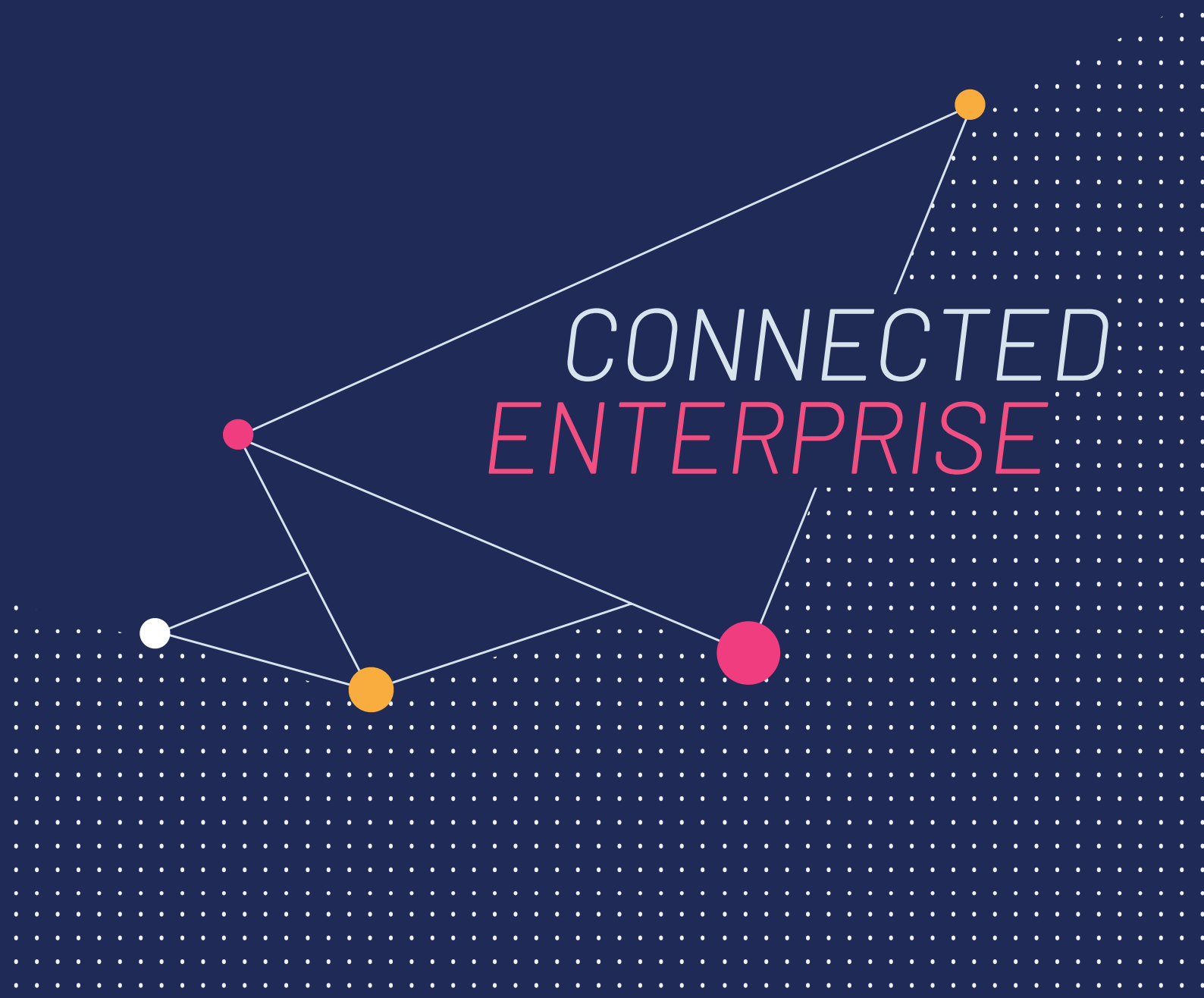
nagarro

THINKING BREAKTHROUGHS



CONNECTED ENTERPRISE

TRIGGER NEW IDEAS AROUND MEANINGFUL APPLICATION SCENARIOS AND GET ANSWERS TO SOME OF THE MOST PRESSING QUESTIONS!

Table of Content

THE CONCEPT OF THE CONNECTED ENTERPRISE

SCAN QR CODE & VIEW VIDEO

Get the Journey to the Connected Enterprise started

Damianos Soumelidis
Managing Director, Nagarro Austria

It is undisputed that digital transformation is changing the world ever faster and more profoundly. From the personal way of life to the corporate environment, more and more information is becoming available.

Companies are beginning to experiment with digital concepts by trying to use data more effectively, achieving greater agility and retaining a talented workforce. In order to make optimal use of the huge amounts of data, companies are beginning to couple all processes and devices into networks. Organizations that see potential in connectivity focus on digital platforms that connect all the players within the enterprise, not on the conventional way of doing business through intermediaries.

