

NEC Corporation Recognized as the

2021

Company of the Year

Asia-Pacific Artificial Intelligence
Services Industry

Excellence in Best Practices

\Orchestrating a brighter world

NEC

Best Practices Criteria for World-Class Performance

Frost & Sullivan applies a rigorous analytical process to evaluate multiple nominees for each award category before determining the final award recipient. The process involves a detailed evaluation of best practices criteria across two dimensions for each nominated company. NEC Corporation excels in many of the criteria in the artificial intelligence services space.

AWARD CRITERIA	
<i>Visionary Innovation & Performance</i>	<i>Customer Impact</i>
Addressing Unmet Needs	Price/Performance Value
Visionary Scenarios Through Mega Trends	Customer Purchase Experience
Implementation of Best Practices	Customer Ownership Experience
Leadership Focus	Customer Service Experience
Financial Performance	Brand Equity

NEC Corporation: Provider of Artificial Intelligence Services

For almost five decades, NEC Corporation (NEC) has been the leading player in artificial intelligence (AI) technologies for visualization, and analysis and control. By utilizing ground-breaking AI technologies, such as image and video recognition, speech recognition, and machine learning (ML), the company excels in industries such as public safety, energy, finance, healthcare, and manufacturing.

Today, NEC advances its AI services technology, improving its position in the market and bringing versatile AI services to customers. Since 2018, the Tokyo, Japan-headquartered company has invested \$3.8 billion to strengthen its presence in the AI services space worldwide. Specifically, in 2018, the company acquired NPS, a leading software and services provider to the public sector in Australia and the United Kingdom, for \$625 million.¹ This acquisition enabled NEC to integrate its biometric scanning and facial recognition products with core NPS software platforms, accelerating its business expansion and advanced product offerings for customers worldwide.

Also, in 2019, the company acquired KMD, the largest Danish information technology company, for \$1.2 billion to step up its safety business and position itself to further penetrate businesses from northern Europe to the whole of Europe and globally.² Additionally, in 2020, NEC acquired Avaloq, a leading Swiss

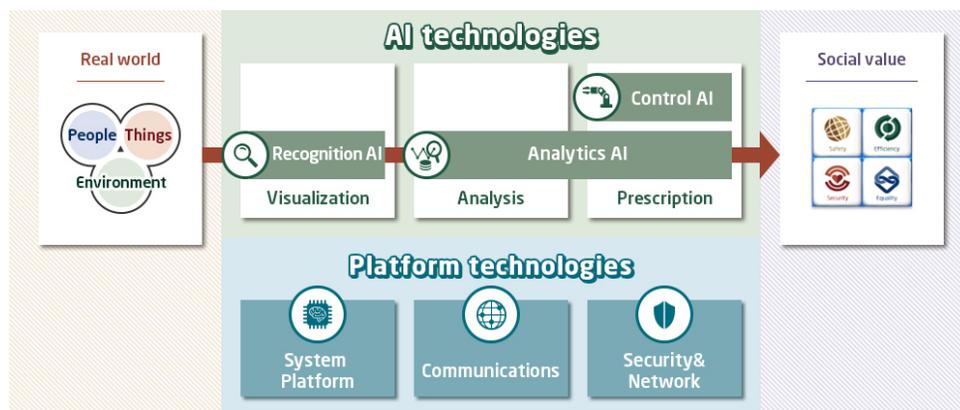
¹ <https://www.necsws.com/news/northgate-public-services-successfully-acquired-japanese-corporation-nec/>

² https://www.nec.com/en/press/201812/global_20181227_01.html

financial software company, for \$2 billion to equip itself with digital finance software knowledge as it enters into the field worldwide and works on advancing its commercial expansion in the digital government field.³ In this regard, NEC aims to develop new innovative solutions that combine Avaloq’s industry-leading software with NEC’s cutting-edge technologies like biometric authentication and blockchain technologies.

At the same time, NEC has strong research and development focus aimed at creating new social value by strengthening the following technology areas: Recognition, Analysis and Control AI, and supported by Security and Network, Communications, System. Currently, NEC has close to a thousand AI-focused specialists based at 10 laboratories across the globe (America, Europe, Japan, China, Israel, India, and Singapore).⁴ They concentrate their research activities on Biometrics, Data Science, Video/Acoustics Analytics, Edge AI, Cybersecurity, Medical AI, and many other research areas.

