



PROJECT

# 360° Prevention

“Because the safety of our teams is our greatest value”

## How 360° Prevention was born...

**1**

E-REDES is the distribution network operator and manages **230,000 kilometres of network spread throughout the country**. The main activity risk for technicians is **electrical risk**, so any distraction, carelessness or overconfidence can be fatal.

**2**

Every day, it has around **3,500 technicians in the field - both in-house and from external providers** - carrying out thousands of work orders across the country, which is why it is essential to **ensure safety conditions**.

**3**

This project aims to reinforce the use of **Personal Protective Equipment** in order to **reduce the number of unsafe acts/behaviours** and guarantee the safety and well-being of **technicians**.



# E-REDES ensures the supply of electricity with quality and efficiency and guarantees compliance with the safety conditions of technicians

1



## Ensure the distribution of electricity in mainland Portugal

Maintaining the distribution network and guaranteeing security of supply, in compliance with quality standards.

2



## Ensuring training competences

Ensure that all field technicians have specialised training for the activities they carry out.

3



## Ensure safety conditions

Ensuring that technicians are aware of the risks associated with carrying out each job, as well as the appropriate prevention measures. **And that they have and use the appropriate personal protective equipment to carry out their tasks.**

4



## Carry out the work

Carry out work in different business areas (Construction, Maintenance, Operation and Commercial Services) safely

## The challenges in the field include ensuring that technicians use the appropriate Personal Protective Equipment (PPE) for the different tasks.

# 1

### **Carrying out several short work orders per day**

Due to the high number of work orders, the repetitiveness of the tasks and their experience and confidence in carrying them out, technicians are sometimes tempted to ignore some basic safety rules. It is important to create controls for the use of PPE, without adding bureaucracy to the process so as not to increase the time it takes to carry out tasks.

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# 2

### **Need for continuous training/awareness-raising on the risks of the activities, namely the use of appropriate PPE**

All the technicians have adequate training to carry out their duties. However, because they carry out the same tasks on a daily basis, they end up neglecting the proper use of some PPE.

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# 3

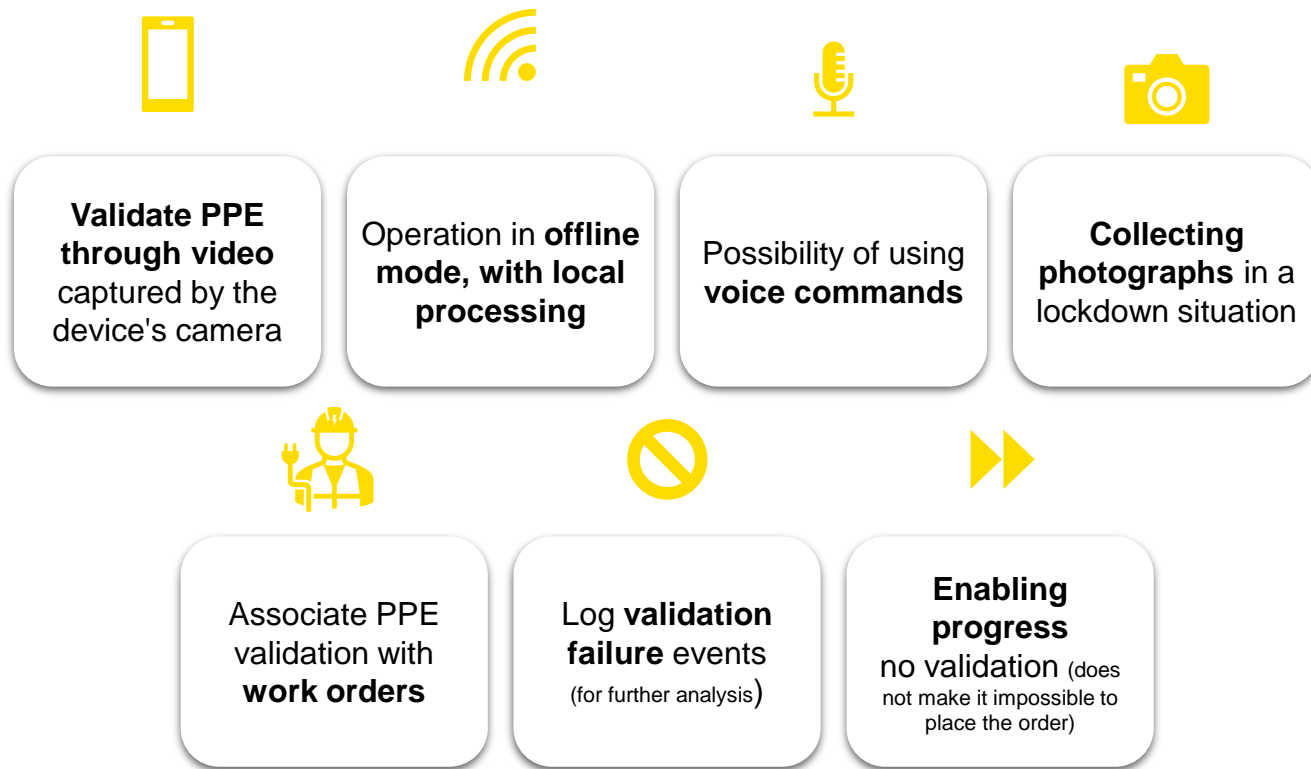
### **Difficulty in monitoring work involving electrical risks**