Unfortunately, too many well-meaning decision-makers pursue their digital transformation activities as isolated stand-alone projects. Some are dazzled by technologies, while others are driven by technology trends rather than business requirements.

At Nagarro, we firmly believe that in a world where natural boundaries are becoming increasingly blurred, continuous information flows are the key to success. And successful digital transformation does not stop at departmental boundaries. The Connected Enterprise thus stands as the overarching concept for the modern company of the future, which uses digital technologies on an interdisciplinary and consistent basis to ensure sustainable business success.

Smart Factory
Connected Sites & Connected Worker

CONNECTING THE WORKERS HAS BEEN AN ENTERPRISE GOAL FOR MORE THAN A CENTURY, NOW IT IS A REALITY.

SCAN QR CODE & VIEW VIDEO

THE CONCEPT OF CONNECTED SITES

SMART GLASS

DEVICE - DATA – DECISION

DEVICE

Make production process smarter and more connected

DECISION

All factory sites are connected to each other allowing you to make informed decisions

DATA

Connected Worker in a smart factory is augmented by the power of real time data/analytics

BENEFITS OF CONNECTED SITES AND CONNECTED WORKER

- Ability to evaluate the performance of all sites together
- Global view on the factory with connected sites and with the ability to roll up KPIs across sites to a global level
- Connectivity of machines on the production line for real time data capture and analysis
- Ability to obtain real time and actionable insights
- Faster and more efficient quality checks without human intervention
- An intelligence that can predict machine breakdowns and thus avoid downtimes
- Efficient workforce which is connected, always has the prioritized orders to work on and sufficient information to execute those work orders successfully
- New, cheaper and faster ways of training the operators, and provisions for on the job help and guidance for them

Smart Factory

Connected Sites & Connected Worker

09:00 AM

At the cookie house headquarter Thomas views the global dashboard of all connected factories.

1

Inside the Vienna Factory

10:00 AM

John views his work dashboard.

Desktop

Mobile

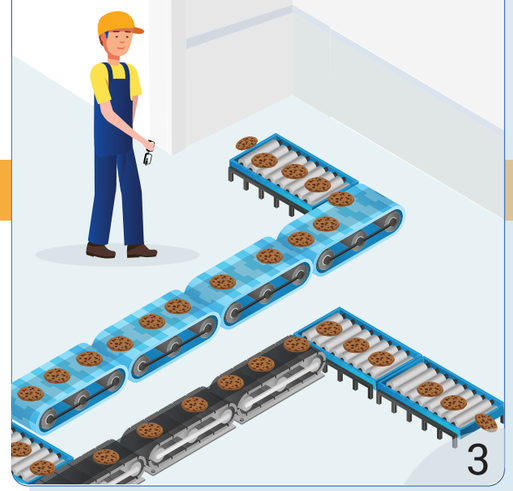
Tablet

Violation 26: 'Line 1 - Blender machine - Weight'

2

10:02 AM

John grabs his glass and starts to move towards line 1.



3

10:05 AM

John opens the blender on line 1.
He uses his glass to understand the problem.

4

10:10 AM

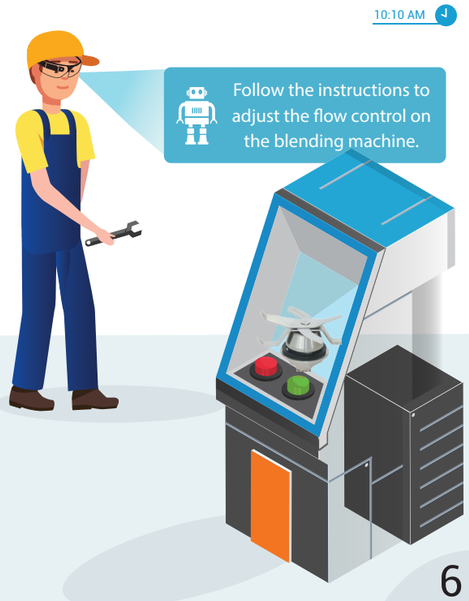
John interacts with FirstConnect (Virtual Assistant) to find a solution.

Hello, FirstConnect

5

10:10 AM

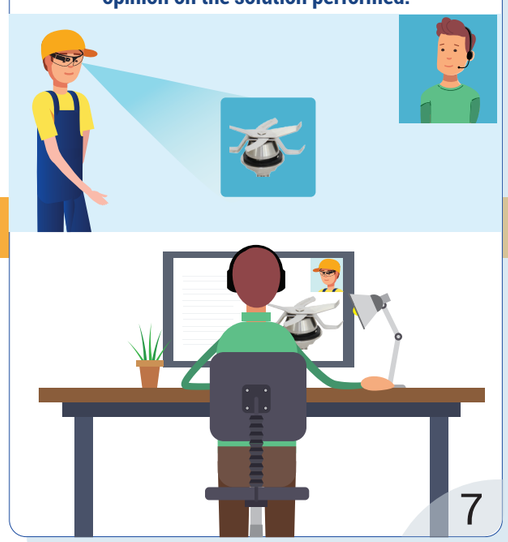
Follow the instructions to adjust the flow control on the blending machine.