NEC’s AI Technologies at a Glance



Source: NEC Corporation

NEC also works on expanding cooperation with various technology companies around the world. For instance, in March 2020, NEC entered into cooperation with Siemens to provide AI monitoring and analysis solutions to digitize manufacturing.⁵ Specifically, this solution connects NEC’s System Invariant Analysis Technology (SIAT) with MindSphere®, the cloud-based open Internet of Things (IoT) operating system from Siemens, to help advance the operations of the customers’ factory systems, product quality, and plant equipment. In this regard, this collaboration enabled clients to achieve data collection, storage, monitoring, and analysis customized to their specific manufacturing needs.

³ https://www.nec.com/en/press/202010/global_20201005_02.html

⁴ https://www.nec.com/en/global/rd/labs/pdf/NEC_Research_Activities.pdf

⁵ <https://www.businesswire.com/news/home/20200308005027/en/NEC-and-Siemens-Partner-to-Provide-AI-Monitoring-and-Analysis-Solution-to-Accelerate-Digitization-in-Manufacturing>

Also, in March 2021, NEC signed a collaboration agreement with Lockheed Martin Corporation, the American aerospace, defense, information security, and technology company, to extend partnerships utilizing NEC's SIAT.⁶ Specifically, NEC's SIAT will continue to provide Lockheed Martin Corporation with AI and ML capabilities to support its activities at design and production phases of spacecraft development, including applications on National Aeronautics and Space Administration's Orion vehicle for Artemis' mission.

Frost & Sullivan recognizes that NEC exceeds customers' expectations and needs as customers value highly the efficiency and reliability of its services:

*"This has been an extremely rewarding project that sees NEC's facial recognition software deployed on Amadeus' market-leading hardware for the first time. We've worked very closely together to create a contactless boarding process and to deliver on the requirements of both Narita International Airport Corporation and the Japanese government."*⁷

- CEO, ICM Airport Technics (an Amadeus Company)

*"The United Nations 11th Sustainable Development Goals talk about safer transport, efficient resource management, and more sustainability and resilience. Lisbon has a strong commitment to this, and to achieve it, we needed a partner that could adapt to this reality. The NEC Platform allows us to improve our processes, and the platform tools are accessible to the entire community."*⁸

- Deputy Mayor, Lisbon Council

*"The power of AI is leveraged across our entire enterprise, and with a trusted partner like NEC, we gain the resources to expand its abilities at scale across our internal operations. By proactively analyzing telemetry data, we are able to deliver our systems even faster and streamline the work that our employees do every day."*⁹

- Executive Vice President, Lockheed Martin Space

Providing Industry-leading Artificial Intelligence-based Platform

Amid today's unstable security and economic environment, many companies across different economic segments (e.g., airports, borders, police, manufacturing, energy, and healthcare) seek AI-based tools and services to adapt to versatile business and societal needs. Namely, they look for ways to improve data processing, security, and planning at their facilities.

NEC Corporation is leading the way by providing AI-based services that aid customers across various sectors of economy to ensure improved safety and efficiency unmatched by the competition. In response to the spread of COVID-19, in 2020, NEC will provide infectious disease control solutions that

⁶ https://www.nec.com/en/press/202103/global_20210302_02.html

⁷ <https://www.aviationpros.com/airports/press-release/21218430/amadeus-airport-it-americas-inc-narita-airport-amadeus-and-nec-introduce-japans-first-end-to-end-biometric-boarding-process>

