The Human Interface Technology Laboratory (HIT Lab NZ) is a human-computer interface research centre at the University of Canterbury. The Lab is a partner of the world-leading HIT Lab US based at the University of Washington, and is a key research theme of UCi3, the $20 million ICT Innovation Institute based at UC.

HIT Lab NZ is revolutionising the way people interact with computers, by creating cutting-edge interfaces that bridge the real and virtual worlds and enhance face-to-face and remote collaboration. Leading-edge technologies developed in the Lab are used in areas such as education, medicine, scientific visualisation, telecommunications and entertainment.

Current Projects
The HIT Lab NZ's current industry-collaborative projects include:

**Mobile AR**
The Mobile AR project explores how Augmented Reality (AR) applications can be developed for mobile phones. This involves developing computer vision libraries and computer graphics code for mobile phones, and ways of interacting with graphics that are very intuitive on a mobile device. The HIT Lab NZ produced the first collaborative AR application for mobile phones and is currently working on mobile games and advertising applications.

**MagicBook**
The MagicBook explores seamless transition between reality and virtual reality. When users look at the pages of a real book through a hand held display they can see virtual content superimposed over the real pages. Users can fly into the scene and become immersed in a virtual reality environment. During the project researchers created a new type of digitally enhanced book which seamlessly merges different types of media. Research is being conducted on computer vision tracking, advanced GPU technology and spatial sound rendering. Tangible user interaction and the systems' collaboration capabilities also allow other users to be part of the story. This project has applications for enhancing education, entertainment and engineering.

**Multimodal AR Interfaces**
Augmented Reality (AR) allows users to interact with virtual and real objects at the same time since it seamlessly combines the real world with computer-generated content. A multimodal interface that combines speech and gesture input provides an intuitive way to interact within an AR environment because it uses common communication skills from human-to-human conversation. This project uses speech and 3D computer vision-based free hand gesture input to manipulate virtual graphics in an AR setting. This work will lead to new ways for people to collaborate remotely.

**CALMARS**
CALMARS is a project that explores how Augmented Reality (AR) technology can be used to engage with users in new media applications and with context-aware mobile interfaces. Basic research is conducted in three areas: AR authoring, multimodal input and natural feature tracking. These techniques will then be applied to two application domains, mobile AR and AR for art and entertainment. This is an international project that involves collaboration with three groups of partners in Korea, Japan and Europe. One outcome will be an authoring tool that allows non-programmers to easily develop AR applications.

**Next Generation Videoconferencing**
The Next Generation Videoconferencing project focuses on key video conferencing methods, collaboration and applications that are available now in New Zealand over high speed IP networks. It aims to enable people to collaborate remotely as easily as having a face to face conversation. With the launch of KAREN (Kiwi Advanced Research and Education Network) bringing Gigabit bandwidth speeds to universities and institutions in New Zealand, video collaboration can now be achieved at a higher quality and larger scale. This will develop intuitive ways for remote collaboration over high speed networks.

**VisionSpace**
VisionSpace is a three-screen immersive stereo projection system for virtual reality applications that allows people to view and intuitively interact with 3D virtual data. The VisionSpace system provides advanced visualisation capability which complements the Supercomputer efforts at UC and elsewhere. It supports research in bioengineering, geographic information systems, physics, chemistry, architecture and a range of other application areas. The VisionSpace facility is a resource for teaching and research, for academia, business and industry.

Study at the HIT Lab
The HIT Lab NZ currently hosts around 12 Master's and PhD students. Many of the students are from a computer science, engineering or arts background and are from a variety of countries around the world.

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