6

10:25 AM

John has a video call with Alan to get an expert opinion on the solution performed.



7

10:35 AM

Problem is resolved.
John uploads the image and voice notes for future reference.

8

CONNECTED WORKER /
TRAINING WITH HOLOLENS

SCAN QR CODE & WATCH DEMO VIDEO

CONNECTED MACHINES /
PREDICTIVE MAINTENANCE

SCAN QR CODE & WATCH DEMO VIDEO

Smart Factory
Maintenance Predictions for Machines & Immersive Training on Hololens

HOLOLENS - A NEW, CHEAPER AND FASTER WAY TO TRAIN WORKERS

Even after having completed the necessary training, new workers still require a guiding hand when they start operating actual machines. We propose Augmented Reality based training using HoloLens. Using a HoloLens, workers can complete the training on a 3D machine model and learn how to operate it and its parts.

AI predicts potential machine breakdown in 3 days.

1

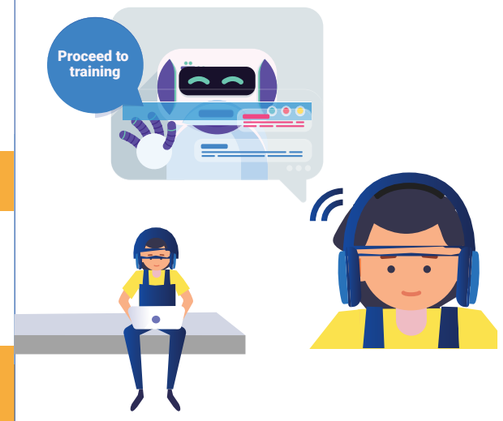
Steve analyzes the prediction and creates a work order.

2

John receives a new task to service the planetary mixer.

3

AI engine recognizes that John has not worked on the machine for 6 months.



4

Smart Factory

The Maintenance Prediction of a Machine & The Immersive Training on HoloLens.

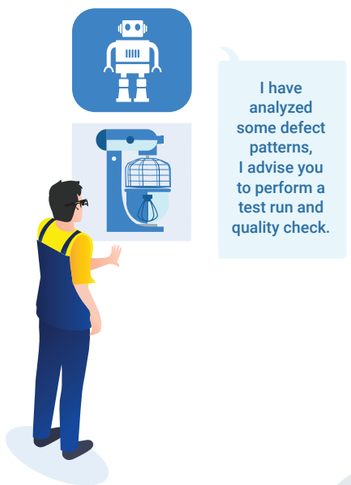
John attends a fully immersive training on HoloLens.

5

John and Peter collabrate in the same augmented environment.

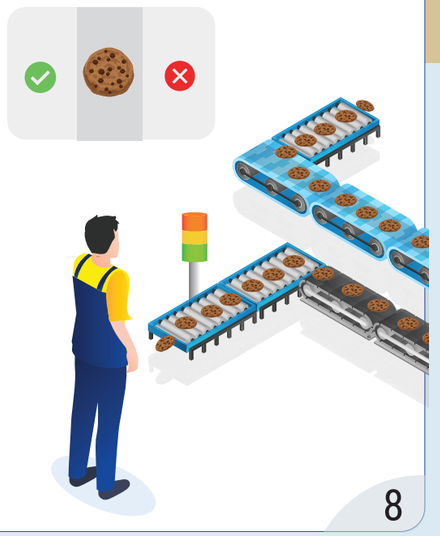
6

Now fully trained, John repairs the machine.



7

John performs a test run on the conveyor belt.



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Smart Factory
AI powered Quality Check

EDGE COMPUTING COMPATIBILITY AS SHOWN IN THE COOKIE FACTORY EXAMPLE

Artificial Intelligence promises smart, fast and efficient quality checks during production. In the example of a cookie factory, a camera mounted against/attached to the conveyor belt takes images of every cookie produced.
An AI engine checks the baked goods against pre-determined parameters. Cookies that don't comply with the necessary quality standards get sorted out.

However, AI not only ensures the product's quality, but also its safety. Metal detection sensors attached to the conveyor belt trigger an alarm at the detection of metal. The contaminated batch is consequently swiftly discarded. The AI engine then analyzes and evaluates the collected data to prevent such occurrences from happening in the future.

