single photon sensors are costly and bulky.

**There is clearly a need for improved vision systems for use in a number of applications.**

## THE TECHNOLOGY

Monash University researchers have developed an image sensor and system which is able to simultaneously capture 3D images comprising depth, intensity and motion. This imaging system utilises a single optical path which results in increased image quality at the same time as reduced size and cost.

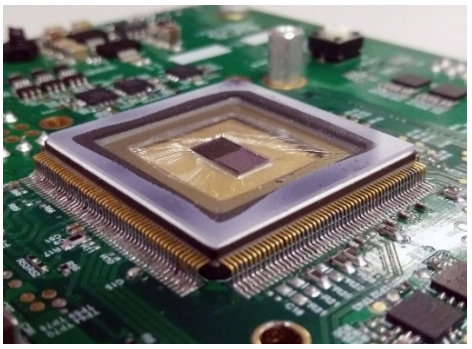
The sensor uses a spatio-temporal image capture mode to reduce the latency of the output of localised intensity changes to micro-seconds. This sparse event data output massively reduces the required image processing computation power.

As the sensor is able to count individual photons, it is capable of imaging over an extremely broad dynamic range.

The novel image sensor is ideal for use in applications where minimising total system size and mass is desirable.

The sensor design is amenable to implementation in standard commercial CMOS processes, which has the benefit of minimising manufacturing cost.

Monash has developed a prototype system which demonstrates the capabilities of the sensor.



## THE OPPORTUNITY

We seek a commercial partner for licensing and co-development of the technology. We envisage implementing these sensors into high technology imaging systems that are customised for end applications such as autonomous vehicles and environment mapping.

**Intellectual property:** Australian provisional patent filed (AU2017902066).


## KEY CONTACT

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