⁸ <https://www.asmag.com/showpost/30622.aspx>

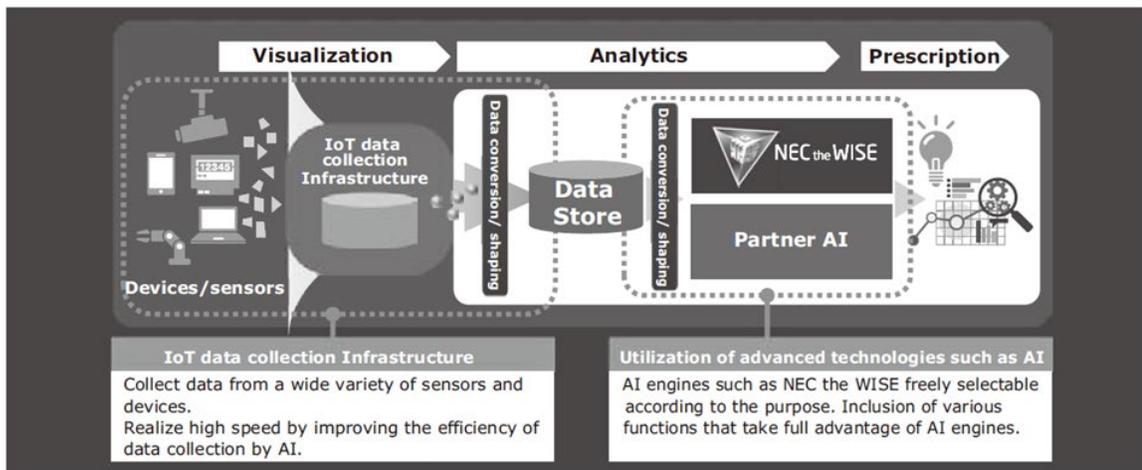
⁹ https://www.nec.com/en/press/202103/global_20210302_02.html

combine thermal temperature screening and facial recognition technology to five major airports in Hawaii, helping to ensure the safety and health of travelers and residents of the state.

At the center of its exemplary performance is NEC the WISE, NEC’s AI platform that offers several competitive advantages, including:

- **Versatility:** NEC the WISE comprises a five-layer IoT model composed of layers such as device computing, short-distance networking, edge computing, wide-area networking, and cloud computing. The platform’s architecture flexibility allows users to customize NEC the WISE functionality in line with their business requirements, ensuring a swift transition from testing to production. At the same time, NEC the WISE allows users to utilize partner cloud technology systems from non-NEC manufacturers safely and seamlessly via the application programming interface gateway.

NEC’s use of advanced technologies such as AI



Source: NEC Corporation¹⁰

- **Flexibility:** NEC the WISE enables eradicating differences between various data formats and communications systems. Thus, the platform allows users to connect non-IT devices and save the labor time and costs needed for equipment expansion and update. To this end, the platform utilizes a set of adapters that read non-IoT devices and verifies them in advance to enable proper data collection.
- **Efficiency:** NEC the WISE allows users to collect information in various formats from different devices and sensors quickly. The platform’s AI engine enables users to analyze and visualize acquired data to clarify any issues in existing operations and paves the way towards more effective business operations.

¹⁰ <https://www.nec.com/en/global/techrep/journal/g17/n01/170103.html>

- **Reliability:** The purpose of NEC the WISE is to provide “reliable AI” that respects human rights and privacy. Namely, the platform provides users with AI tools that explain how they behave, produce predictions, and what variables impact prediction results (e.g., white-box AI).

Excelling in Innovative Practices

“For almost five decades, NEC Corporation has been the leading player in artificial intelligence (AI) technologies for visualization, and analysis and control. By utilizing ground-breaking AI technologies, such as image and video recognition, speech recognition, and machine learning, the company excels in industries such as public safety, energy, finance, healthcare, and manufacturing.”

- **Maksym Beznosiuk, Best Practices Research Analyst**

NEC dedicates its active efforts to innovative practices to aid versatile customer demands across various sectors around the globe. For example, in 2019, the company introduced new recognition technology that accurately identifies people.¹¹ Namely, NEC created a solution that can acquire clear, high-resolution iris images from people as they walk past by expediting image processing of captured images. Specifically, this solution evaluates the position of eyes with high resolution and at high frame rates. Simultaneously, NEC’s solution utilizes a proprietary image quality index to acquire the best high-quality images for iris authentication. As a result, this newly developed solution enables clients to

conduct a quick identity verification process while people walk past instead of requiring people to stand still. Hence, by combining iris recognition and imaging tools, NEC allows clients to utilize its new recognition solution across various applications such as identity verification at ticket gates at bus stops and security authentication at large-scale facilities like airports.

