



# The Shinano Mainichi Shimbun Inc.

## Using Artificial Intelligence to automatically summarize articles

### Creating efficiency with cutting-edge technology

The newspaper company The Shinano Mainichi Shimbun Inc. summarizes its news articles in order to offer them to external media outlets. However, the company found it difficult to attract enough people with the expertise required to perform this task, which put pressure on their existing front-line staff. So the company turned its attention to Artificial Intelligence (AI). By using automatic article summarization technology developed by Fujitsu and Fujitsu Laboratories, Shinano Mainichi succeeded in automatically generating summaries that were as good as manually created ones, and in a fraction of the time. This automatic summarization system is being used since April 2018.

“Thanks to our Artificial Intelligence-based automatic article summarization system, we can now generate articles containing limited numbers of characters for external media without the need for editorial staff input. We plan to use this system for various external media in the future.”

Shunichi Furuta  
Chief, Technology Development Center  
Production Bureau  
The Shinano Mainichi Shimbun Inc.

### Providing summarized newspaper articles to external media

#### Difficult to attract people who could write good summaries

Newspaper articles based on serious interviews and in-depth investigations are often summarized for distribution to radio, TV, electronic bulletin boards, and the like. Recently, the value of summarized articles has grown as they are increasingly distributed to web portals, social media sites, and other internet-based media. The newspaper company Shinano Mainichi Shimbun has been distributing articles to external media for some time. According to Shunichi Furuta, Chief, Technology Development Center, Production

Bureau, The Shinano Mainichi Shimbun Inc., “As a newspaper publisher, our main role will continue to center on paper-based newspapers, but we need to respond decisively to changes in our business environment. Providing summarized articles to external media is one of the new challenges that we have embraced.” At present, several full-time personnel with experience as reporters create and distribute summarized versions of the company’s articles for distribution to cable television, electronic bulletin boards, digital signage, and other external media outlets. Whereas regular newspaper articles contain a large or small Japanese characters, articles for other media need to be shortened to, for example, 150 characters in the case of cable television and 80 for electronic bulletin boards. It is not easy to summarize an article in an easy-to-read format without losing important information. This prompted Shinano Mainichi to look at AI. The idea was that perhaps the latest machine learning technologies could be applied to summarize newspaper articles into smaller versions with a specified number of characters.

### Deploying Fujitsu Laboratories’ automatic article summarization technology to create a model for learning summarization methods

Shinano Mainichi has been using Fujitsu’s electronic typesetting

system to produce its paper-based newspapers for many years. In 2015, the 2 companies had been conducting workshops to jointly consider issues related to information systems, and listed various items for review. One such item was automatic summarization of newspaper articles using AI-based machine learning. Hiroshi Misawa, Managing Director, The Shinano Mainichi Shimbun Inc., says “We discussed a lot with editorial staff whether we could use AI as a new system or not. Fujitsu then explained about summarization technology. It was still undisclosed technology in Fujitsu Laboratories, but I could see a huge potential of this AI technology for not only article summarization but also writing electrical scoreboard news and headings.” Based on summarized editorial data from Shinano Mainichi, Fujitsu demonstrated how to learn summarization methods and thereby create a machine learning model that could be used to summarize general articles. Although the results differed somewhat from human-generated summaries, Shinano Mainichi concluded that the summarized articles could be used with a few adjustments.

The 2 companies then started field tests in 2017. Shinano Mainichi provided thousands of summarized articles distributed to cable television outlets in the past, as well as the original articles upon which they were based. Fujitsu used those two sets of data as training data to create a key sentence extraction model and a sentence abbreviation model.

At first, the field tests involved analysis of the training data itself. It was found that, although the introduction portion of the article is the main target for summarization, some other parts, including event dates and contact addresses, can be extracted irrespective of where they appear in the article.

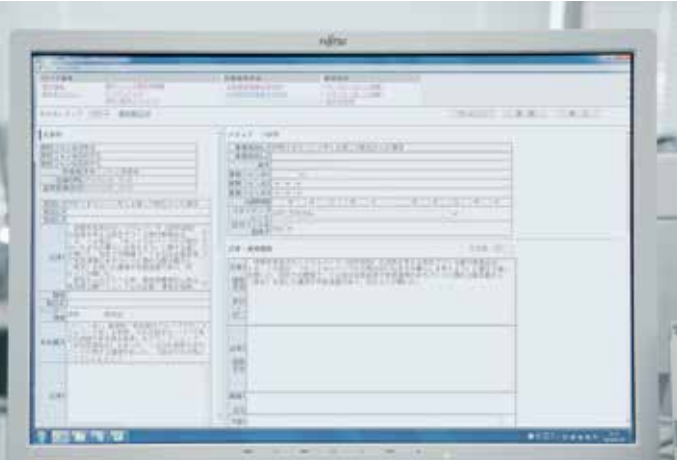
The next stage focused on reinforced learning. This involved increasing the volume of training data to create a key sentence extraction model for distribution to cable television outlets. The model was used to summarize regular articles from Shinano Mainichi and confirmed whether or not the quality was suitable for commercial use.

Shunichi Furuta, Chief, Technology Development Center, Technology Bureau says, “The LEAD method commonly used for computer-based summarization only picks up information from the beginning of the article. By contrast, the automatic article summarization technology of Fujitsu Laboratories enabled us to include in the summarized versions important information found at the end of articles, such as key dates and contact numbers. I was surprised.” When the model was applied to articles from “News Packs” from Kyodo News, it was possible to produce summarized articles of a similar standard despite the difference in training data.

### Automatic article summarization for cable television outlets

#### Work completed instantly that normally takes a person up to 5 minutes

Having confirmed the effectiveness of automatic article summarization based on machine learning, Shinano Mainichi decided at the end of 2017 to add the process to its editing system



for cable television outlets. To minimize changes to its existing workflow, Shinano Mainichi accesses the system via a web-based API.

Shunichi Furuta summarizes the testing, evaluation and decision-making processes. “Our Media Editing Department participated in the verification process and discussed how the technology’s implementation might impact our current workflow. After the proof of concept for 3 months, we confirmed that the summarized articles made sense and would stand up to scrutiny in a production environment.”

The Automatic Article Summarization System went into operation in April 2018. An average of 60 summarized Shinano Mainichi articles are now distributed to cable television outlets every day. Whereas it normally takes a person 3 to 5 minutes to summarize an article, the process is done instantly using AI. And the total time to summarize headlines and articles, which normally takes 10 minutes, has been halved – leading to major improvements in work efficiency and productivity. Shunichi Furuta adds, “There was practically no modification to our existing editorial system, and no need to alter the operations of our article summarization team.” He predicts that from now on it will be possible to automatically summarize articles for major metropolitan electronic bulletin boards and other external media outlets, in addition to cable television.

Fujitsu plans to provide similar article summarization technology as a component in its AI-based FUJITSU Cloud Service K5 Zinrai service. The service will be compatible with electronic bulletin boards, social media, and other media formats that have character-count restrictions.

Customer Profile

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