

NEC's Image Recognition Technology – Use Cases for Industry

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Agenda

- NEC Corporation Overview
- NEC's Initiatives in Image Recognition
- Introduction "FoT" Technology
- GAZIRU – NEC's Image Recognition Service
- Summary & References

NEC Corporation Overview

As of March, 2019

Leading social value innovator

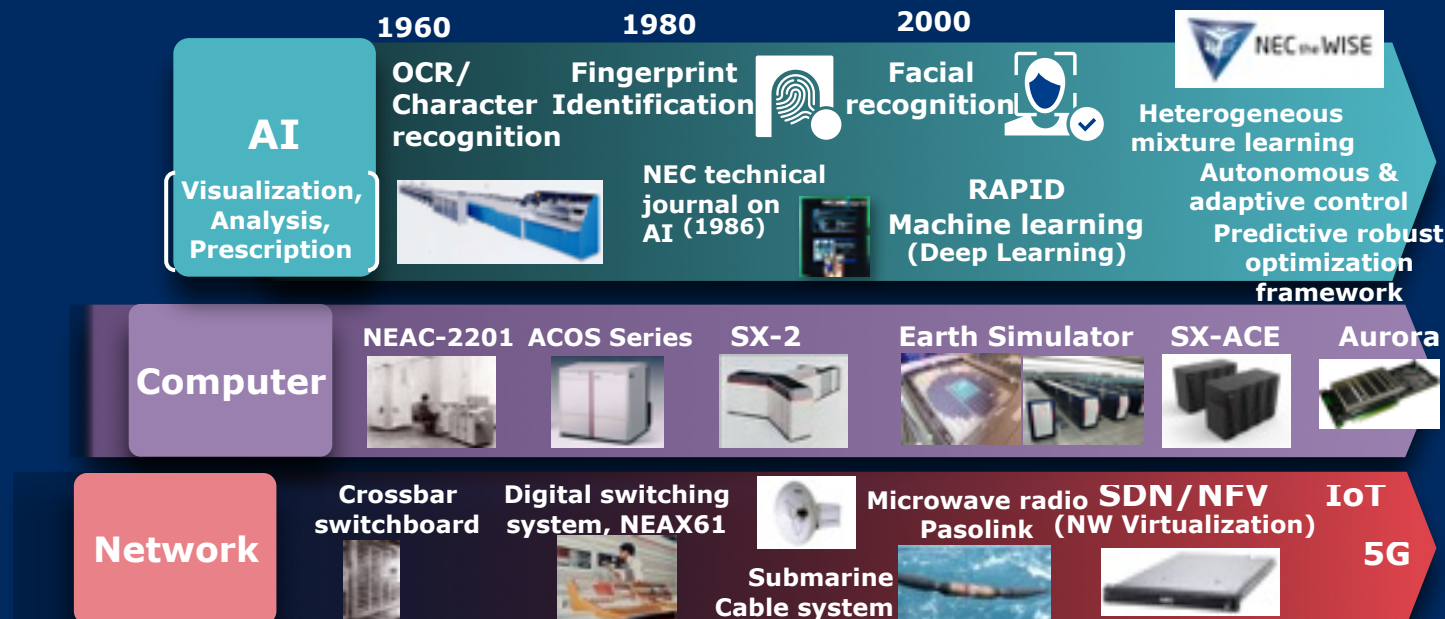
**Provides telecommunications, Public solutions,
Enterprise business solutions**



- Headquarter: **Tokyo, Japan**
- **119 years** of brand success
- **109,390** employees worldwide
- **EUR ~23 billion** net sales
- **303** consolidated subsidiaries
- Business activities in **169** countries and territories
- **World's Top 100** global technology leaders (2018 Thomson Reuters)
- **Fortune Global 500** company

NEC's Initiatives in Image Recognition and AI

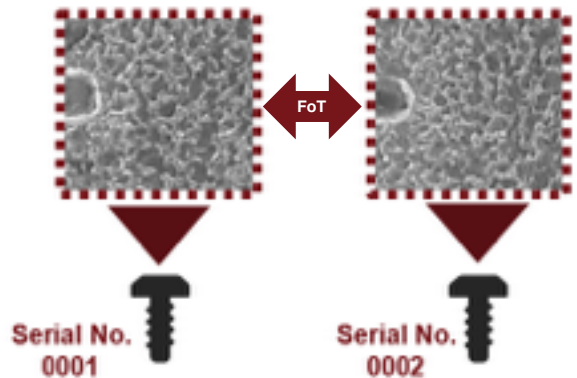
Wealth of specific knowledge acquired over the past fifty years



What's "Fingerprint of Things (FoT)" recognition technology?

Fingerprint of Things (FoT) is created based on microscopic surface patterns of objects.

„Fingerprint of Things (FoT)“ recognition technology is capable of the high-accuracy recognition of every individual piece of uniformly manufactured industrial products.



- Even parts like bolts made from same metal mold have different surface patterns
- 10,000 bolts made from the same mold:
Validity of FoT identification: 100 %
- Even usual smartphone cameras are able to check the patterns and match with ones stored in databases.

