Axis supports new developments in state-of-the-art image processing technology at University of Tokyo Graduate School.

Basic research is being performed on technology that features Open Angle View Image shown as a real-time image using a Multiple Camera System.

Real-time system for image-based rendering from a multi-view video, consisting of a total of 64 video cameras.

Organization:
Naemura Lab, Dept. of Information & Communication Engineering, University of Tokyo

Location:
Tokyo, Japan

Industry segment:
Education

Application:
Image composition

Mission

At the Research Department in the Department of Information & Communication Engineering at the University of Tokyo Graduate School, the Naemura Laboratory performs diversified research in the field of Human Communication Media consisting of media and content material. Particularly, the Research Department has seen outstanding results in the subject of Open View Image Technology. An example of this is Simultaneous Motion Image Technology, which involves the advanced-level recording of detected presence and a communication technology that enables the filming of an open area from different angles.

Since 1998, the laboratory has been developing a Multiple Camera System in which multiple cameras are lined up in an "alleyway" style. The first system developed was comprised of 16 surveillance cameras (4 cameras vertically x 4 cameras horizontally) that gathered analog video signals into one workstation. The video transmission zone of this system was limited and would not permit any further increase in the number of cameras used. Thus the important issue was faced of how to more efficiently build the part of the system that inputs data to the calculator unit in order to build a Multiple Camera System consisting of additional cameras.

Solution

The demand for a high-quality product in performing the research found an answer in Axis network cameras, which perform Simultaneous Motion Imaging shown as a real-time image.

The network camera connects to the IP network, and is able to directly compress and process the visual data of an image. Consequently, even in the case where the zone transmission is limited, it is possible to compress and efficiently transmit massive amounts of data. Furthermore, by sending a simple command from the calculator unit, in turn made possible by the HTTP server function, the positioning of the camera and the capture of an image are facilitated. The major reason for adopting Axis network cameras was because of their excellent features, as well as their cost-effectiveness.

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"Because 64 camera images will be processed as a real-time image, the system's loading equipment needs to accommodate more than one function. The network camera balances this need satisfactorily at a reasonable cost."

Associate Professor Takeshi Naemura, Specialist in Electronic Information and Communication, University of Tokyo Graduate School.

Result

The laboratory has recently used the AXIS 210 Network Camera in a configuration of 8 cameras high by 8 cameras wide, along with the Simultaneous Motion Image system. The system is being put to intensive use for research on Open Angle View Image technology. In adopting the Axis network cameras, the lab has been able to design the equipment body unit into a more compact form, thereby making the system mobile. As a result, the laboratory research team feels that the performance of the research has progressed rapidly.

The network camera also accelerates the rate at which the research is performed. Time and effort were needed for the building of the Multiple Camera System. However if too much time was spent in the building, the primary research that needed to be done would have been delayed. "Setting up the Axis network camera was simple, and using it was easy," said Assistant Professor Takahashi. "So, it didn't hinder the efficiency of research performance."

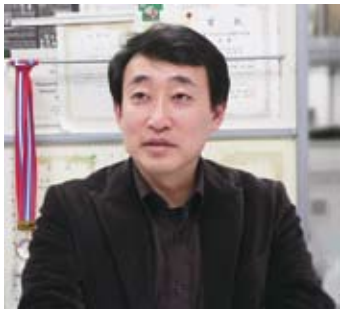
With the previous Multiple Camera System that comprised an array of four cameras in height by four cameras in width, the images obtained from each camera were transmitted through an analog video cable and special equipment in order to reach the workstation. With this method, the cable wiring was very complicated, and moving the system once it was set up was very tedious. Once the Axis network cameras were adopted, it became easier to move the system because the structure of the Multiple Camera Equipment was simple and because it was possible to connect it directly to the network. This greatly accelerated the speed of research.

"Visual information can now be collected via gigabit Ethernet cable, and it is possible to move the equipment easily by attaching a mobile carrier to the Multiple Camera System unit," said Assistant Professor Takahashi. "Accordingly, it is possible to experiment with outdoor photography, and this has greatly contributed to the research."

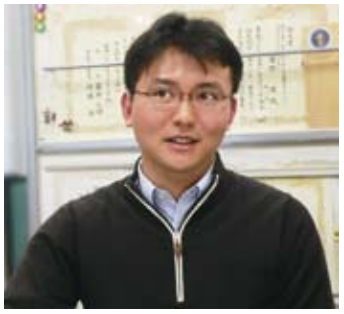
The network camera is very promising in the field of Jointly Shared Open Angle View Communication Research, particularly because it collects images from on-the-spot photography that have been synthesized as real-time images. When the recording of Open Angle View Image Research is completed, this will lead to new fields of research such as the application of a photographic method consisting of free-angle camera work content, and also of Jointly Shared Open Angle View Communication, which displays a real presence-like view of a jointly shared visual open area.

"Currently, the level of research has advanced to the point that it is possible to immediately produce an optional image that differs in appearance from an image taken on an actual camera," said Assistant Professor Takahashi. "Additionally, in the near future, for example in the television industry, where images are on a level surface which creates the impression that the speaker is talking to a wall--changes will take place so that the viewer can make visual point shifts from the speaker to the data. The viewer will also have the feeling of being in the same room as the speaker, who in reality is distant from the viewer. It is certain that this kind of communication quality will take place."

The research team also has a future vision of performing research that demonstrates the interactive communication of reproducing real presence-like images through the network. Axis presents dependable technological strength such as high-quality image technology and application functionalities, which are indispensable for state-of-the-art research.



Mr. Naemura, Associate Professor, Information & Communication Engineering, Interdisciplinary Information Studies, University of Tokyo.



Mr. Takahashi, Project Assistant Professor, Information & Communication Engineering, Interdisciplinary Information Studies, University of Tokyo.

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Interdisciplinary Information Studies
Harashima & Naemura Lab
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Harashima & Naemura Lab, a real-time video-based rendering system using a network camera array project
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