EXAMPLE: METAL DETECTION ON COOKIE FACTORY PRODUCTION LINE

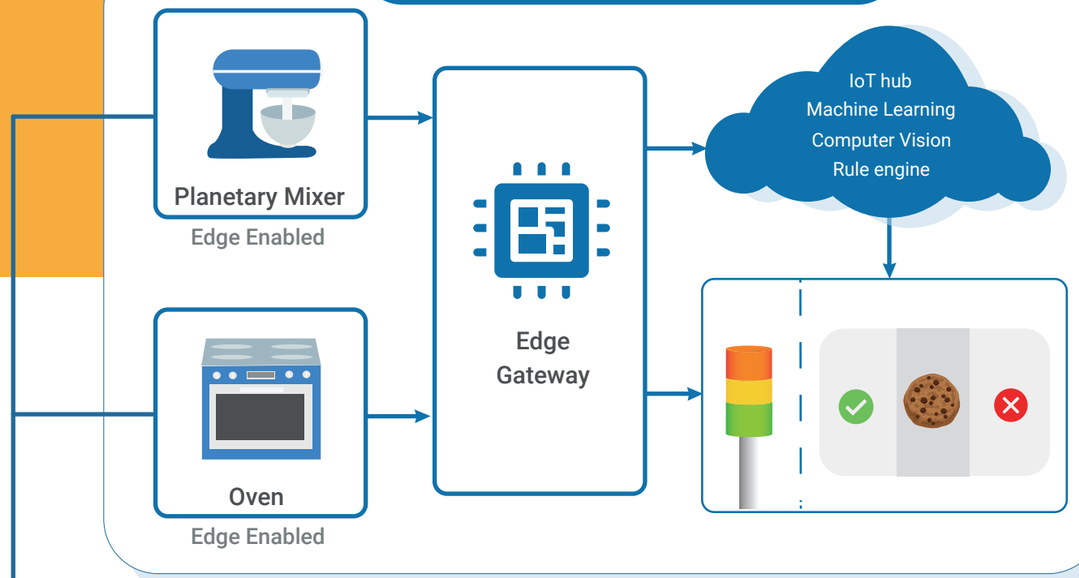
In the case of the cookie factory, metal detection sensors can be attached to the conveyor belt. In case a scrap of metal is detected, an alert is triggered and users are instantly notified on a device or wearable of their choice. Sirens go off and the contaminated batch is discarded. The AI engine then evaluates and analyzes the collected data to prevent such occurrences in the future.

