Multimedia content retrieval using automatic speech recognition

Sub-word based realization of speech search without any restriction of vocabulary, grammar, or language

We have developed a technology to retrieve multimedia content directly using speech from collections of speech and/or multimedia data.

In addition, we have released it to the public on an open website for a verifying experiment since last year (http://www.voiser.jp). This system searches for keywords in speech contained at such multimedia content at video sites and speech sites on the Internet, and is characterized by the ability to search without a dictionary and to use any word as keyword without restriction. The ability was realized by unique universal-code based recognition units that AIST has been developing for speech recognition. The system breaks down the speech into sub-phonetic segments (SPSs) for recognition, and applies search processing to the coded SPSs to achieve high search performance. The system makes it possible to search a large amount of multimedia content containing proper nouns and new words on the Internet in real time without any further maintenance. Practical application of this technology enables users to efficiently extract multimedia information and enormously expands the possibility of creating new values for a huge amount of unused multimedia content.

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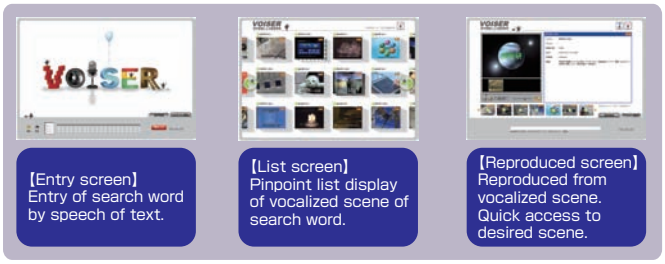

Demonstrative website which can do pinpoint search of video contents
(http://www.voiser.jp)

Imaging of single calcium atoms using electron energy-loss spectroscopy

Low voltage microscope enables structure analysis without destruction

We have developed a low-voltage electron microscope with a newly designed aberration correction system. The accelerating voltage of transmission electron microscope has been substantially reduced to 60 kV from 200-300 kV which used to be required to obtain the resolution of 0.1 nm. Here we demonstrate the first example of low-voltage microscopy imaging of individual molecular structure without massive destruction. Combined with electron energy-loss spectroscopy (EELS), the single atoms encaged inside carbon nanotubes have been successfully identified. Single calcium (Ca) atoms inside the nanotubes were unambiguously identified for the first time using EELS.

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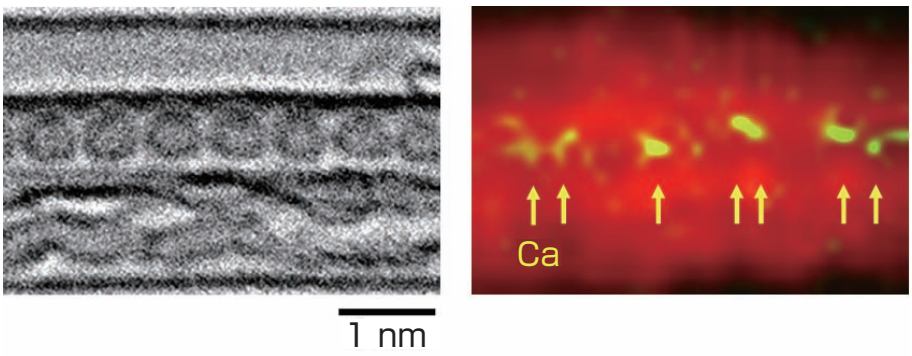

Scanning transmission electron microscope (STEM) image of Ca peapod (left) and its chemical map (right)
Ca map (yellow) and carbon map (red) are shown. Seven Ca atoms are indicated by arrows.