

Toward the Co-creation of New AI Services



General Manager of Service Innovation
Department

Masayuki Tsuda, Ph.D.

Artificial intelligence (AI) is booming again, and hardly a day goes by without some mention of AI in newspapers and on news sites. As in previous AI booms, there are some overexpectations and misunderstandings about AI. However, emerging AI services using image recognition, voice recognition, and other technologies are raising expectations that AI will actually be more practical this time.

Shortly before the previous AI boom (which was from the second half of the 1980s to the first half of the 1990s) came to an end, the neural network^{*1} attracted much attention as a promising learning approach. At that time, I was a student doing research on controlling a robot using a neural network with a back-propagation^{*2} algorithm. In my experiments, a mainframe computer spent the night processing the data collected by sensors and learning motions from the data. The results of learning were downloaded to a notebook computer and used to control the robot. At that time, many people including me greatly expected neural networks to provide the breakthrough needed to make a computer intelligent enough to enable innovative services such as autonomous driving. However, the then neural networks didn't have such capabilities, so the expectations and boom withered away before we knew it. Well, about 25 years have passed since then, and a new AI boom has been sparked by deep learning using multi-level neural networks. Technology development seems to run in cycles in much the same way as business.

What are the differences between the current AI boom and the previous ones? One difference is that the learning algorithms have improved; the recurrent neural networks in use today can more easily learn from time-series data, and convolutional neural networks can more easily learn from spatial data and have found a wide range of application. This is the result of steady and patient efforts by AI researchers over the years. The other differences relate to the spread of the Internet and major changes in the computing environment that have contributed to the resurgence of AI. The new learning algorithms can now be released as open source software over the Internet

and updated as needed. Cloud computing, meanwhile, has made it possible to process large volumes of diverse data (big data) in realistic periods of time. As a result, even software developers without any specialized skills in AI can now develop in a relatively short time AI services utilizing terabyte-class big data and cutting-edge deep-learning programs released over the Internet.

Hurdles to development of AI-based services have therefore been lowered drastically in comparison with the past, and we can expect competition in the development of such services to accelerate. In such an environment, how can one AI-based service differentiate itself from others? My answer is "big data." With deep learning, for example, one approach is to increase the types of data for smooth convergence of learning errors and to use a huge amount of data for improved learning accuracy. Consequently, to achieve even faster development of more valuable services, how to acquire big data suitable for a service is a key issue.

A useful approach to resolving this issue is "co-creation (+d^{*3})" promoted by NTT DOCOMO. One example of this approach is the "AI Taxi" service, which predicts customer demand for taxis. This novel service was developed through co-creation with a taxi company. AI taxi consists of two parts. One part creates a prediction model using deep learning and a combination of big data possessed by NTT DOCOMO and big data possessed by its partner taxi company. The other part processes real-time information using that model and predicts the areas in which customers will be looking for a taxi 30 minutes later. The prediction is done every 10 minutes. Experiments have shown that the service can increase the income of drivers, so the taxi company has decided to use the service in its business. Needless to say, AI Taxi could not have been developed with only one or the other type of big data. It came about, rather, through co-creation activities that combined the big data contributed by each company. The co-creation of a new service or new business by combining big data in this way can also be accomplished between NTT DOCOMO and other partners. A new service born in this way could be used for the business of a party other than NTT DOCOMO or its partner. From the viewpoint of utilizing big data and AI, co-creation will become more important in the near future.

Going forward, through co-creation activities, my department and I commit ourselves to developing new services and new businesses such as AI Taxi by combining our own big data with our partner's big data and by applying the power of AI.

^{*1} Neural network: An information processing system that simulates the brain's nerve cells (neurons) and their interconnections. Learning is achieved by changing the strengths of those connections.

^{*2} Backpropagation: A learning algorithm used by neural networks for changing the strengths of inter-neuron connections by propagating neuron output errors backwards to the neurons to minimize error.

^{*3} +d: Brand name of NTT DOCOMO initiative for creating new value together with partner companies.