Smart Production

Advanced Program Production Technologies

In order to make the most of the massive amount of diverse information around us, we are working on technologies to automatically recognize objects and text in images and speech in programs as well as gathering technical information such as camera positions and lighting conditions. Analyzing such information can help identify social events and assist in program production.

Viewer-Friendly Broadcasting Services

We are working on various technologies to deliver information to every member of society. These include closed-captions and sign language for the hearing-impaired as well as audio guides and tactile devices for the visually impaired. We also offer news and information using simpler Japanese to accommodate foreigners and language learners.

Scene Text Detection

We are developing a system that automatically generates metadata for video materials by recognizing texts from sign boards and name plates that may be included in the footage by chance. Detailed metadata will help producers to later find the footage they need.

Recognizing text in the footage to automatically generate metadata

Speech Recognition for Real-Time Closed-Captioning

Our research in this area focuses on improving speech recognition systems to provide real-time closed-captioning for live programs. This will broaden the range of programming available to people with different needs, including the elderly and hearing-impaired.

Using speech recognition to produce real-time closed-captions for live programs

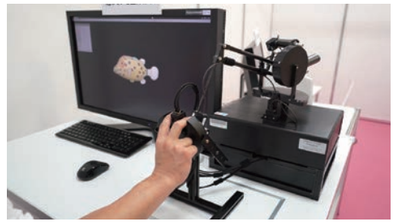
Automatic Sign-Language CG System

We are developing a system to automatically generate sign-language computer graphic (CG) animations. It allows us to broadcast emergency weather information using sign language even when interpreters are not available. The system currently has a dictionary database comprising 20,000 pairs of Japanese expressions and three-dimensional sign-language motion data. It uses our original TV programming language called TVML to incorporate sign-language animations into programs.

Computer-generated sign-language animation

Haptic Presentation Technology

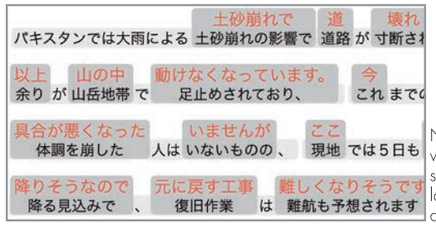
We have been exploring the use of haptic or tactile technologies to convey shapes and other hard-to-explain information to the visually impaired, including two-dimensional information such as maps and three-dimensional objects such as works of art.



Haptic presentation device to convey 3D information

Language Assistance

To help those learning Japanese to understand our news, we are developing a system that automatically converts our news texts into simpler Japanese or supplements it with vocabulary from selected languages.



News service with supplementary language assistance

3D Television

Looking beyond the upcoming 8K broadcasting, we are continuing our research on three-dimensional (3D) television without the need for special glasses. Our R&D includes improving 3D capturing and display technologies for an integral 3D system as well as developing new devices to enable 3D presentation using holographic images.

Integral 3D Television

We are developing an integral 3D system using microscopic lens arrays to display images from various viewpoints. It can capture images in real-time and display a more natural 3D presentation that viewers can see from any angle not only horizontally but also vertically without special glasses. Compared with two-dimensional television, an integral 3D system requires far more information in order to represent depth, and we are trying to increase the pixel count of the capturing and display devices.

Integral 3D image using 13.3-inch 8K OLED display

Electro-Holography

We are exploring the possibility of an electro-holographic display device as a candidate for the future 3D television. Displaying 3D images with a wider viewing zone requires submicron spatial light modulators (SLMs). Our current focus is to develop a spin transfer SLM with a pixel pitch of less than 1μm.

Holographic presentation using a spin transfer SLM

International Standardization

NHK STRL has been contributing to international standardization initiatives including the ITU (International Telecommunication Union), SMPTE (Society of Motion Picture & Television Engineers), and MPEG (Moving Picture Experts Group). The Japanese standard ISDB-T for digital terrestrial television broadcasting and HDTV program production standards have been approved as recommendations at the ITU Radiocommunication Sector (ITU-R). As of April 2016, Japan and 17 other countries have adopted ISDB-T .

We are also pushing for the standardization of 8K Super Hi-Vision. In 2004, the recommendation ITU-R entitled "Extremely high resolution imagery" was approved, followed by the "Parameter values for an expanded hierarchy of LSDI image formats for production and international programme exchange" in 2006. In 2012, a set of parameter values was approved as an international standard, covering various parameters including frame rates and color gamut. More recently, in 2016, the ITU-R approved the HLG (Hybrid Log-Gamma) system for HDR (high dynamic range) images, which was jointly developed by NHK and BBC. These are just a few examples of our achievements as we continue to work towards the rollout of 8K broadcasting and its international standardization.

Contributing to Society

Many of the achievements by NHK STRL are open to the public. We welcome anyone taking advantage of our patented technologies and other expertise. One example is a high-sensitivity HD HARP camera capable of shooting high-quality images in the dark. It has been used in production such as to cover breaking news at night and shooting in the lightless deep sea. It is also used in the field of medical imaging in situations where lighting is limited to minimize the effect on patients.

International Cooperation

International cooperation in the field of research has become ever more important. NHK STRL has introduced various studies and achievements at international conferences while promoting joint research by sending our staff to universities, research institutions, and corporate labs abroad. We have been actively engaging with the Future of Broadcast Television (FoBTV) initiative, which was launched in 2011 for international broadcasters, research institutions, and standardization bodies to get together to discuss next-generation terrestrial television broadcasting. We have also been helping to promote ISDB-T, the Japanese terrestrial television broadcasting standard, to the world. Furthermore, we play a major role in the ABU (Asia-Pacific Broadcasting Union), welcoming many researchers from fellow member broadcasters.