SCAN QR CODE & WATCH DEMO VIDEO

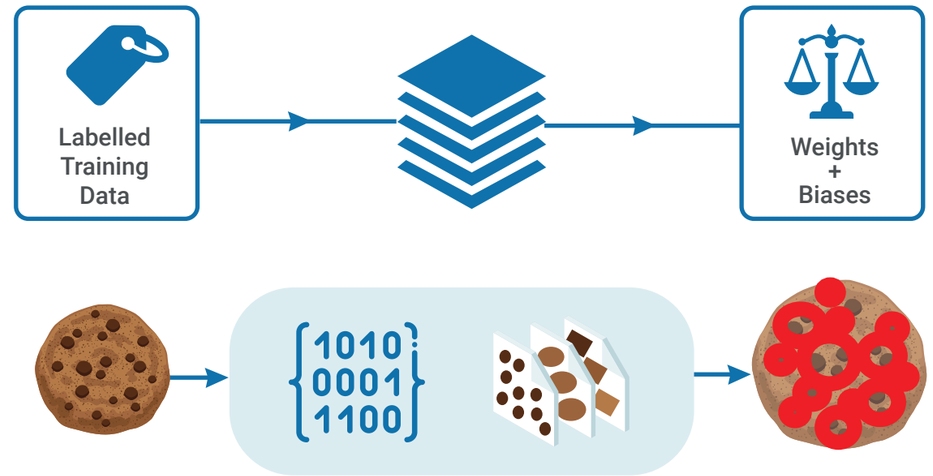
Smart Factory

The Quality Check of the Product

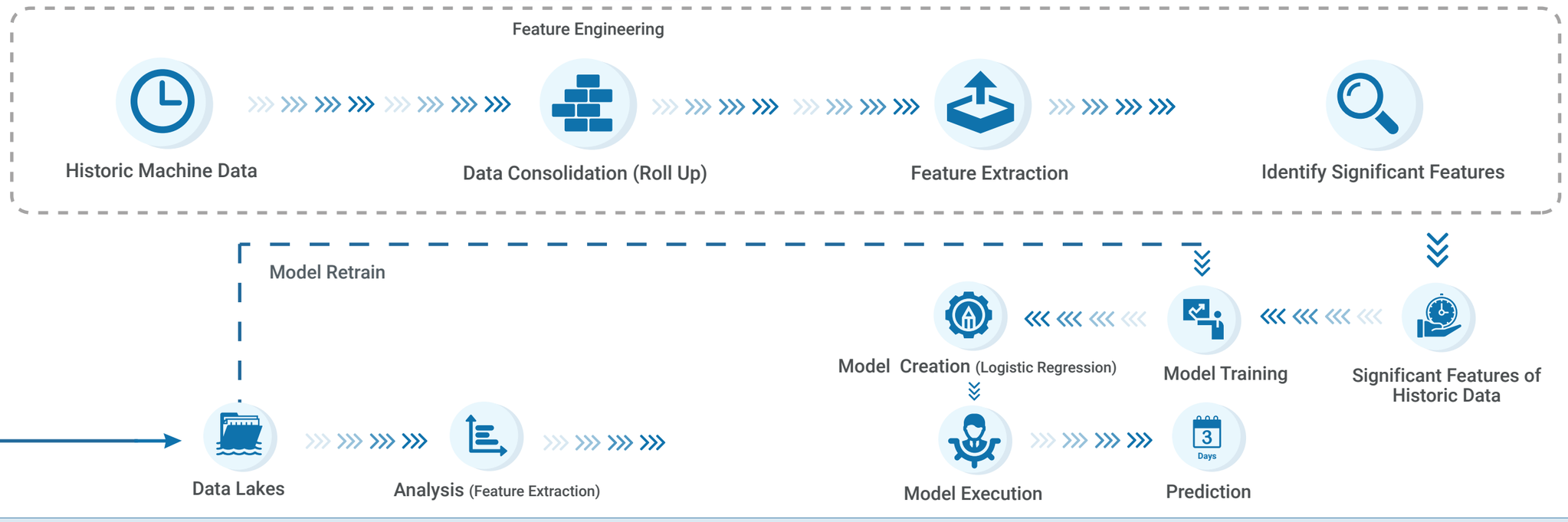
Cloud Computing v/s Edge Computing



Computer Vision and Machine Learning



Predictive Maintenance



AN UAV MACHINE FLIES AUTONOMOUSLY, CAPTURES IMAGES, CHECKS FOR CORROSION AND SUGGESTS MAINTENANCE.

Smart Warehouse
AI Driven Inspection

THE USE OF A DRONE FOR INSPECTION AND INVENTORY CHECKS

SCAN QR CODE & WATCH DEMO VIDEO

AN EXAMPLE OF INSPECTIONS AND INVENTORY CHECKS USING A DRONE

PROBLEM

A WAREHOUSE MANAGER STRUGGLES WITH THE FOLLOWING:

- Industrial pipes placed on the ceiling frequently leak due to corrosion. The leakage results in broken product boxes and thus increased costs. Manual checks are difficult, infrequent and costly.
- Warehouse managers often request the delay in the goods delivery as they are unsure of the warehouse's capacity. Counting the empty shelves is a time-consuming process as it is done manually.

SOLUTION

WE AT NAGARRO HELP VIA AN UAV MACHINE (DRONE) POWERED BY AN AI ENGINE:

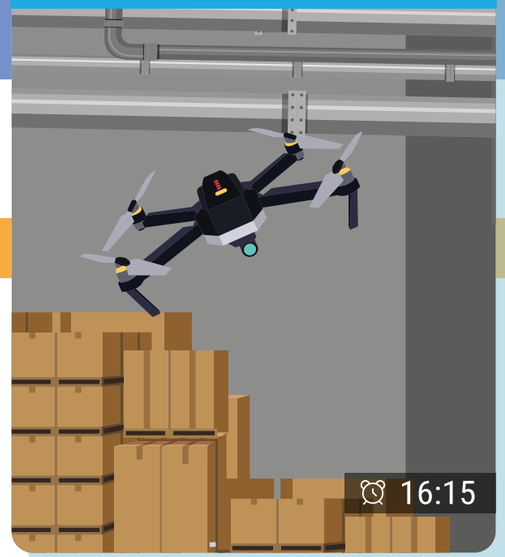
- With its ability to fly autonomously, a drone can capture images to check the corrosion level of the pipes. An AI engine can thus process the images to identify the pipes which are most likely to leak in the next weeks / defined number of days. Thus, these pipes can be timely repaired to prevent package loss.
- Drones can also be used to identify empty shelves. Once identified, a drone can read the bar-code and send the information back to the inventory management system. Thus, the system tracks the number and location of empty shelves at all times. This prevents manual inter-vention and disruptions in the inbound process.

