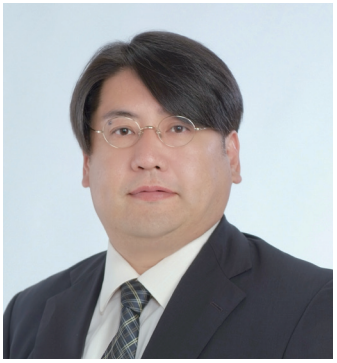
# NICT's Natural Language Processing Technology for COVID-19

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NICT is developing AI-based technologies capable of processing natural languages, such as Japanese and English. The use of these technologies—some of them have already been commercialized—is not limited to research purposes: their use may potentially have significant social impacts. In this article, I will describe the ways in which these technologies may be useful for helping people cope with COVID-19-related issues.


NICT has researched and developed speech translation technologies, implemented for example in the VoiceTra application, which is capable of translating speech inputs in one language (e.g., Japanese) into speech outputs in another language when installed on a smartphone or similar devices. NICT has also developed text translation technologies capable of translating patent and other types of documents. The ongoing COVID-19 pandemic has increased the importance for the global healthcare community to share information internationally and examine research papers published on COVID-19 written in various languages. The use of translation technologies may greatly facilitate these activities. For example, Japanese healthcare practitioners with inadequate English skills may wish to have meetings with English-speaking counterparts or peruse research papers written in English in search of more effective COVID-19 treatments and anti-COVID-19 measures. Translation technologies will help them achieve these objectives more efficiently.

Currently available speech translation technologies are incapable of initiating translation until users pause their speech. NICT is developing a revolutionary translation technology capable of translating users' speech as it continues without interruption—a potentially useful tool in cross-lingual communication situations such as international video conferences. We are aiming to put this technology into practice by 2025. NICT has also been engaged in a so-called "translation bank" project. Translation of research papers and simultaneous interpretation in professional meetings require proper translation of terms, phrases and wordings unique to specific fields of expertise. In this project, NICT is collecting past translation data used in various professional fields from private companies and other organizations and using this data to develop highly accurate machine translation systems specialized in specific fields of expertise. For example, data being collected from a number of pharmaceutical companies will be used to develop a simultaneous interpretation technology for healthcare practitioners. The use of these technologies is expected to facilitate international collaboration among healthcare practitioners around the world, allowing them to more effectively respond to pandemics.

A prolonged outbreak of an infectious disease makes it even more difficult for the public to cope with potential natural disasters. Evacuees are likely to have higher risks of being exposed to the three C conditions (i.e., Closed spaces, Crowds and Close contact with others) in evacuation facilities. NICT and its collaborators are developing SOCDA, a smartphone chatbot application designed to facilitate disaster relief organizations' efforts to efficiently collect information from people affected by natural disasters. The use of SOCDA will allow these organizations to comprehend the health of individual victims and the current capacity of evacuation facilities, enabling them to help victims avoid contracting infectious diseases by making appropriate recommendations. For example, they may be able to guide evacuees to facilities more resistant to the three C conditions. The usability of SOCDA in this pandemic context is scheduled to be tested during FY2020.

COVID-19 infection has been shown to be often life-threatening to senior citizens and a number of COVID-19 clusters have been detected in nursing facilities. NICT and collaborating companies are developing MICSUS, a spoken dialogue system capable of verbally interacting with the elderly (Figure). We have carried out several tests to verify the usability of MICSUS for elderly people. MICSUS is designed to accomplish two tasks. First, it automatically and thoroughly assesses the health of senior citizens and sends high-quality data to caretakers, thereby reducing their workloads. Second, it can engage in casual conversation with senior citizens living alone using information collected from the Web and other sources to free them from feeling socially isolated. In addition, the use of this dialogue system is expected to reduce the need of care managers to meet care receivers in person, thereby lowering the risk of spreading contagious diseases. This risk can also be minimized by presetting MICSUS to ask elderly users if they have noted any signs of infection. MICSUS is also able to detect health concerns from elderly people by recording video of them, possibly including infrared cinematography, and collecting other information with various types of sensors. This function can detect possible symptoms of infectious diseases (e.g., fever) from them even before they complain of ill health and transmit the information to healthcare providers.

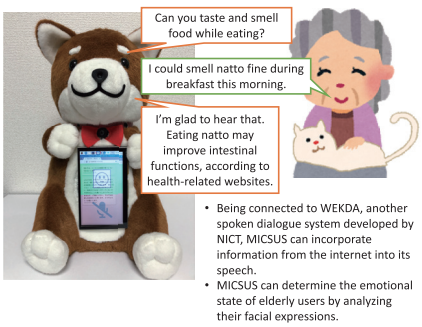


Figure MICSUS: a multimodal interactive system for the elderly