

Growing Stage

(Fiscal Year 2002-2004)

Tsukuba Science City Area

Development of Intelligent Information Technology to Support Urban Life

Tsukuba Center, Inc

2-1-6 Sengen, Tsukuba City, Ibaraki 305-0047 JAPAN
Tel: +81-29-858-6000

Core Research Organizations

University of Tsukuba,
National Institute of Advanced Industrial Science and Technology (AIST)

Major Participating Research Organizations

Industry... Niigata Seimitsu Co., Yamamoto System Design, Inc., Hitachi Engineering Co., Ltd. (current: Hitachi Information & Control Solutions, Ltd.) and others
Academia... University of Tsukuba, and Tsukuba College of Technology (current: Tsukuba University of Technology)
Government... National Institute of Advanced Industrial Science and Technology (AIST)

Typical result of City Area Program

1. Application of Fluency Information Theory to the next-generation multimedia products

The signal conversion technology based on Fluency Information Theory was developed and applied to manufacture advanced multimedia products including the high quality audio apparatus at an international standard level, the dialogic DTP system in high resolution and scalability, and the image processing LSI for high resolution TV. These achievements won many awards including the 4th Funai Information and Scientific Promotion Award, the 30th Inoue Harushige Award, the Nihon Printing Society paper award and the print Asahi association prize, giving the honorable opportunities to held independent sessions in the international academic societies like AUTM. Moreover, the technology based on Fluency Information Theory is highly evaluated as the international de facto standard technology for multimedia systems.

2. Development of ubiquitous stereovision device (USVD)

Development and patent application of USVD were achieved. The USVD enables an automatic and stable extraction of individual moving tracks from the real-time scene images taken by stereo-cameras and an automatic analysis of a large amount of time series image data. The aimed properties of the prototype USVD were confirmed by the feasibility studies in a practical manner at places such as a station platform, a railway crossing and a store. The USVD technology was transferred to the collaborated enterprises and contributed to foundation of a venture enterprise in December in 2004.

Fluency information theory (Funai Information and Scientific Promotion Award in 2004)

Description format with one-variable signal Description format with two-variable signal Description format with three-variable signal

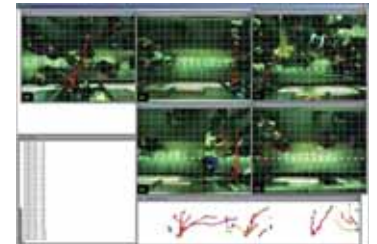
High definition and scalable integrated description format

(Sound revolution) (Printing revolution) (Image revolution)

(Received 35 awards in Japan and overseas) Paper award of Japanese Society of Printing Science and Technology, Paper award of Inoue Harushige Foundation (Adopted by Renesas Technology Corp.)

World standardization of multimedia signal conversion technology which matches human sensitivity

Multimedia revolution through fluency information theory



Experiment of trajectory acquisition on the edge of the platform in Tokyu Toyoko Line Yokohama Station

About the approach after the project

The above-described project has been succeeded to the new project promoted by the collaboration of Tsukuba University, National Institute of Advanced Industrial Science and Technology (AIST), and National Agriculture and Food Research Organization (NARO). The new research theme is "Development of Ubiquitous Visual Information Surveillance System for Safe and Secure City-Life" that aims the research and development of image IT for safety and security of city life.

1. Progress of Fluency information theory towards the de facto standard of multimedia systems

Towards the higher and wider application and the de facto standard of the signal conversion technology based on Fluency information theory, practical LSIs for processing the signal information on individual multimedia, i.e. audio, printing, video, TV, etc., are produced in cooperation of industry-academia-government organizations. In addition, establishment of a research-contract venture company based on this technology is planned.

2. Development of intelligent surveillance systems with the ubiquitous stereovision device (USVD) etc.

The feasibility experiments on USVD were performed during a half year in the Aichi Expo site. The effectiveness of USVD was confirmed. Cooperative researches with the several companies noticing the USVD technology on its application to the next-generation surveillance systems has started. In addition, it is promoted to develop the cubic higher-order auto-correlation (CHLAC) algorithm that enables the automatic detection of unusualness and its application to the intelligent surveillance systems.



Image enlargement process
Enabling high resolution enlargement of DTP image

Demonstration experiment

| | |
|------------------------------------|--|
| Date | Friday, March 25, 2005 - Thursday, September 22, 2005 (6 months) |
| Time | 9:30am - 9:00pm All hours from opening till closing |
| Floor surface illuminance | 3 - 30lux for the place in sunlight near the exit 100lux |
| Camera layout | 1 camera on each corner of 3-multiplex area to measure the number of people walking, total 4 cameras |
| Color image and display image | Data for 1 minute 30 seconds x 12 times per day x 6 months |
| Top of human heads tracking data | Total time excluding image recording around 370 million frames |
| Frame rate | Image recording around 15 frames/sec. Top of human heads recorded data around 12 frames/sec. |
| Color image | 192 x 136 pixel |
| Reconfiguration in three dimension | Calculation with resolution 320 x 240 |

Demonstration experiment at EXPO 2005 Aichi