




Augmanity Project

2026.01.14 ESAN

Bosch – Corporate presentation

A global network



 **402,800***
Bosch associates
make these solutions
possible

 **60***
countries –
440 regional
subsidiaries

Four business sectors



Mobility
Solutions



Industrial
Technology



Energy & Building
Technology



Consumer
Goods

✓ Including sales and service partners, Bosch's global manufacturing and sales network covers nearly every country in the world.

* As of 12.19
Preliminary, rounded figures based on internal accounting

i4.0 Innovation Consortium Project



AUGMANITY
AUGMENTED HUMANITY

AUGMANITY

“Augmented Humanity”

*Anticipate the **future** by developing user friendly, immersive and supportive **technology***



Cofinanciado por:



UNIÃO EUROPEIA
Fundo Europeu
de Desenvolvimento Regional

[POCI-01-0247-FEDER-046103 : LISBOA-01-0247-FEDER-046103]

AUGMANITY i5.0 Innovation Consortium Project

Participants



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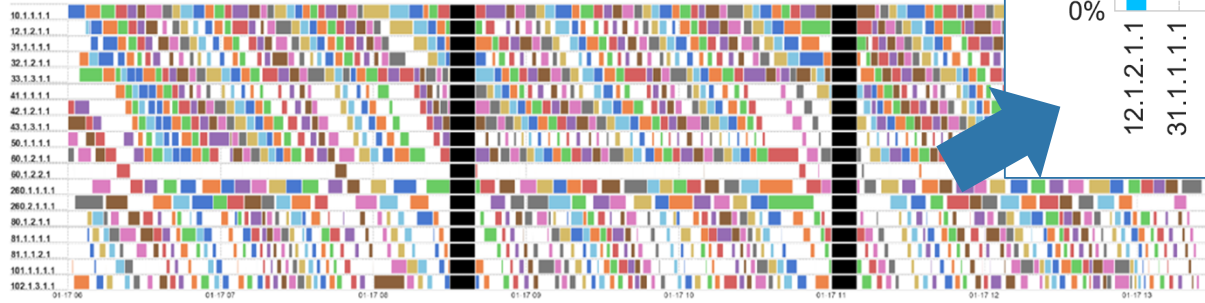


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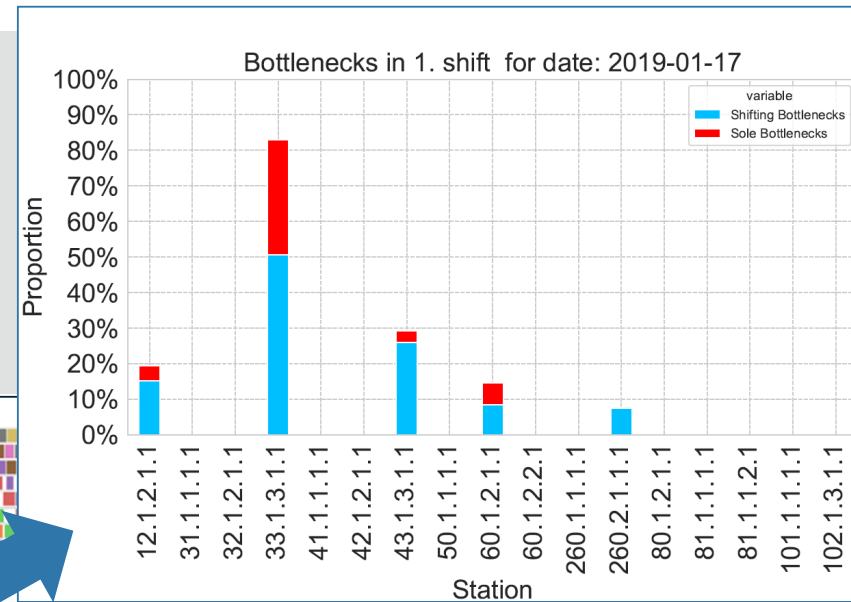
Bottleneck detection