Smart Warehouse

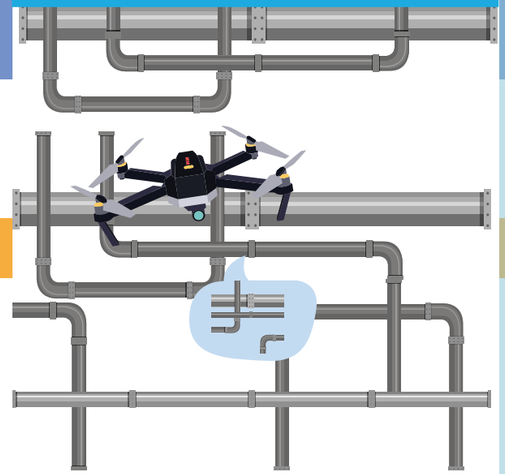
Smart Warehouse AI Driven Inspection

Hi! I am Tom, the warehouse manager.

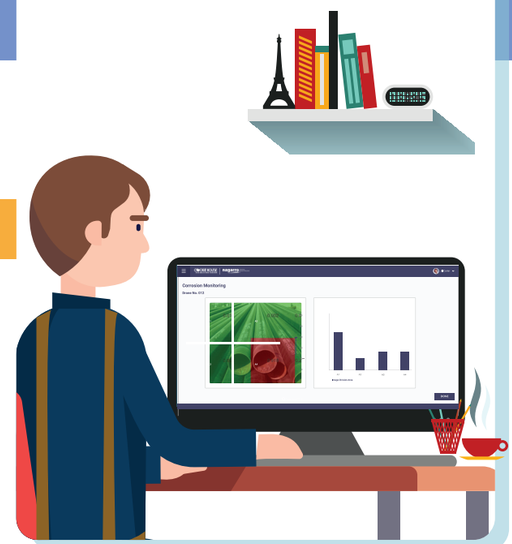
Drone flight is scheduled to check the pipe's corrosion level.



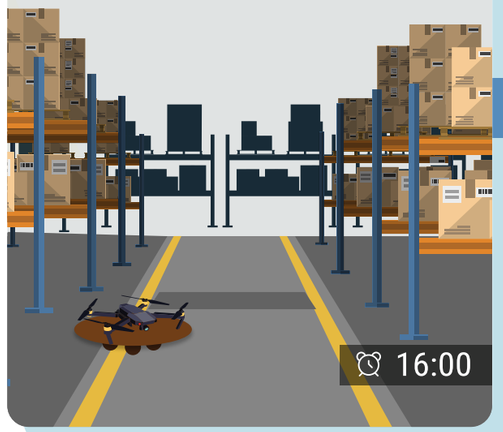
The drone takes pictures of the pipes. Pictures are then sent to the AI engine for analysis.



AI engine processes the images and calculates the pipe's corrosion level.

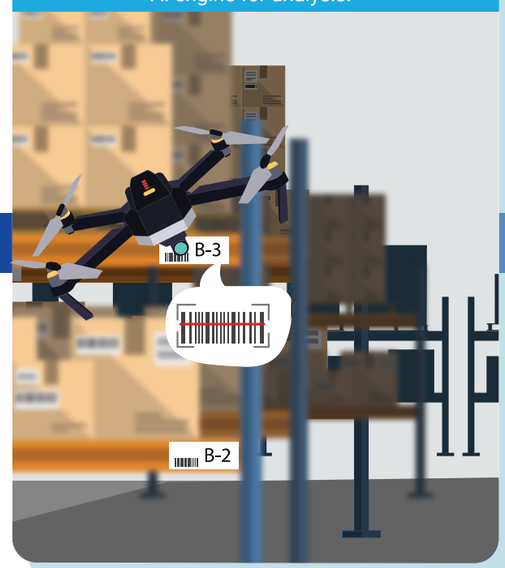


Drone flight is scheduled for inventory inspection.

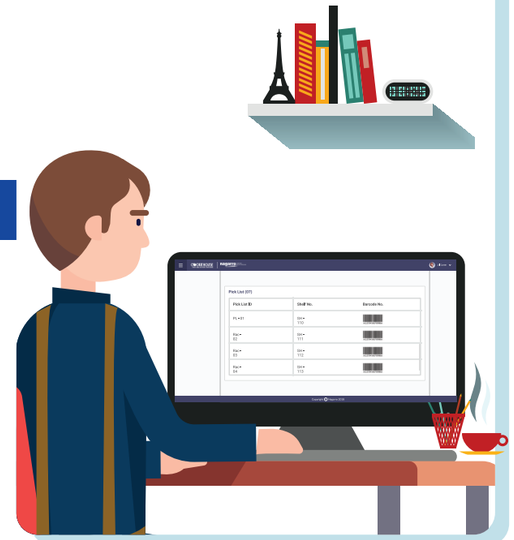


Drone takes an autonomous path and performs the inventory check.

Drone takes pictures of racks, shelves and boxes. Pictures are then sent to the AI engine for analysis.



AI engine processes the images and identifies the number of boxes on the shelves.



Smart Warehouse
Pick & Stock using Smart Glass & Finger Ring Scanner

PICK & STOCK SCENARIO

SCAN QR CODE & WATCH DEMO VIDEO

Usually, pickers carry a hard copy of the items to pick. They mark items as they pick them. Naturally, this process is prone to human error. With the help of a finger ring scanner and a smart glass, workers can pick and stock much more precisely, efficiently and in the right order.

