About NEC

Company Name：NEC Corporation
Head Office：7-1, Shiba 5-chome Minato-ku, Tokyo 108-8001 Japan
Phone: +81-3-3454-1111
Established：July 17, 1899
Representative Directors:
Chairman of the Board：Nobuhiro Endo
President and CEO：Takashi Niino

Capital：¥397.2 billion (As of Mar. 31, 2017)
Consolidated Net Sales：
¥2,665 billion (Fiscal year ended Mar. 31 2017)
Employees：
NEC Corporation 21,444 (As of Mar. 31, 2017)
Consolidated Subsidiaries：
238 (As of Mar. 31, 2017)

NEC is focusing on developing Solutions for Society that will help resolve many of the issues the world is facing and lead to the creation of a brighter and more prosperous society. Through co-creation initiatives with many different stakeholders, including customers and business partners, citizens and government agencies, and international institutions, we are actively devising new business models to create social value by harnessing our extensive ICT assets.

Highlights for social value creation

Safety
Providing safey and secury for daily life and society in both the physical world and the cyber world

Manufacturing /Logistics/Retail/Servives
Lnking MAKE, CARRY, and SELL to offer new values across the entire value chain

Traffic and Urban Infrastructure
Harnessing ICT to help solve infrastructure challenges in countries and regions all over the globe

Telecommunications
Supporting diverse communication services with advanced SDN/NFV solutions

AI/Big Data
Creating new value through advanced analytics services in the era of skyrocketing Big Data utilization driven by AI

Internet of Things
Bringing business innovation of new era with Internet of Things (IoT) technologies

Cloud
Creating new values by linking SoR and SoE in hybrid clouds

SDN
Leveraging our extensive track record and partnerships to take the lead In SDN-based network operations

Overseas Laboratries

NEC Laboratories America

NEC Laboratories America, is located in Princeton, New Jersey and Cupertino, California. With the mission to create technology innovations that contribute to society, NECLA partners with NEC business units to bring its innovations to the market.

- Complex system analysis and security technology
- Advanced network and sensing technology
- System solution technology for surveillance
- Media analytics and machine learning

NEC Laboratories Europe

Conducting advanced research addressing technology and business trends on ICT platforms and social solutions in Europe & world-wide.
Located at the heart of Heidelberg, we collaborate closely with academic and industrial research groups in Europe, including universities, public research institutes, as well as industries such as network operators, ICT vendors, automotive and utilities, etc.

- AI-based data analytics for public infrastructure and enterprise solutions
- Blockchain and IoT security
- 5G virtualization and software networking
- IoT and AI platform for smart cities and industries

NEC Laboratories China

NEC Laboratories China (NLC) aims to create innovative technologies in AI and 5G to support the creation of valuable social solutions. Located at Beijing, the most innovative city of China, NLC closely collaborate with leading universities, standardization organization as well as industrial partners in marketing research, transportation and retail, etc.

- Machine learning-based data analytics and system optimization
- 5G wireless communication technologies and standardization

NEC Laboratories Singapore

NEC Laboratories Singapore (NLS) aims to accelerate time-to-market of NEC's social solutions towards safer and smarter cities. NLS Researchers and Experts are housed at the Advanced Centre for Experimentation (ACE), located at Biopolis, Singapore. ACE allows NLS to co-create social solutions jointly with government, enterprises and partners. ACE is also a place where any of the NEC Laboratories and NEC Business Entities can transfer their technologies to NLS, for NLS to perform Solution Experimentation with customers in:

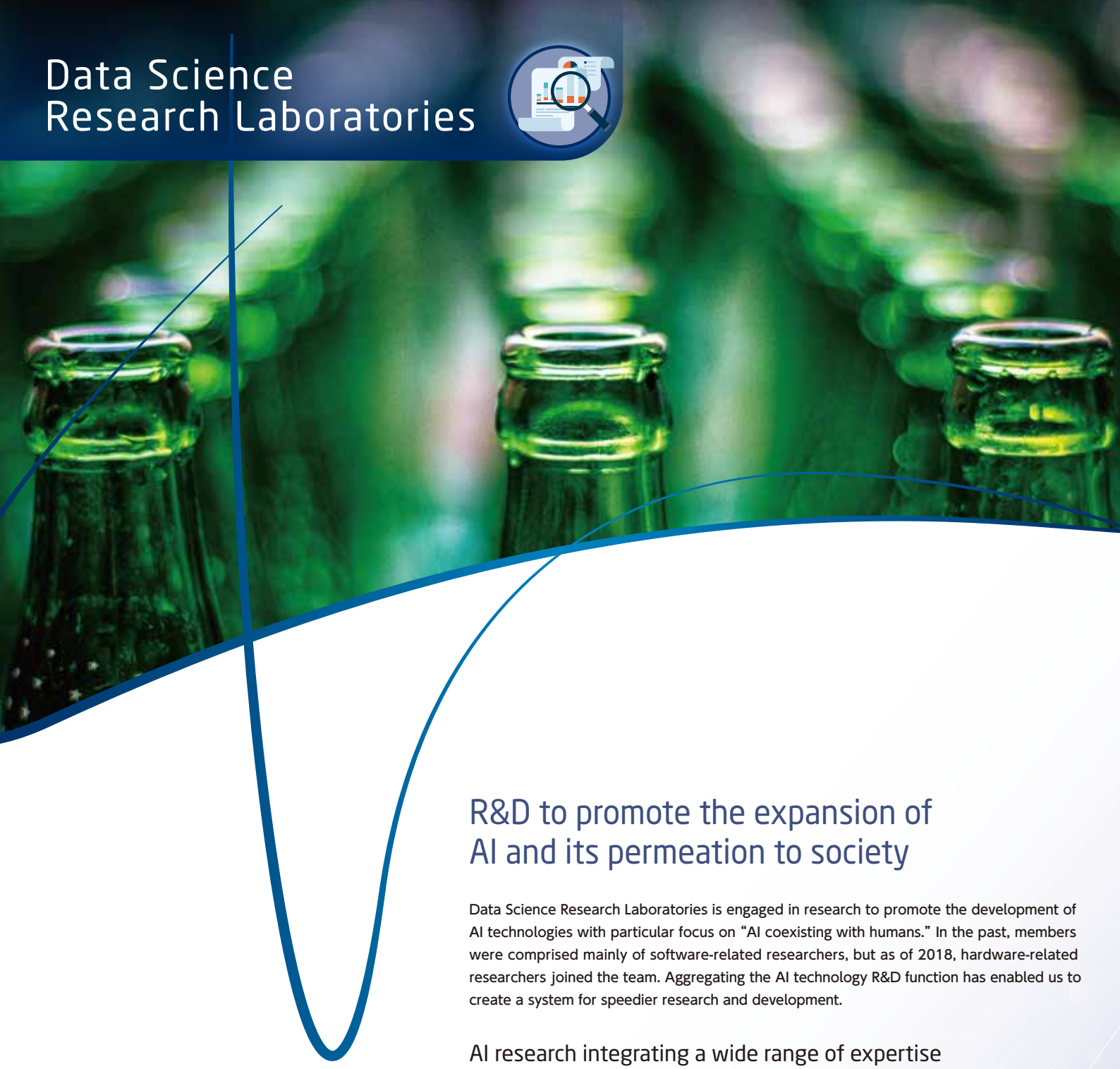
- Public Safety and Security
- City Mobility
- Healthcare

NEC Laboratories India

NEC Laboratories India (NLI) aims to create time-to-market social solutions and technologies for solving challenges of developing countries including India. With the members of NEC Technologies India's Center of Excellence teams, NLI Researchers and Experts work together to co-create leading social solutions and related technologies jointly with government, enterprises and research partners. NLI to perform Solution Experimentation and launch businesses with customers in:

- City Mobility/Inter-cities Logistics
- Safety for Smart City
- Payment/Authentication

Data Science Research Laboratories



R&D to promote the expansion of AI and its permeation to society

Data Science Research Laboratories is engaged in research to promote the development of AI technologies with particular focus on “AI coexisting with humans.” In the past, members were comprised mainly of software-related researchers, but as of 2018, hardware-related researchers joined the team. Aggregating the AI technology R&D function has enabled us to create a system for speedier research and development.

Toshihiko Hiroaki
General Manager,
Data Science Research Laboratories

AI research integrating a wide range of expertise

The Data Science Research Laboratories is comprised not only of researchers specializing in algorithm development, but also specialists engaged in the research of data mining systems and sensing systems. The hardware and software specialists work together very closely in an aim to improve computation speed of machine learning, obtain data that cannot be perceived by the human senses, and further expand the scope of AI functions and its applications.

World-leading proprietary AI technologies

NEC has a track record stretching over a half century in the development of various AI technologies, including character recognition. NEC owns a roster of world-leading propriety technologies that stem from the knowhow cultivated at our laboratories. For instance, the Heterogeneous Mixture Learning that can explain the reasons behind big data-based predictions is a technology that encapsulates NEC’s vision of AI coexisting with humans. We are also world leaders in cutting-edge research in prescriptive analysis and machine learning from small data.

DATA SCIENCE

Biometrics Research Laboratories

Aiming to achieve "human understanding" through biometric research

As the world in which we live makes steady progress toward the implementation of AI and IoT, sensors and networks are connecting together people, things, and contexts, and biometrics is attracting enormous attention as the technology for creating safe channels to connect the real world with the digital world. Biometrics Research Laboratories focuses on the development of recognition technology centered on face recognition and voice recognition, and continuously engages in research to realize a world in which everyone can easily and fairly utilize AI services without having to worry about falsifications or identity theft.