- ▶ Raw Data : 'Part Processed' timestamp
- ▶ Compute the residence time per station (estimation ~ OEE)
- ▶ Requirement : **All stations must be connected**

▪ residence time per station (1st station is equal to cycle time)



One sample day in Aveiro Plant line 7





SOFT WEARABLE

THE EXOUPPERLIMB IS A SMART DEVICE THAT CAN BE ATTACHED TO THE BODY TO COLLECT THE USER'S BODY SIGNALS SUCH AS POSITION AND ORIENTATION OF THE UPPER LIMBS, TRUNK, BODY TEMPERATURE, HEART RATE, BLOOD PRESSURE, AND OTHERS. THE SENSORS CONSTITUTE A SET OF CONDITIONS THAT MUST BE OBEYED TO MAKE THEM MORE ACCURATE AND CLOSER TO REALITY, TRANSLATING IT INTO REAL-TIME INFORMATION WHICH HELPS TO PREVENT FUTURE WORK INJURIES.

PERSONAL PROTECTIVE EQUIPMENT

SHOWCASING A SENSING LAYER AND BOTH ACTIVE COMPRESSION AND VIBRATION SYSTEMS TO PREVENT FATIGUE SYMPTOMATOLOGY. THE CORRESPONDING FUNCTIONALITIES WERE TESTED USING A SAFETY FOOTWEAR PROTOTYPE DURING STANDING AND WALKING POSTURES TO DETERMINE THE APPROPRIATE INTEGRATION, AND USABILITY, COMFORT, AND BIOMECHANICAL SPECIFICATIONS.