Advantage

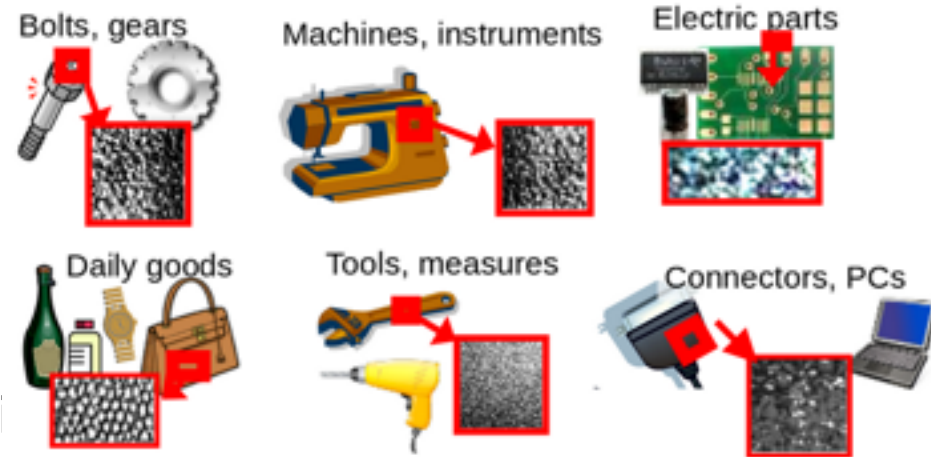
The FoT technology achieves individual recognition of various objects without using traditional ID tags like RFID, 2D-barcode or other tags

- traditional ID tags like barcodes or others could even not be used with small objects
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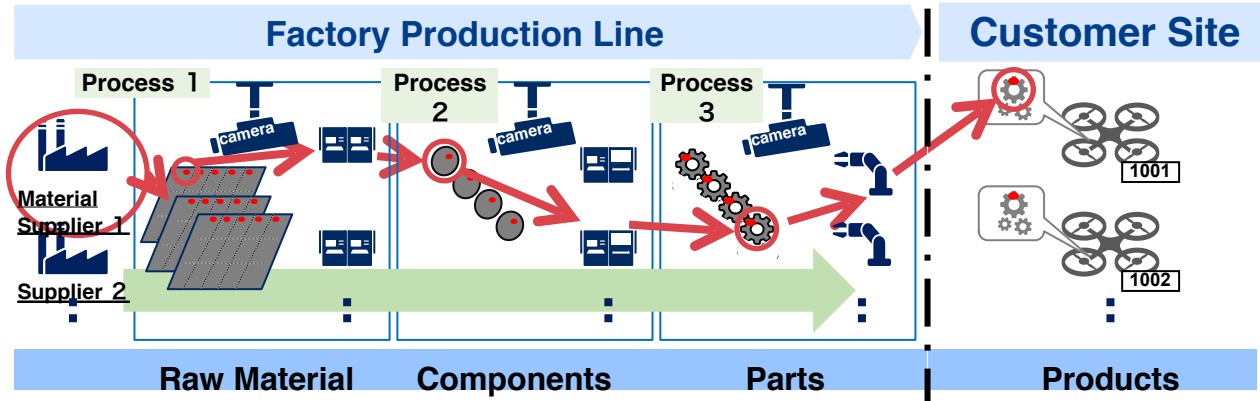
Enables use of IoT to store & retrieve „individual“ related data like

- type of material, dimensions of object, production date, manufacturer etc.

FoT can significantly contribute to processes



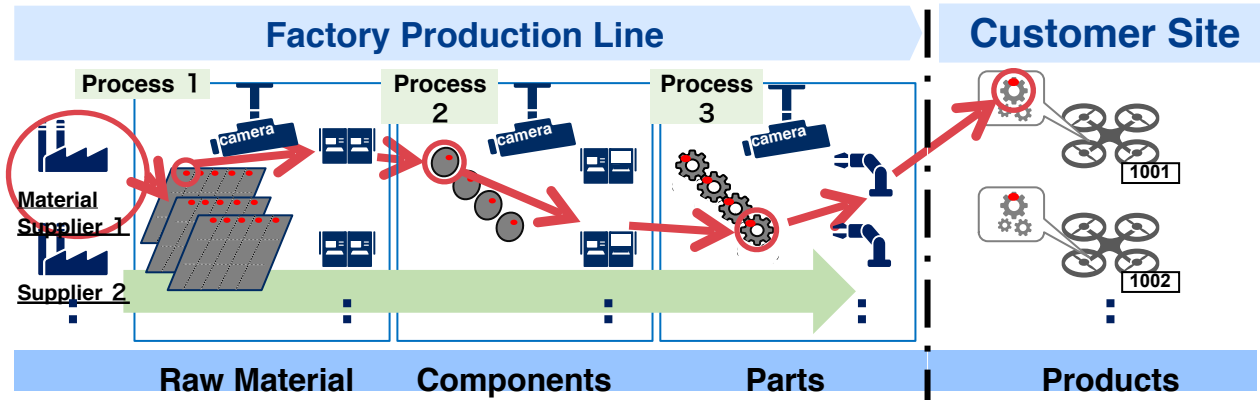
“FoT” Traceability in Supply Chain Management