Helping Companies with Artificial Intelligence Strategy

NEC aids companies across different industries with their strategy at an early stage of AI adoption via its AI Discovery Program, an AI-focused consulting service. Specifically, NEC’s AI consulting comprises services such as the design of AI concept, business vision, and practical steps to drive smooth AI adoption. Such services are especially beneficial for companies at the early stage of incorporating AI tools in their activities as NEC’s qualified personnel have hands-on experience and insight into AI adoption across various business domains like healthcare and manufacturing.

Best Practice Examples

Frost & Sullivan research notes NEC for the exceptional performance its AI-based solutions as shown by the following best practices examples:¹²

Best Practices Example 1: NEC designed and deployed the network and infrastructure solution at Sydney Coliseum Theatre at West HQ, an entertainment destination in Western Sydney.¹³ The client looked to install tools to optimize the customer experience for its guests and staff at the theatre. NEC

¹¹ https://www.nec.com/en/press/201911/global_20191106_01.html

¹² <https://www.nec.com/en/case/index.html>

¹³ <https://www.nec.com/en/case/westhq/index.html>

developed a frictionless facial recognition verification process for entry to the Sydney Coliseum Theatre. Specifically, NEC installed 20 self-service kiosks at venue entrances to leverage facial recognition algorithms by identifying faces in single-camera images for identification and age verification. In this regard, NEC's solution also included a cloud-based analytics platform to help clients gain actionable insights based on the information collected via installed kiosks and simplify administration at the client's facilities.

Best Practices Example 2: NEC provided its industry-leading Automated Fingerprint Identification System (AFIS) to the Centre for Development of Advanced Computing in the Kerala region, India.¹⁴ Specifically, the client looked for tools to help various police and enforcement authorities to process and verify fingerprints faster. NEC's AFIS helped the client speed up investigation and verification of fingerprints across 600 police/enforcement facilities in the state, including district police headquarters and police stations. Specifically, NEC's AFIS aided the client with matching unknown fingerprints captured at crime scenes against a central database of fingerprints for criminal investigation.

Conclusion

Today, companies in sectors such as public safety, healthcare, energy, manufacturing, and transportation look for artificial intelligence (AI) instruments and services to ensure effective operations and safety at their facilities and areas-of-interest. NEC Corporation is at the forefront of providing AI-based services and solutions that allow customers to gain security and efficiency, unmatched by competitors. Namely, NEC the WISE and AI services suite allow users to process data effectively and elevate the performance of their critical assets to a higher level.

With its hands-on experience and customer-centric focus, NEC Corporation earns Frost & Sullivan's 2021 Asia-Pacific Company of the Year award in the AI services market.

¹⁴ https://www.nec.com/en/press/201906/global_20190618_01.html

What You Need to Know about the Company of the Year Recognition

Frost & Sullivan's Company of the Year Award is its top honor and recognizes the market participant that exemplifies visionary innovation, market-leading performance, and unmatched customer care.

Best Practices Award Analysis

For the Company of the Year Award, Frost & Sullivan analysts independently evaluated the criteria listed below.

Visionary Innovation & Performance

Addressing Unmet Needs: Customers' unmet or under-served needs are unearthed and addressed by a robust solution development process.

Visionary Scenarios through Mega Trends: Long-range, macro-level scenarios are incorporated into the innovation strategy through the use of Mega Trends, thereby enabling first to market solutions and new growth opportunities.

Leadership Focus: Company focuses on building a leadership position in core markets and on creating stiff barriers to entry for new competitors.

Best Practices Implementation: Best-in-class implementation is characterized by processes, tools, or activities that generate a consistent and repeatable level of success.

Financial Performance: Strong overall business performance is achieved in terms of revenue,

revenue growth, operating margin, and other key financial metrics.

Customer Impact

Price/Performance Value: Products or services provide the best value for the price compared to similar market offerings.

Customer Purchase Experience: Quality of the purchase experience assures customers that they are buying the optimal solution for addressing their unique needs and constraints.

Customer Ownership Experience: Customers proudly own the company's product or service and have a positive experience throughout the life of the product or service.

Customer Service Experience: Customer service is accessible, fast, stress-free, and high quality.

Brand Equity: Customers perceive the brand positively and exhibit high brand loyalty.