THE CURRENT PROCESS IS COMPLETELY MANUAL. THE PICKERS CARRY A HARD COPY OF THE ITEMS TO PICK & MARK AS THEY GO.

- Pickers have to juggle looking at the sheet, driving the cart, scanning items and putting items into the cart.
- Pickers miss items and need to go back for them; this often leads to delayed or incorrect orders.
- Pickers may mix up orders by placing items into incorrect baskets.
- The optimum route of picking depends on the user's level of experience.
- It's difficult to change the picklist, once the pickers are en route.

BENEFITS OF THE VOICE-OPERATED ASSISTED REALITY APPLICATION ON THE SMART GLASS:

- Pickers don't need to carry printed copies of their pick list. The list is now available on demand electronically. Hence, their hands are free, which increases their efficiency.
- If pickers miss picking an item, they are promptly notified on their screen.
- The visual display illustrates which item goes into which basket. This prevents potential mix-ups.
- Picklists can be changed and removed en route or adjusted based on high/low priority orders, available inventory or worker availability etc.
- The use of a finger ring scanner simplifies the scanning process for the pickers.

Smart Warehouse

Smart Warehouse Pick & Stock

Anna
Smart Warehouse Worker

Explore Picklists

Anna launches the application on her Smart Glass and explores the assigned picklists.

1

Anna
Smart Warehouse Worker

Verify Location

Anna opens a picklist and goes to the location mentioned, she scans the location barcode & views the items.

2

Anna
Smart Warehouse Worker

Scan and Pick Items

Anna scans the item's barcode as mentioned in the picklist. The application suggests the location of the trolley.

3

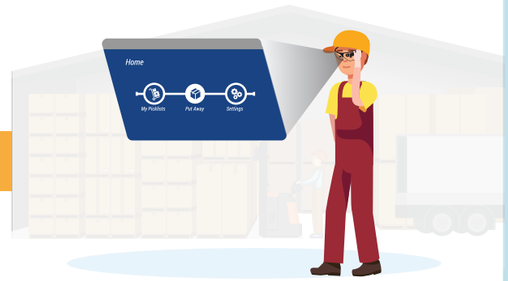
Anna
Smart Warehouse Worker

Scan and Place Item

Anna places the item in the cart and scans the trolley locacation. She then picks the next item from the shelf.

4

Steve
Smart Warehouse Worker



Select Put Away

Steve wears the smart glass and launches the application.

5

Steve
Smart Warehouse Worker

Scan Items

Steve scans the available items and puts them on the trolley.

6

Steve
Smart Warehouse Worker

Move Items

Steve starts moving towards the storage location.

7

Steve
Smart Warehouse Worker

Stock Items

By scanning the item and location, Steve puts the items on the shelves one-by-one.

8

Smart Procurement
with Blockchain

THROUGH A SCALABLE AND ENTERPRISE READY SOLUTION ON BLOCKCHAIN, THE PROCUREMENT DEPARTMENT OF A FACTORY CAN MITIGATE CHALLENGES USING BLOCKCHAIN TECHNOLOGIES, LIKE COST-REDUCTION, TRACEABILITY, TRANSPARENCY, SECURITY AND EFFICIENCY.

BLOCKCHAIN-TECHNOLOGY FOR SUPPLY CHAIN TRACEABILITY

SCAN QR CODE & WATCH DEMO VIDEO

SMART PROCUREMENT

In a factory the procurement department faces the following challenges:

- Their suppliers lack end to end visibility of orders within the procurement lifecycle
- Failure to track parts within the supply chain
- A lack of adequate fraud detection mechanisms
- Disruptions within the supply chain due to the involvement of multiple stakeholders and their subsequent ripple effects

A SUPPLY CHAIN TRACEABILITY SOLUTION ON BLOCKCHAIN

Through scalable and enterprise ready blockchain solutions, the procurement department of a factory can overcome arising challenges using the following tenets of blockchain technology:

- Efficient supply chain management resulting in cost reductions
- Farm-to-fork traceability of products and their components
- End-to-end transparency within the supply chain
- Enhanced security provided by the blockchain platform
- Increased efficiency due to the elimination of redundant documentation and speedy transactions via smart contracts

Smart Procurement powered by Blockchain

Daniel is on a technology platform which is resilient and gives him farm-to-fork traceability for his products.

Daniel
Procurement Manager, Cookie House GmbH

Requisition Request & Inventory Check

Daniel recieves requisition request for milk.
He analyzes the available and required inventory.

1

Thanks to blockchain-as-a service, Daniel can easily bring a stakeholder onboard his scalable and permissioned Blockchain ecosystem.

