Executive Summary

On November 30, 2022, OpenAI unveiled ChatGPT, and its capabilities sent shockwaves around the world. Various functionality has since been added to ChatGPT, and with other companies also announcing their own generative AI offerings, we're in the midst of a global boom in generative AI. The uptake of generative AI continues to advance, with many organizations using it to enhance value-added and improve efficiency.

On May 13, 2024, some 18 months after ChatGPT, OpenAI released its latest model, GPT-4o. If you've already used it, you no doubt have a feel for how it has evolved, but the many articles and videos out there introducing and reviewing GPT-4o also offer a glimpse of just how much it has changed. The speed with which generative AI technology is developing is truly astonishing.

Yet many negative aspects of AI are also being called out. In Japan this year, we have started to see an increasing number of news stories about AI being used to facilitate fraud. The incidence of deep fake images and audio of celebrities being used is also on the rise. And the potential for AI to be used in elections and propaganda has long been a concern. With important elections on the slate around the world this year, heightened vigilance will be crucial.

Against this backdrop, the European Union (EU) approved a law for regulating AI on May 21. The law will become fully applicable in 2026, and will impose four levels of restrictions on AI systems commensurate with the magnitude of the risk. High fines are to be imposed for high-risk violations. The strictest prohibitions apply to applications of AI such as social scoring and predictive policing, which can disadvantage specific individuals and groups. The next level is high-risk AI systems, which include those used in educational admissions, employment and hiring, biometric authentication, and infrastructure operations, with these systems being subject to strict conditions and obligations. Images and audio created by generative AI must also be clearly labeled as artificially generated.

The EU's AI regulation law could become the global standard for AI regulation. Understanding and complying with legal regulations is a given when using AI in business, and it is crucial that companies hold themselves to high ethical standards. As AI spreads to every corner of society, it will become increasingly important for individuals to acquire AI literacy.

The IIR introduces the wide range of technology that IIJ researches and develops, comprising periodic observation reports that provide an outline of various data IIJ obtains through the daily operation of services, as well as focused research examining specific areas of technology.

Our periodic observation report in Chapter 1 discusses messaging. Email is an important application that has been in use since the advent of the Internet. The history of email, which made it easy to send messages to a large number of recipients, is also a history of mail system administrators combating abuse. The article discusses the abuse landscape of recent years and new efforts by IIJ in this area. It also discusses developments and challenges over the past year, which has seen a major shift in the area of sender authentication.

The focused research report in Chapter 2 looks at RDF Dataset Canonicalization. RDF (Resource Description Framework) is a framework for representing information on the web and is standardized by the W3C. The article's author is involved in the standardization of RDF Dataset Canonicalization (a mechanism for canonicalizing data represented using RDF) at the W3C. The article starts by giving an overview of RDF, and then discusses the standardization effort, looking at why canonicalization is necessary, the procedures involved, and challenges faced.

The focused research report in Chapter 3 covers DRM (digital rights management) in the area of video delivery. Technologies that protect content rights are essential when distributing digital content that is easily copied. The article focused on video DRM, and it is fair to say that DRM has been a major contributor to the great popularity of today's Internet-based video delivery services. I hope this gives you some idea of what sort of processing is being performed behind the scenes when end users enjoy video content.

Through activities such as these, IIJ strives to improve and develop its services on a daily basis while maintaining the stability of the Internet. We will continue to provide a variety of services and solutions that our customers can take full advantage of as infrastructure for their corporate activities.

Junichi Shimagami

Mr. Shimagami is a Senior Executive Officer and the CTO of IIJ. His interest in the Internet led to him joining IIJ in September 1996. After engaging in the design and construction of the A-Bone Asia region network spearheaded by IIJ, as well as IIJ's backbone network, he was put in charge of IIJ network services. Since 2015, he has been responsible for network, cloud, and security technology across the board as CTO. In April 2017, he became chairman of the Telecom Services Association of Japan's MVNO Council, stepping down from that post in May 2023. In June 2021, he also became a vice-chairman of the association.