LIVE FEEDBACK TO PRODUCTION MANAGERS

ALERT URGENCY



PRODUCTION UNIT INFO

GRAPHIC FEEDBACK

SUGGESTED ACTION



EXO.UPPER.LIMB



PROTECTIVE
EQUIPMENT
Personal

SERVER

LOCAL NETWORK
OR INTERNET



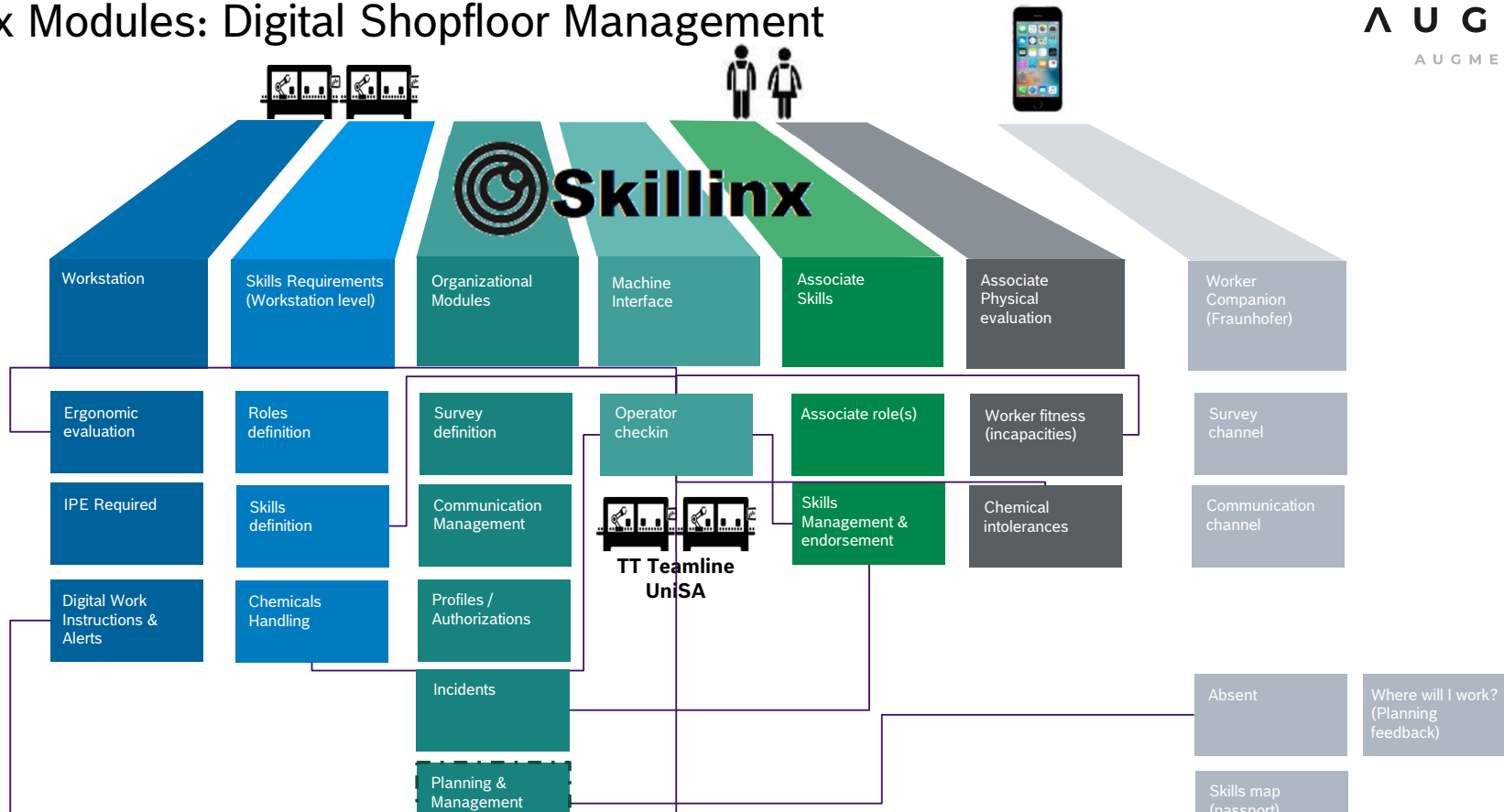
USER INTERFACE
DEVICES
SMARTPHONE + TABLET + DISPLAY

AUGMANITY i5.0 Innovation

Skillinx Modules: Digital Shopfloor Management



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Smart wearables enable next generation industry shopfloor management

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Plataforma AIoT Skillinx



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O **Skillinx** é uma plataforma AIoT (Artificial Intelligence of Things) desenvolvida pela **Bosch** com a participação da **UA**, utilizando a tecnologia **OutSystems** para facilitar a **Colaboração Humano-Máquina** (HMC) e otimizar a gestão do chão de fábrica.

Principais Funcionalidades

-  Integração entre sensores IoT e sistemas de gestão de recursos humanos
-  Algoritmos de IA para otimização da alocação de trabalhadores
-  Sistema de gestão de competências e formação acelerada
-  Dashboards em tempo real para monitorização de desempenho
-  Adaptação dinâmica às mudanças nas linhas de produção



Internal C-SC1 | Home Comfort | HC/MFD-Av | 2025-09-17

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AUGMANITY i5.0 Innovation

Integração OT e IT



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Um dos maiores desafios da Indústria 5.0 é a **integração eficiente** entre os sistemas operacionais (OT) e os sistemas de informação (IT).

Arquitetura da Solução Skillinx

A plataforma OutSystems permitiu criar uma **ponte digital** entre sensores, dispositivos IoT e sistemas de gestão empresarial, possibilitando o desenvolvimento ágil da plataforma Skillinx.

Camada OT

Sensores, atuadores, PLCs e dispositivos IoT no chão de fábrica conectados através de gateways e protocolos industriais.

Camada IT

Aplicações de gestão, análise de dados e interfaces de usuário desenvolvidas com OutSystems para tomada de decisão.