Accompanying the teams in the field is a significant challenge given the geographical dispersion of E-REDES' activity (scattered throughout the country). The new resources, less adapted to the use of PPE when carrying out tasks, require special attention.

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# E-REDES has developed Prevenção 360° - an innovative solution with Artificial Intelligence to promote additional control of the correct use of PPE.

## Android application



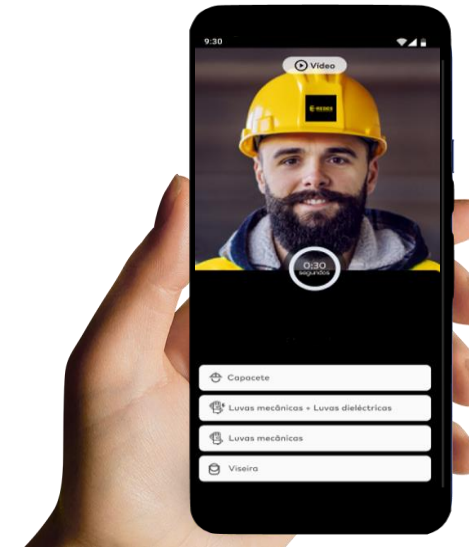
## Computer Vision model to recognise the use of PPE



**Configuring the types of PPE to be validated**



**Automatic model for recognising PPE in real time**

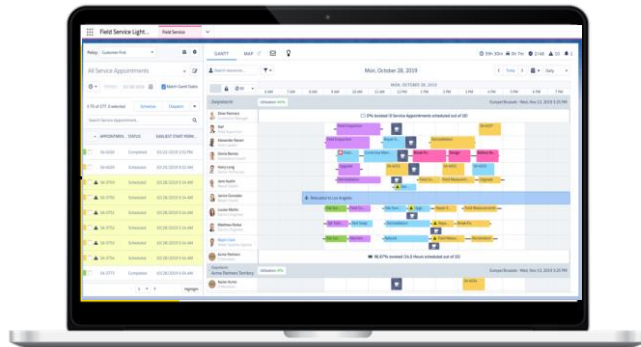


It fits into a comprehensive *employee experience* strategy *and* complements other tools to increase productivity, safety and team satisfaction.

**START DAY**



**OPTIMISATION ROUTES**



Route optimisation for teams in the field. Obtains the best execution sequence taking into account the distance between sites, skills, traffic...

**STRENGTHENING SECURITY**



Computer Vision (AI) for automatic, real-time validation of the use of protective equipment

**SUPPORT REMOTE**



Supporting teams with Augmented Reality and remote Experts to optimise performance and confirm that work is completed correctly

## 360° Prevention ensures that technicians use Personal Protective Equipment properly, without adding bureaucracy to the process

How does 360° Prevention minimise the risks arising from the task?