Daniel
Procurement Manager, Cookie House GmbH

Suppliers Registration

If Daniel wants to register additional suppliers, he can do that directly on the blockchain application.

2

Because the platform is distributed and immutable, Daniel saves significant transaction and reconciliation costs.

Daniel
Procurement Manager, Cookie House GmbH

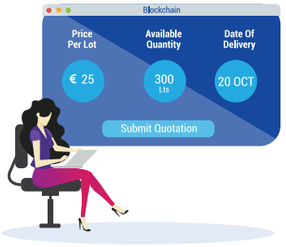
Request Quotations

Daniel requests quotations from registered suppliers.

3

Blockchain allows Kathy to participate in the futuristic business model and provides seamless integration with her existing systems in place.

Kathy
Fulfillment Manager, DairyFresh Supplies GmbH



Supplier Submits Quotation

Kathy analyzes the quotation request and submits the quotation.

4

Blockchain minimizes the trust Daniel requires to interact with anyone in the ecosystem, eliminating trust premiums and intermediaries.

Daniel
Procurement Manager, Cookie House GmbH

Supplier Selection & Order Allocation

Daniel selects single/multiple supplier(s) to deliver the milk and sends them purchase orders.

5

Kathy knows the system is secure and tamper-proof, so she can focus on what she does best - supply best quality.

Smart contracts ensure that agreements are binding, secure and get executed automatically. This enables trust and quick decision making in the ecosystem.

Kathy
Fulfillment Manager, DairyFresh Supplies GmbH

Order Fulfillment

Kathy arranges the material and books logistics from a pool of options available to her.

6

Tokenization allows Stephan to represent his physical assets digitally on blockchain. Thus, fully leveraging his IoT infrastructure when coupled with blockchain.

Stephan
Logistic Partner, A2Z Transport International LLC

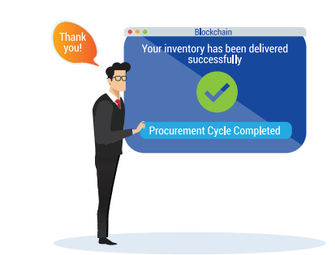
Inventory Transportation

Stephan transports inventory to the manufacturer warehouse. Meanwhile IoT sensors monitor the ambient conditions of milk, and relay the information to blockchain.

7

Blockchain is transparent. Hence Daniel can trust the received items and quickly find origin of a problem. He can audit the ecosytem in real time and all the time.

Daniel
Procurement Manager, Cookie House GmbH



Inventory Recieved

Daniel receives the inventory at the manufacturer warehouse, and marks the order received on blockchain.

8

Get started with the Nagarro Innovation Workshop

NOW THAT YOU ARE AWARE OF TECHNOLOGY USE CASES IN DIFFERENT INDUSTRIES, HOW DO YOU GET YOUR OWN CONNECTED ENTERPRISE JOURNEY STARTED?

THE NAGARRO INNOVATION WORKSHOP - OUR 3-STEP APPROACH:

STEP 1 - IDEATION + DIGITAL USE CASE: FIRSTLY, WE GENERATE IDEAS BASED ON THE PROBLEM STATEMENT PROVIDED BY THE CLIENT

- An inspirational presentation
- Moderating an interdisciplinary ideation workshop
- Documenting the workshop results through various visualisation techniques

DOWNLOAD THE INNOVATION TOOLKIT: WWW.NAGARRO.COM/INNOVATION-TOOLKIT

STEP 2 - BUSINESS VALUE: THE RESULTS OF STEP 1 ARE SUBJECT TO A VALUE & COST EVALUATION TO SELECT KEY USE CASES

The key factors are:

- Potential business value levers across the use cases
- An initial value estimation
- An estimation of the implementation effort
- Potential risks

CONTACT US: INFO@NAGARRO.COM

STEP 3 - PROTOTYPE & MOBILIZATION: THE SELECTED KEY USE CASES ARE IMPLEMENTED & DEMONSTRATED AT A MANAGEMENT FAIR

The most promising cases are implemented in a click-demo which is tailored to the clients' needs. It is typically comprised of:

- A click demo
- Creating the prototype (incl. relevant licenses & hardware)
- Crafting the necessary materials for a management event
- An inspirational presentation at the management event and support during the demo
- A "hands-on" zone to offer the audience the full experience

Client Investment:

- Typically 2-8 hours of group sessions
- The first workshop is typically to create innovation candidates
- Follow up workshops are for ideation / deep dive
- Team members are picked from different work areas
- From ideation to proof of concept in 6-8 weeks

About Nagarro

Nagarro drives technology-led business breakthroughs for industry leaders and challengers. When our clients want to move fast and make things, they turn to us. Today, we are more than 5000 experts across 21 countries. Togehter we form Nagarro, the global services division of Munich-based Allgeier SE.

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