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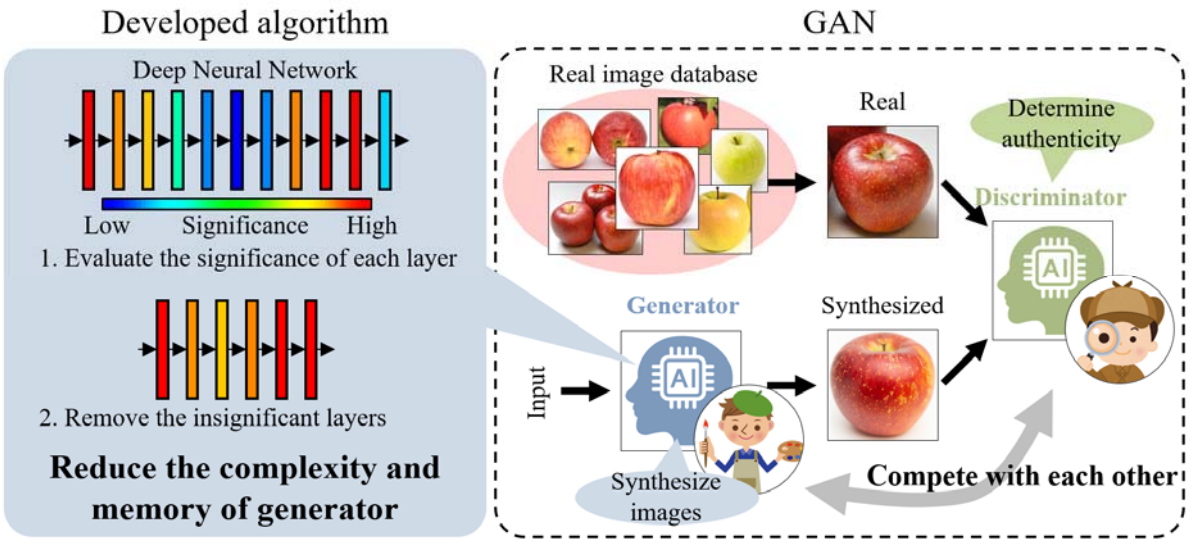
Mitsubishi Electric Develops Compact GAN

Offers rapid image synthesis with low computational complexity and reduced memory footprint

TOKYO, January 31, 2019 – Mitsubishi Electric Corporation (TOKYO: 6503) announced today that it has developed a compact GAN (Generative Adversarial Network) based on Mitsubishi Electric's proprietary Maisart®* artificial intelligence (AI) technology. GANs derive from a new machine learning technology that synthesizes photo-realistic images by making two AIs—a generator and a discriminator—compete with each other. The computational complexity and memory footprint of the compact GAN is about one-tenth that of a conventional GAN,** a property which enables effective synthesis of the enormous number of images used for the training of other AIs.

* Mitsubishi Electric's AI creates the State-of-the-ART in technology Maisart

** Based on an in-house comparison with our own implementation of a conventional GAN



Overview of GAN and the developed algorithm

Key Features

1) ***Reduces the computational complexity and memory footprint of the generator by 90 percent***

With a GAN, the AI that synthesizes images is called a generator, and is often realized using a deep neural network requiring significant computational resources and memory. Mitsubishi Electric has developed a novel algorithm that evaluates the significance of each layer in deep neural networks. By removing layers evaluated to be insignificant, the computational cost and memory footprint of the generator can be reduced to about one-tenth of their conventional size[**] without sacrificing the quality of the synthesized images.

2) ***Reduces cost of preparing training images for AIs***

Training AI to recognize images requires access to millions or tens of millions of images with diverse variations – one of the biggest challenges of current AI applications, since such data preparation is hugely costly in terms of the time and human resources required. The new compact GAN can synthesize images automatically and rapidly using low-cost devices such as laptops, potentially leading to a significant reduction in the cost of preparing training images for AIs.

About Maisart

Maisart encompasses Mitsubishi Electric's proprietary artificial intelligence (AI) technology, including its compact AI, automated design deep-learning algorithm and extra-efficient smart-learning AI. Maisart is an abbreviation for "Mitsubishi Electric's AI creates the State-of-the-ART in technology." Under the corporate axiom "Original AI technology makes everything smart," the company is leveraging original AI technology and edge computing to make devices smarter and life more secure, intuitive and convenient.

Patents

Pending patents for the technology announced in this news release number one in Japan and one outside of Japan.

R&D Facilities Involved

Information Technology R&D Center, Mitsubishi Electric Corporation

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About Mitsubishi Electric Corporation

With nearly 100 years of experience in providing reliable, high-quality products, Mitsubishi Electric Corporation (TOKYO: 6503) is a recognized world leader in the manufacture, marketing and sales of electrical and electronic equipment used in information processing and communications, space development and satellite communications, consumer electronics, industrial technology, energy, transportation and building equipment. Embracing the spirit of its corporate statement, Changes for the Better, and its environmental statement, Eco Changes, Mitsubishi Electric endeavors to be a global, leading green company, enriching society with technology. The company recorded consolidated group sales of 4,444.4 billion yen (in accordance with IFRS; US$ 41.9 billion*) in the fiscal year ended March 31, 2018. For more information visit:
www.MitsubishiElectric.com

*At an exchange rate of 106 yen to the US dollar, the rate given by the Tokyo Foreign Exchange Market on March 31, 2018