### Needs

**1** Service integrated into current mobility solutions used by technicians

**2** Define Personal Protective Equipment by activity

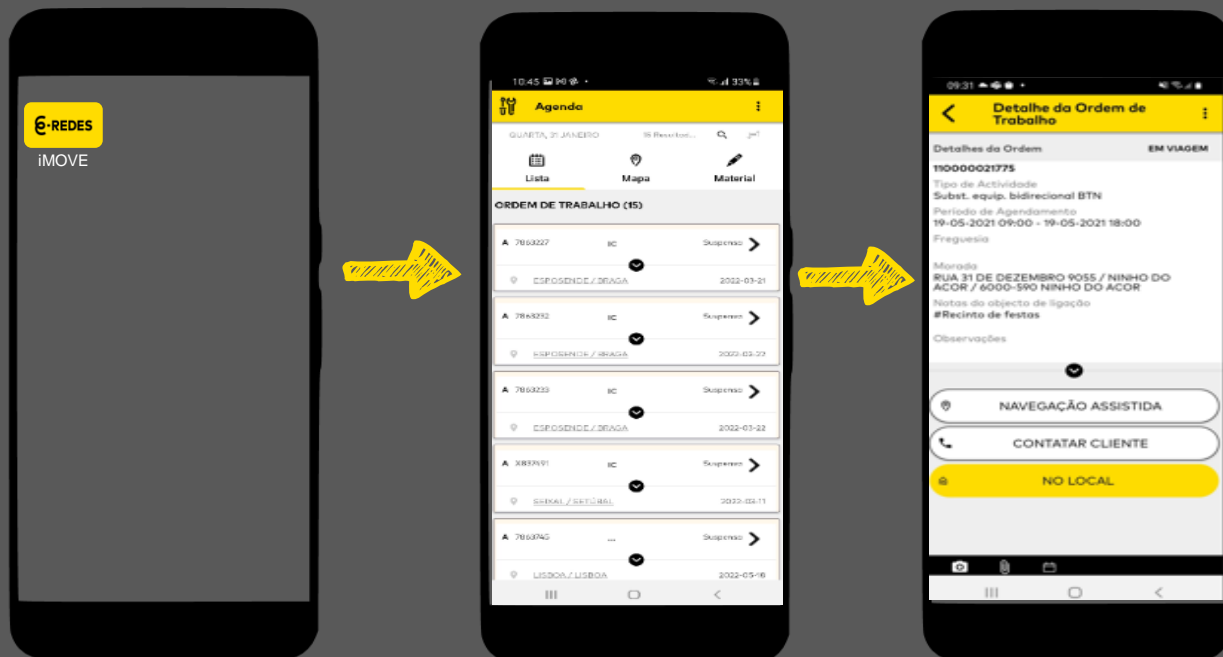
**3** Validate PPE in real time, with local processing

### Results and benefits

Development of an **Android application, fully native and operating offline** (when there is no mobile network), and integrated with the mobility tools currently used in field interventions

Determining the **risk of the activity and the appropriate PPE** for each type of order. Use of artificial intelligence and computer vision models to recognise each PPE - MobileNetV3 - convolutional neural network (CNN) designed for use in smartphones (efficient in computing and energy consumption)

In each Work Order, **before starting the task**, a pop-up appears in the technicians' operating applications to **automatically validate the proper use of PPE in real time**, without any additional bureaucracy or manualities, so as not to burden the time taken to carry out the task.



# 360° integrated prevention in operations with electrical risks

## Description

**360° Prevention** is integrated into the mobile operations platform in common use and works in remote environments



### Integrated with everyday operating tools

Application integrates with technicians' daily work tools, ensuring that the adoption of technology is fluid and non-intrusive, facilitating adoption



### Operation in Offline Mode

Internet connection-independent operation ensures continuous security monitoring, even in remote locations or with limited connectivity. Local processing reduces vulnerability to cyber attacks



### Usability - voice commands and volume button

Possibility to move forward using the side button of the mobile device or via voice, leaving it "hands free"





# Immediate feedback through advanced AI models

## Description

The **360° Prevention application** enables the automatic validation of PPE before activities are carried out.



