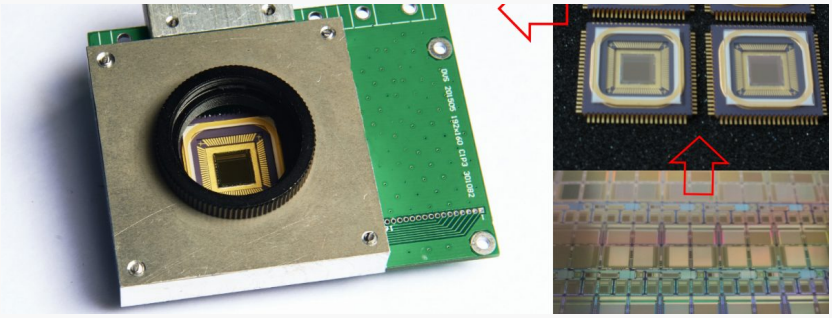
An eye on the future

Published by QS Asia at August 2016

Tags Categories



Close-up view of the high-speed image sensor IC, silicon wafer and the main board of the assembled camera

Singapore – Researchers at Nanyang Technological University's School of Electrical and Electronic Engineering (EEE) have developed a revolutionary camera system that can track high-speed objects with very little redundant data and at much lower cost compared to its commercial counterparts.

The system could help autonomous vehicles to become smarter and make split-second decisions about whether and how to avoid potential collisions. It can also be used in manufacturing, defence, surveillance and other fields.

Traditional motion detection systems work by continuously taking pictures. To capture fast-moving objects, the systems have to be set at very high frame rates of more than 500 images per second, which produces massive amounts of data.

The EEE system does not take pictures. Instead, it analyses every pixel in its view and records only those that show significant changes in light intensity. If the background does not change, the data is not captured. Moving objects, however, change pixels' light intensity, and the coordinates and time-stamps are logged.

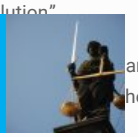
Users set the rate of change that triggers the data collection, so the system can reject not only static backgrounds but also slower-moving ones, for example when it is monitoring traffic from a moving car or unmanned aircraft.

The camera system can also differentiate between objects by looking at their light properties, and predict each object's movement and speed by analysing the motion of the brightness patterns as it collects data. Autonomous vehicles need such intelligence to recognise and avoid potential collisions.

Since the system's speed is not limited by traditional photography concepts, such as exposure time and frame rates, it can track the movement of high-speed objects down to the microsecond, or one-millionth of a second.

It can monitor scenes at the equivalent of more than 100,000 frames per second, and generate 1,000 times less data than its commercial competitors for the same work, which drastically reduces the signal processing cost and expands its applications.

Manufacturers now spend millions of dollars to monitor their automated work processes, especially in intricate electronic circuit production. Professor Chen Shoushun from EEE said: "Our invention can be a high-speed and low-cost alternative solution."

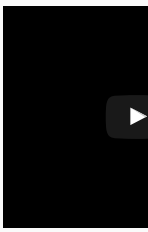


amera's ability to capture light changes in microseconds enables it to track gunfire and individual bullets' help in explosives analysis and identification.

Enter your search

QS WOWNEWS (Issue No 23)
(Download)

FIND US



CATEGORIES

- Discovery
- Excellence
- Global strategy
- Sustainability

Stories by

ASIA & OCEANIA
EUROPE & AMERICAS

In the longer-term, the EEE system could revolutionise ultra-mobile embedded computers by allowing them to interpret images and recognise objects. Its low and targeted data production sidesteps power and computing limits that now prevent the small and lightweight devices from performing either task.

The researchers are improving their technology to make it even faster and use less power. They welcome academics, firms and government agencies to partner them to find new applications for their work.

Related posts

Wearable device that warns of heart attack

Read more

MIDDLE EAST & AFRICA

Movers and Shakers

Check out the latest career moves in Asian and Middle Eastern higher education.

Movers and Shakers

QS Global Events

QS-APPLE
QS-MAPLE
QS World*Class*
QS *in conversation*
QS Subject Focus Summit
QS Summer School Summit
QS WORLDWIDE

QS Asia Privacy Policy