Internal C-SC1 | Home Comfort | HC/MFD-Av | 2025-09-17

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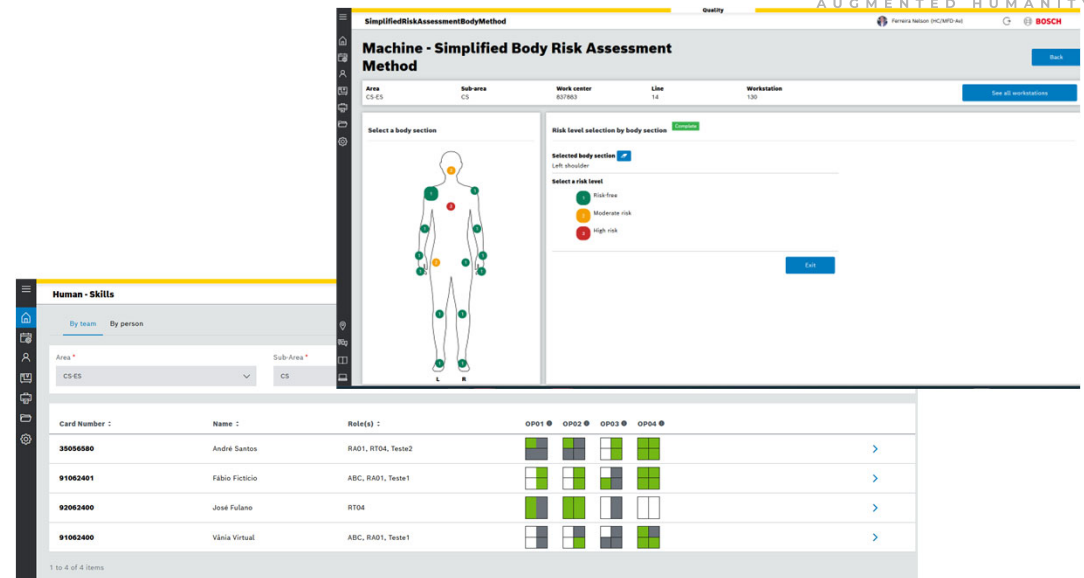
AUGMANITY i5.0 Innovation Resultados



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A implementação da Plataforma **Skillinx** trouxe resultados significativos para a Bosch, transformando a forma como as equipas são preparadas para novas linhas de montagem e otimizando a gestão do chão de fábrica.



Principais Conquistas

75%

Redução no tempo de formação

4%

Aumento na produtividade

4 dias

Tempo de preparação de equipas

Reconhecimento

O projeto Augmanity e a plataforma Skillinx foram reconhecidos internacionalmente com o **OutSystems ONE Innovation Award** em Amsterdão, destacando-se como uma das primeiras aplicações práticas da Indústria 5.0.

AUGMANITY i5.0 Innovation Exemplos



Exposição a Químicos “IoT” AUGMANITY AUGMENTED HUMANITY

Avaliação Física

New Assessment Development

Human > Fitness / New Assessment

Worker: Select a Worker

Personal Information Active

Worker Name: **Adilla Soares**

Card Number: **31332674**

Worker Type: *

Work Center

Area: **MSE-CS-ES**

Sub-Area: **MSE2-CS-ES**

Next Assessment: *
dd-mm-yyyy

Ergonomics Assessment Human Characteristics Chemical Intolerances

Assessment Parameters

Check medical history

1 Risk-free 2 Moderate risk 3 High risk

“Características Humanas”

Person WorkStation Sensitivity Off/On

Photosensitive demanding	<input type="checkbox"/>
Physical demanding	<input type="checkbox"/>
Visual demanding	<input type="checkbox"/>
Hearing demanding	<input type="checkbox"/>
Mentally exhausting	<input type="checkbox"/>

Chemical Intolerances

H210 Very sensitive

H310 Fatal in contact with skin

[Edit Intolerances](#)

Workstation Requirements

Line: Select a Line

Workstation: Select a Workstation

Use the filters above to search for workstation evaluations.