### User-friendly interface and immediate feedback

Validation, via video or photo, of the PPE in use - helmet, visor, mechanical protection gloves, dielectric protection gloves - for electrical risk activities. Intuitive user interface providing instant feedback



### Computer vision AI models

It uses sophisticated AI models - convolutional neural networks (CNNs), to identify, classify and verify the correct use of PPE. These models are trained on vast data sets to recognise a wide range of equipment in different lighting conditions and positions,



Demonstration video validating PPE

## Through advanced technology, 360° Prevention reinforces the culture of safety and the well-being of teams



**Direct impact on the reduction of accidents at work**, by ensuring the proper use of PPE and reducing unsafe behaviour, promoting a culture of safety and zero tolerance for accidents.



**Direct impact on employees, their direct and indirect families by** reinforcing the organisation's commitment to the health and safety of its technicians - internal and external - contributing to a safer working environment and people's well-being.



Potential for extension to other types of orders (e.g. work at height or underground), with the validation of other PPE (rope, harness, smoke mask) Application can also be extended to other Group distribution companies in Spain and Brazil, which allows the **scope of action and impact on the community to be expanded.**



**Prevention 360°** incorporates cutting-edge technologies to improve safety in the workplace but above all demonstrates a **practical and effective application of artificial intelligence** to tackle **real challenges**, setting a new standard in **technological innovation for occupational health.**

# Some results

- Ensure that 100 per cent of workers have and use the appropriate personal protective equipment (PPE) for the task they are carrying out.
- Reduce/eliminate the number of accidents at work caused by the lack of Personal Protective Equipment.
- Minimising the risks arising from the task.
- Implementation of a more consistent safety culture.



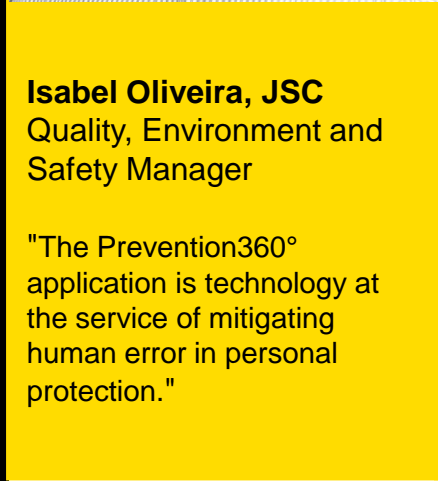
**Luis Fonseca, E-REDES**  
Digital Acceleration Leader

"We use state-of-the-art technology to reinforce the safety culture and save lives! In the project we went beyond mere adherence to rules and regulations to promote a safer working environment, reducing accidents and serious injuries."



**Luís Bárbara - DGU**  
Digital Manager

"It was very rewarding to be part of this project, not only because of the excellent technological challenge, but above all because of the impact it has on the lives and safety of our people"



**Isabel Oliveira, JSC**  
Quality, Environment and Safety Manager

"The Prevention360° application is technology at the service of mitigating human error in personal protection."



**Sandra Matos, PROEF**  
Quality, Environment and Safety Manager

"The 'digital' validation of the use of PPE, before the start of activities, allows for greater awareness of its necessity and relevance, systematising and internalising safe behaviours."



**João Santos, NTTDATA**  
Utilities Engagement - DevTeam

"This innovative solution is a clear example of how innovation and technology can drive progress and excellence in our sector."



**Andreia Campos, E-REDES**  
Project Leader, Environment and Safety

"The Prevention 360° application brings a new approach to safety, automating the safety of technicians and reducing accidents and unsafe behaviour."



**João Santos, NTTDATA**  
Utilities Engagement - DevTeam

"This innovative solution is a clear example of how innovation and technology can drive progress and excellence in our sector."