Innovation Management

NEC believes that innovation is the key to continually adding value to society, and continuously invests 4-5% of its revenue in R&D. NEC proactively embraces open innovation in addition to intensively investing in its technological strengths.
In fiscal 2017, NEC launched a new AI technology brand, NEC the WISE, and initiated four major research collaborations with universities and public research institutions as part of its intensive investment program.

Executive Vice President, CTO (Chief Technology Officer) and Member of the Board Katsumi Emura

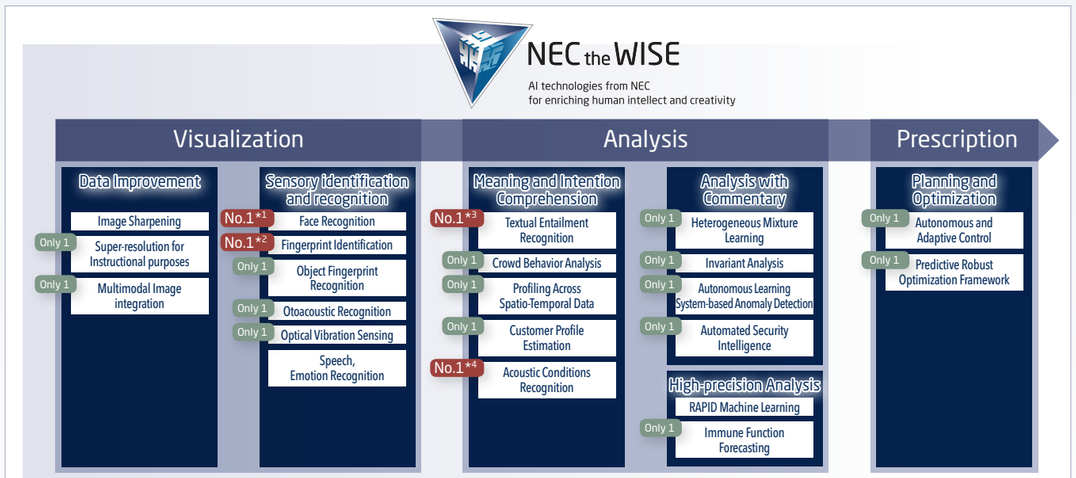
Intensive Investment in Technological Strengths and Proactive Open Innovation

To gain competitive advantage, NEC invests intensively in its distinctive technological strengths, most notably data-analysis and real-world visualization technologies.

NEC has long been developing advanced AI technologies. In July 2016, NEC aggregated its AI technology portfolio under the NEC the WISE brand name to better solve customers' issues by optimally combining technologies.

Additionally, NEC is enhancing its design capabilities with respect to ICT platforms that capitalize on its strengths in both computing and communication technologies to solve real-world issues subject to power supply and/or communication bandwidth constraints.

With in-licensing of external technologies essential to expansion of added value, NEC is an active practitioner of open innovation. NEC embraces open innovation in pursuit of diverse collaborations that extend beyond technology alone. One such example is the NEC/University of Tokyo Strategic Partnership Agreement for Future AI Research and Education. NEC is forging ahead with comprehensive co-creation that runs the gamut from basic research to sharing of visions or themes regarding how research results can be applied within society, to social receptivity testing and human resource development.



*1 Ranked 1st four consecutive times in task assessment sponsored by the U.S. National Institute of Standards and Technology (NIST).
*2 Ranked 1st five times in task assessment sponsored by the U.S. National Institute of Standards and Technology (NIST).
*3 Ranked 1st in task assessment sponsored by the U.S. National Institute of Standards and Technology (NIST)(2012).
*4 Ranked 1st at international acoustic detection contest DCASE2016 (2016)

Intellectual Property Strategy

NEC treats its intellectual property (IP) as an important management resource that contributes to its Group's competitiveness and operational stability. NEC strengthens and protects not only its patents and know-how but also the trademarks and designs that underpin its global brands.

In the core Solutions for Society businesses, building an all-encompassing IP portfolio inclusive of customers and partners' businesses is an important priority. NEC is accordingly creating, building and utilizing an IP portfolio to not only erect IP-based barriers to entry and secure competitive advantage but also strengthen and protect collaborations with customers and partners.

NEC owns some 53,000 patents (including approximately 23,000 Japanese patents) as of March 2017.

Major Business Achievements

Business track record	No.1/Only 1 technology
Marketed "Landslide Prediction System"	Technology to estimate the landslide risks
Marketed AI software that analyzes a video image from a surveillance camera and searches for a particular person quickly and with high-precision	High-speed Profiling Across Spatio-Temporal Data
Provided the Australian government with a biometric system Delivered a face recognition system for immigration checks at a major airport in the US	No.1*1 Face Recognition
Delivered an automatic determination system for babies and real faces	Liveness Authentication
Started jointly an operation support service for thermal electric power generation	Only 1 Invariant Analysis
Started laying a Trans-South Atlantic undersea optical cable	World first 100-GB Optical Transmission
Collaborated with the security company to provide a new security system Provided a cloud-type security camera service for the distribution company	No.1*1 Face Recognition Light Encryption
Renewed the contact center operations marketed "Auto Response Solution"	No.1*3 Textual Entailment Recognition
More than 1 billion people registered with the Unique ID System in India	No.1*1,2 Fingerprint, Face Recognition

R&D Strategy

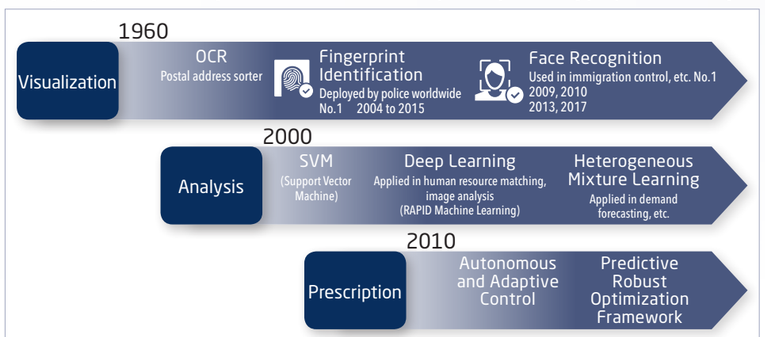
R&D drives technological development. Through R&D, NEC identifies solutions best-suited to resolve social issues and refines its "No. 1/Only 1" core technologies required to realize those solutions in light of technological trends. By so doing, NEC aims to provide value in the form of Safety, Security, Efficiency and Equality. NEC is proactively utilizing global open innovation throughout its R&D operations with the aim of timely commercialization of technologies under development.

Motoo Nishihara
Senior Vice President, in charge of the Central Research Laboratories

NEC has been expanding its NEC the WISE face recognition, heterogeneous mixture learning and predictive robust optimization technologies' scope of application by amassing technologies and building a track record of performance over decades.

For example, face recognition has its roots in image analysis technologies. In the early 1960s, the only available image analysis technology was optical character recognition (OCR) capable of recognizing standardized characters only. Subsequent refinements enabled recognition and comparison of large volumes of non-standardized still images, as exemplified by fingerprint recognition. Today's technologies are capable of recognizing and comparing moving images. This technological advancement was driven by not only increasingly sophisticated recognition algorithms but also major improvements in information processing power and communication throughput engineered by NEC.

To continue improving "No. 1/Only 1" core technologies into the future, NEC is hiring and training diverse personnel. While aggressively hiring top-caliber talent at its overseas research facilities in five locations around the world, NEC is also stepping up recruitment of doctorate-degree holders and graduates of globally top-ranked universities in Japan.



History of NEC's Initiatives in AI