Mobile Digital Twin

AvP-Line 15

Delivery

PC Targets	PC	QTY
69	59	85.5%
128	119	93%

Quality

OK	NGK	EQY
73	2	97%
106	2	98%

Shift Interruptions - Line 15

Current Shift 13:45 - 21:45

Last Shift (Oct. 01) 05:45 - 13:45

View interruptions

Last TTNR 8738213471-0000

Report occurrence

Workstations

- Workstation 1
- Workstation 10
- Workstation 20
- Workstation 30
- Workstation 40
- Workstation 60
- Workstation 70
- Workstation 80 - Hebec
- Workstation 90
- Workstation 90



SKILLINX GDPR COMPLIANCE

AUGMANITY i5.0 Innovation

GDPR codex



#1 Determination of legal basis for data processing

- **Explicit Consent:** Since personal data is considered sensitive under GDPR, if requirement is optional (vs legal req.), it requires explicit consent from the worker. Consent should be informed, specific, and freely given, meaning **workers should understand exactly which data is being collected and how it will be used.**
- **Legitimate Interests:** if the data is necessary to protect workers' safety, we do data processing based on legitimate interests. However, a **legitimate interest assessment (LIA) must be conducted** to balance the need for data collection against any potential privacy impact on the workers.

#2 Minimize Data Collection and Ensure Purpose Limitation

- **Data Minimization:** we collect only the data **strictly necessary** to achieve the intended **legal, safety and health benefits.**
- **Purpose Limitation:** we **define a clear and narrow purpose** for data collection (e.g., legal requirement, ergonomics, health monitoring for safety) and avoid using the data for unrelated purposes without additional consent.

AUGMANITY i5.0 Innovation

GDPR codex



#3 Implement Robust Security Measures

- **Data Encryption:** we use encryption to protect data in transit (especially because we are dealing with personal information).
- **Access Controls:** we **limit access to personal data to authorized personnel only**, using role-based access controls and minimum yearly authorization checks (Master of Role checks).
- **Data Anonymization/Pseudonymization:** we anonymize or pseudonymize the data to protect worker privacy. (eg: by aggregating ergonomic data per workstation, we reduce the privacy impact while still providing insights).

#4 Conduct a Data Protection Impact Assessment (DPIA)

- We check if a **DPIA is required**. The DPIA will help assess risks to workers' privacy and outline measures to mitigate these risks, ensuring compliance with GDPR.

AUGMANITY i5.0 Innovation

GDPR codex



#5 Implement Transparency and Worker Rights

- **Provide Clear Privacy Notices:** we clearly explain workers the types of data collected, purpose of collection, retention periods, and their rights (e.g., access, correction, deletion).
- **Facilitate Workers' Rights:** we ensure that workers can exercise their GDPR rights, such as accessing their data, requesting corrections, or even withdrawing consent if the data collection is consent-based.

#6 Set Up Data Retention and Deletion Policies

- **Define and communicate how long the data will be retained,** in alignment with the purpose. After the purpose is fulfilled (e.g., safety assessment), we delete the data or aggregate it to reduce privacy risks.

#7 Conduct Ongoing Monitoring and Compliance Reviews

- **Regularly review and update data processing practices,** especially as the technology evolves. Periodic audits will ensure that GDPR compliance is maintained over time (audits aligned with DSO – Data Security Officer).

A woman with long brown hair and round glasses is sitting at a table, looking intently at a chessboard. She is wearing a brown, textured sweater. Her hands are clasped together in a thinking pose. The chessboard is in the foreground, with white and black pieces. The background is a bookshelf filled with books, slightly out of focus. The lighting is warm and focused on the woman and the chessboard.

“The winners of this new industrial revolution won't be the companies with the most complex digital models...

...they will be the ones who are the most ruthless in their pursuit of value.”

Thank you!



www.linkedin.com/in/nelsonferreirai40