1. In manufacturing industry, there is an increasing trend to collect and analyse the big data of the history of manufacturing and using objects
 - connect those results to production innovations and maintenance & inspection services.
2. Provide traceability for raw material, components and parts throughout the production process
 - FoT tracks “things”, even those too small to be tagged or numbered



"FoT" Traceability in Supply Chain Management



3. Value chain management for manufacturing, logistics, sales and customer support
- Providing traceability during the manufacturing process and after delivery to customers
 - Catalogues raw material and parts data in a manufacturing process database
 - When issues are detected, raw material or parts in the same lot can be identified easily

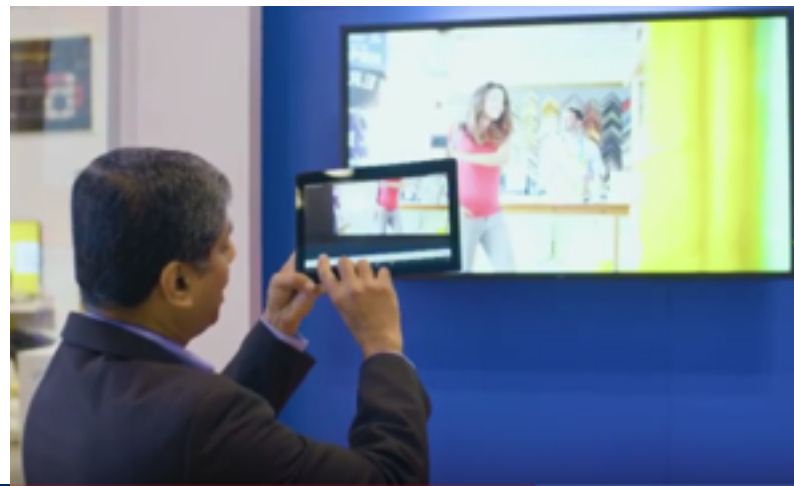
GAZIRU – NEC's Image Recognition Service

GAZIRU – image recognition engine & service that can identify various types of images acquired by snapping a recognition target with a smartphone

Applicable Image Types for Recognition

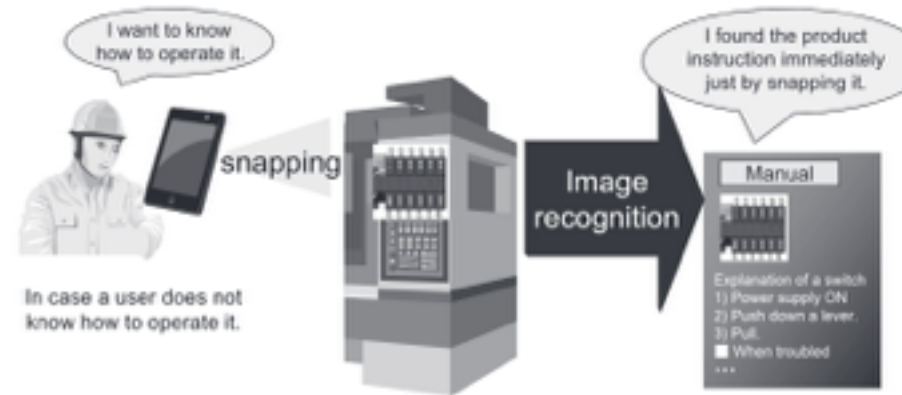
- Two Dimensional objects within e.g. print media or on TV/Signage Screens
- Three Dimensional objects e.g. automobile, animals / plants or food

Identify an object instantly from massive data of up to 1 million



GAZIRU – Use Cases

1. Japan Trading Company. e.g. for high-end used goods, uses GAZIRU service engine to identify counterfeit goods
 - System compares Logos, Colours and dimensions and determines if an item is likely to be a counterfeit good.
2. One of Japan's leading advertising companies uses GAZIRU service and displays detailed information on photos taken e.g. from magazines with the built-in cameras of smartphones.
 - match new pictures with image data that was previously registered on the cloud or within a device.
 - Information returned not only can depend on object itself but also on GPS data or time when and where the picture was taken.
3. Usage for electronic manuals



Summary & References

■ Concept of the Fingerprint of Things identification system

- <https://youtu.be/SBJHFUjqEUQ>

■ NHK World – Japan

- Fighting Fake Goods with AI
 - <https://www3.nhk.or.jp/nhkworld/en/news/videos/20190416140426750/>
 - NEC's service GAZIRU described from 1:20 min on

■ NEC Technical Journal

- Individual Recognition Based on the Fingerprint of Things Expands the Applications of IoT
- <https://www.nec.com/en/global/techrep/journal/g16/n01/160120.html>



Orchestrating a brighter world

NEC brings together and integrates technology and expertise to create the ICT-enabled society of tomorrow.

We collaborate closely with partners and customers around the world, orchestrating each project to ensure all its parts are fine-tuned to local needs.

Every day, our innovative solutions for society contribute to greater safety, security, efficiency and equality, and enable people to live brighter lives.