



Intelligent validation detector

Access control of customers without ticket or without a valid ticket
in underground stations of Metro do Porto

Team

- ▶ André Rodrigues – Developer
- ▶ João Henriques – Manager & User Research
- ▶ Luís Loureiro - Design



Video



A hand holding a lightbulb against a sunset background. The word "Solution" is overlaid in white text with a small red underline under the letter 'u'.

Solution

Solution

- ▶ Combine **thermal cameras** and **screens** placed in the area with access control equipment
- ▶ Identify customers with **red/green boxes** surrounding them
- ▶ Use **shame factor** to persuade people from travelling without a valid ticket
- ▶ Consequence → **increased revenue**



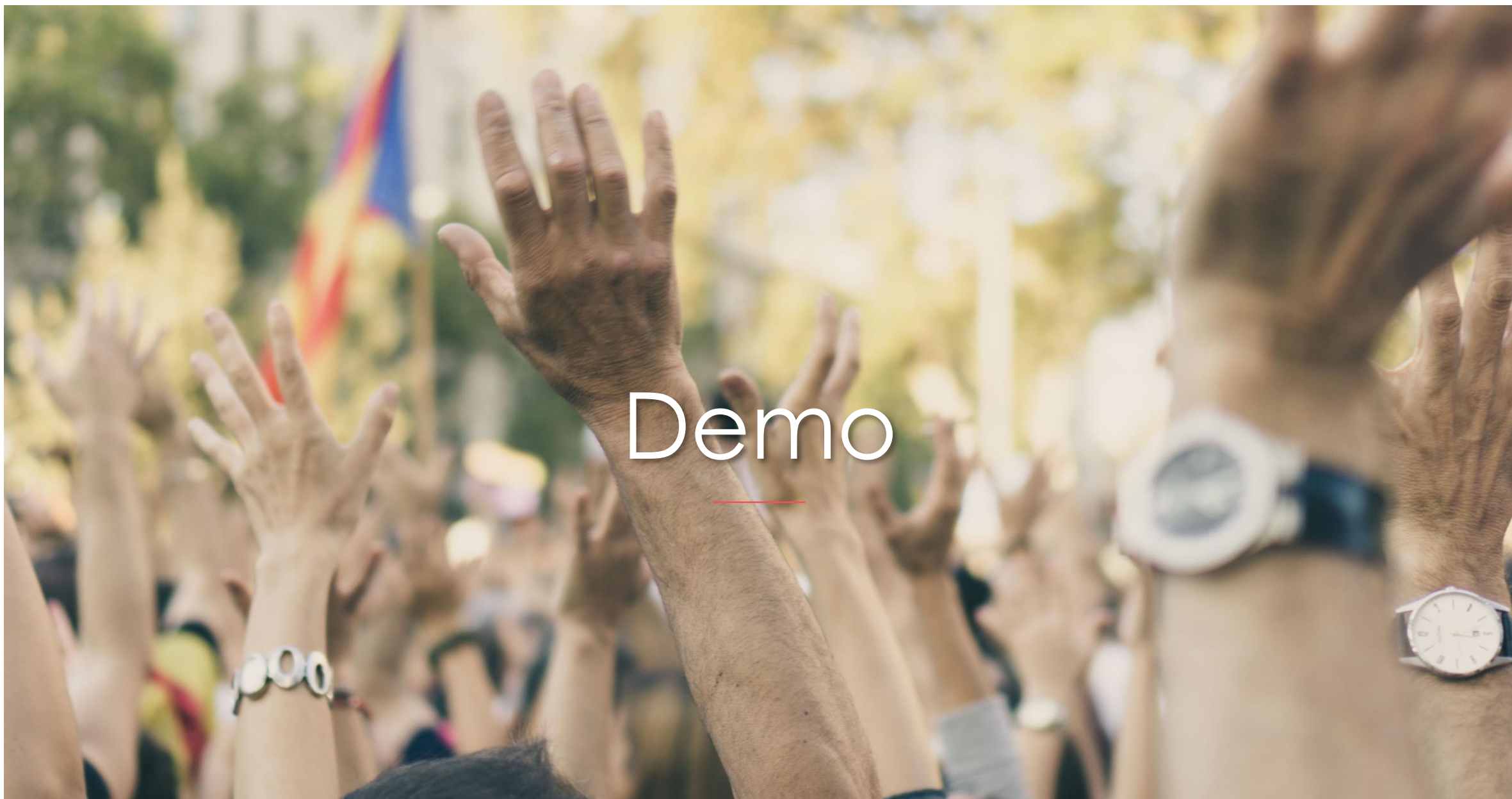
A long-exposure photograph of a yellow subway train moving through a station. The train is blurred, creating streaks of light and color. The platform is visible on the left, with a person standing. The station has a tiled wall and a sign that reads "Faria Guimarães".

