Researchers in Computer Science at The University of Auckland have developed a novel system for acquiring a complete (3D) model of a scene in real-time. The system depends on an efficient algorithm and parallel processing in a Field Programmable Gate Array (FPGA).

The technology

High resolution 3D ‘images’ can be obtained from images streamed from pairs of high resolution cameras. However processing this mass of data (pixels) in real time is difficult without multiple processors. This novel system offers a solution using modern FPGAs to derive depths from the stereo pair.

The hardware consists of two cameras connected directly to an FPGA. The FPGA uses a symmetric dynamic programming algorithm (‘symmetric’ means equal weight is given to left hand and right hand images). Since depths are calculated in the FPGA, all of a host processor’s power can be used to analyze the scene – to detect hazards, recognize targets, plan avoidance strategies etc.

Use of FPGAs also allows systems to be configured easily to meet an application’s requirements for field of view, depth resolution and matching accuracy.

Applications

Applications for an inexpensive but intelligent vision processor are vast:

- Collision avoidance for vehicles or robots
- Reducing damage to cars in car-washing machines
- Picking control on mixed conveyor lines
- Object tracking
- Marker-less motion capture of actors for film animation
- Availability of depth information in real time can enhance any rapid recognition system: the additional data (depth) ensures more accurate recognition in all situations.

IP position

UniServices has Intellectual Property protection pending.
The Faculty of Engineering and its associated research and business centres is by far the largest in New Zealand, with nearly 135 professional research staff and 2400 students in the Faculty of Engineering alone. The Faculty and Centres have state-of-the-art research and commercial equipment.

Engineering at The University of Auckland is outward-looking with world-class capabilities clustered around four global strengths:

**Energy & Environment**

Sustainable energy from hydro, geothermal, wind and biofuels are all areas of innovative research and commercial application.

Energy transfer and management forms the heart of Power Electronics – best known for leading technologies such as inductive power transfer and distributed power management systems.

**Materials**

New materials with new functionalities including nanostructures, thin films, composites and hybrids for the future.

**Information Processing & Electronics**

New technologies for information processing, computing and digital modelling.

Applications vary from human organ modelling for medical trials to optimisation of routing problems for aircraft staffing management.

**Infrastructure**

Civil, structural and utility technologies underpinning modern economies.

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**Auckland UniServices Ltd**

Auckland UniServices Limited is the largest research and development company in the Southern Hemisphere and a wholly owned company of The University of Auckland.

UniServices manages The University’s intellectual property and is responsible for all research-based consultancy partnerships and commercialisation.

By connecting its clients with The University’s brightest academic minds, UniServices provides commercial organisations the innovative technologies they seek, and governments the national programmes they need. The results can mean huge strides in a company’s international competitive edge, or in a country’s health, education and welfare capability.

UniServices open innovation and world-class thinking can change the world.

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Researchers in the Power Electronics Group at The University of Auckland have developed a novel process of transferring electrical power without physical contact. This method can be used to power electric motors and lights and charge batteries with high levels of safety and low maintenance.

The technology

Inductive Power Transfer (IPT) uses magnetic fields to transfer power from transmitter (track) to receiver (pickup) instead of cables or brushes. As a result there are no rubbing parts to wear out or connecting cables to break.

Both transmitter and receiver can be sealed from all external influences allowing the system to be partially buried or to operate under water.

An IPT system is inherently safer than a conventional wired system. The elimination of cable connections between track and pickup mean that broken exposed wires are a thing of the past. The high frequency used (10kHz to 40kHz) cannot cause electrocution in the unlikely event of contact with an exposed live wire or terminal.

Applications

There are a wide range of industrial applications that are already being met using our technology. These include motor drives for conveyer belt systems for use in clean rooms and automotive assembly plants, automated guided vehicles, battery charging systems for buses, and pedestrian and vehicle guidance lighting systems. Applications cover power ranges of a few watts to multiple kilowatts. Some examples are given overleaf.

IP position

The technology is protected world-wide by over 17 patent families.