Masayuki Mizuno
General Manager,
Biometrics Research Laboratories

Researching a multitude of the world' stop class biometric authentication technologies

NEC began research in biometric authentication in 1971 with focus on fingerprint recognition, and has been leading the world in this area ever since. NEC's fingerprint recognition and face recognition technologies in particular have been ranked world's No.1 in accuracy*, and over 700 systems have been deployed in more than 70 countries around the world. We also own a wide array of other recognition technologies, including finger vein authentication, voice authentication, and otoacoustic recognition, enabling us to offer optimized recognition solutions to solve the diverse issues.

* Fingerprint recognition: FpVTE 2003 (Fingerprint Vendor Technology Evaluation), Slap Fingerprint Segmentation Evaluation 2004, ELFT 2007 (Evaluation of Latent Fingerprint Technologies), PFT 2009 (NIST Proprietary Fingerprint Template Testing), FpVTE 2012, PFT II 2013, MINEX 2016 (Minutiae Interoperability EXchange Test), MINEX III 2016
Face recognition: MBGC 2009 (Multiple Biometric Grand Challenge), MBE 2010 (Multiple Biometrics Evaluation), FRVT 2013 (Face Recognition Vendor Test), FIVE 2017 (Face In Video Evaluation)

Using biometric authentication to accelerate "human understanding"

We believe that "human understanding" is the ultimate vision and aim of biometrics technology. Biometrics technology, which creates and analyzes biometric data, is very human-like in that it has the ability to, for instance, look at someone's face and recognize that person's mood or health condition. This is why biometrics can be applied beyond the field of security. We will continue to actively pursue research that enables us to explore the use of biometrics in a wide range of applications, including using human sensing to promote health, improving work efficiency, marketing, and so on.

BIOMETRICS

Security Research Laboratories

Implementing reliable security to protect OT and IoT systems

Security Research Laboratories conducts research both in data security and in cyber security to ensure safety and security of the society. In data security we focus on cryptography, secure computation, blockchain and other technologies to preserve confidentiality while processing data. In the field of cyber security, our laboratories are continuously engaged in research on measures to protect against cyberattacks. We are also actively involved in developing technologies to enable safe AI-based control as well as in research on AI-based cyber security.

World-leading secure computation and blockchain technologies

NEC owns world-leading technologies for secure computation and blockchain. In 2016, we ranked No. 1 for processing speed in secure computing thanks to our proprietary multi-party computation technology, which allows you to process data dispersed and hidden in multiple servers without gathering them into one place. Today, NEC still ranks No. 1 in that field jointly with another company. Our blockchain technology is also one of the world's fastest*, which can process transactions one hundred times as fast as previously possible. Those technologies will be quite useful in processing big data in real time and in accelerating use of OT and IoT systems.

* Based on study by NEC as of May 2018

Cutting-edge research leveraging AI technology and formulation of international standards

Technological advancements in AI have led to flourishing of new security needs. Not only have we been constructing security systems that enable safe AI-based control, we have also been making headway in developing AI-based security. Formulating international standards and de facto standards for this cutting-edge research is another crucial issue with which we must contend. We will continue to actively address this issue while working closely with our overseas laboratories.

SECURITY

System Platform Research Laboratories

Hardware research integrating the real world and cyber world

System Platform Research Laboratories engages in research focused mainly on hardware ranging from cloud and edge systems to devices. The Lab is also known for its active pursuit of cutting-edge research in areas such as quantum computing, spin thermoelectric, infrared sensors, and so on. Our aim is to derive value through AI, centered on computing and communication technologies, and firmly establish this in the real world. We continuously engage in research to further grow and expand this value.

Soichi Tsumura
General Manager,
System Platform Research Laboratories

Technology that is indispensable for the implementation of AI and IoT technologies

When it comes to AI and IoT, although there is a tendency to focus on the software aspects of the systems, it is also imperative to develop a platform to implement these technologies. For instance, even if we were to create excellent AI-powered technologies, practical application would be difficult if speedy processing cannot be achieved. Another important point is to properly pre-process the data to facilitate processing by AI. Our mission is to create a platform that can quickly and flexibly respond to the needs of AI technology.

Achieving an information platform that functions like the air we breathe

We believe that platforms should become like the air we breathe. In other words, it is something we don't think about much, but it is always present and vital to every second of our lives. One purpose of the platform is to ensure the seamless function of AI and IoT systems through the incorporation of automatic sensing and unburdened communication and processing. We also aim to engage in cutting-edge research in areas such as quantum computing to stimulate disruptive innovation enabling the creation of something new from scratch.

SYSTEM PLATFORM