Challenge

Challenge

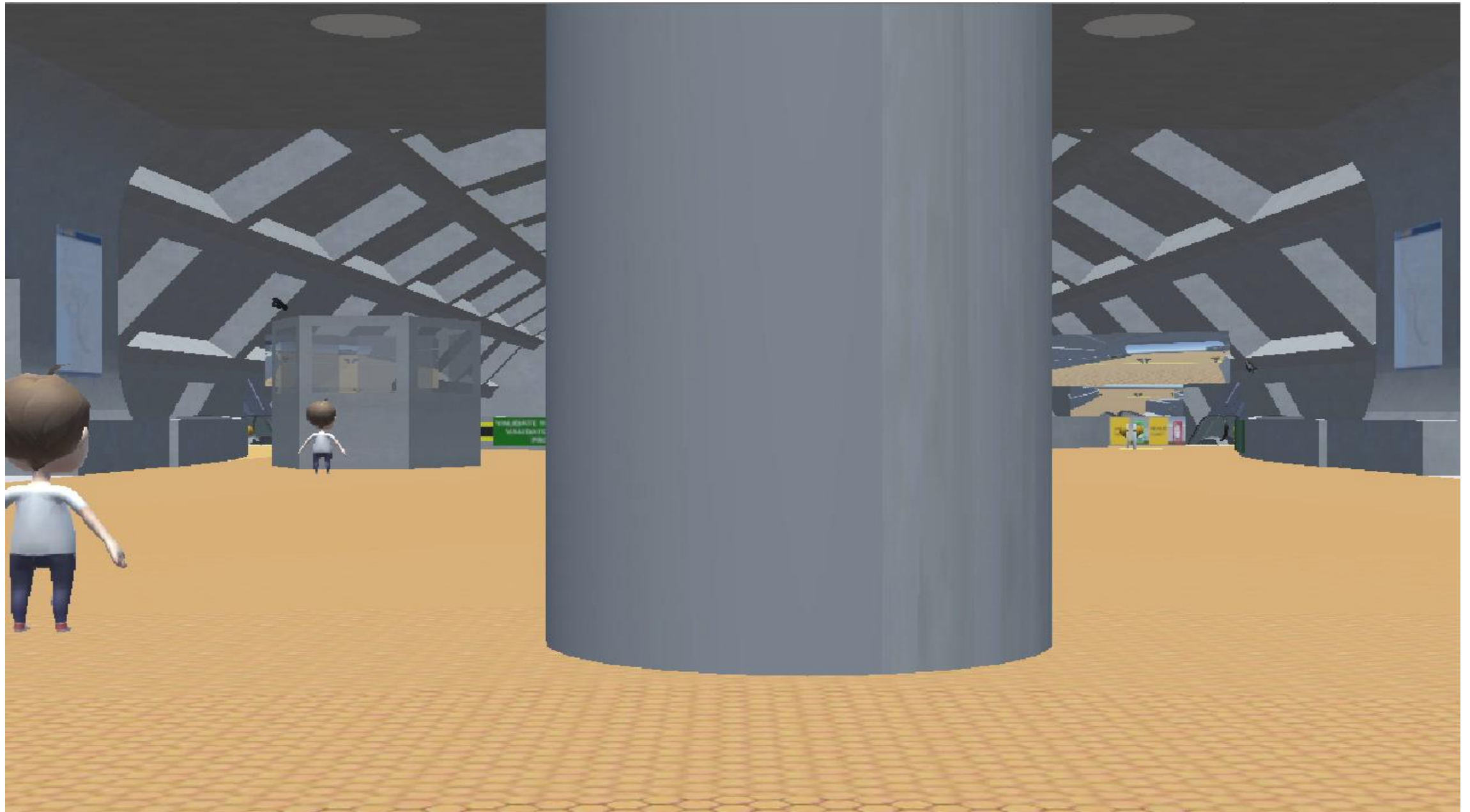


- ▶ About 20% of the Metro of Porto customers travel without a valid ticket
- ▶ Implement a control access system in 14 underground stations
- ▶ Keep the no-physical barriers design
 - ▶ "open"
 - ▶ easily accessible
 - ▶ allow free circulation



Demo

Demo



User Research



	1. Accidental evader	2. 'It's not my fault' evader	3. Calculated risk-taker	4. Career evaders
Occurrence	Rare	Occasional	Fairly often	Always
Intentions	No intent – evasion by accident	No intent – evasion due to barriers	Intent – evasion due to low risk	Entirely intentional
Feelings	Guilt / embarrassment	Nervous, worried but no guilt	Dispassionate, vigilant, no guilt	Pride
View of fare evaders	Condemnation	Range – empathy, injustice or condemnation	Range - understanding to condemnation	Empathy

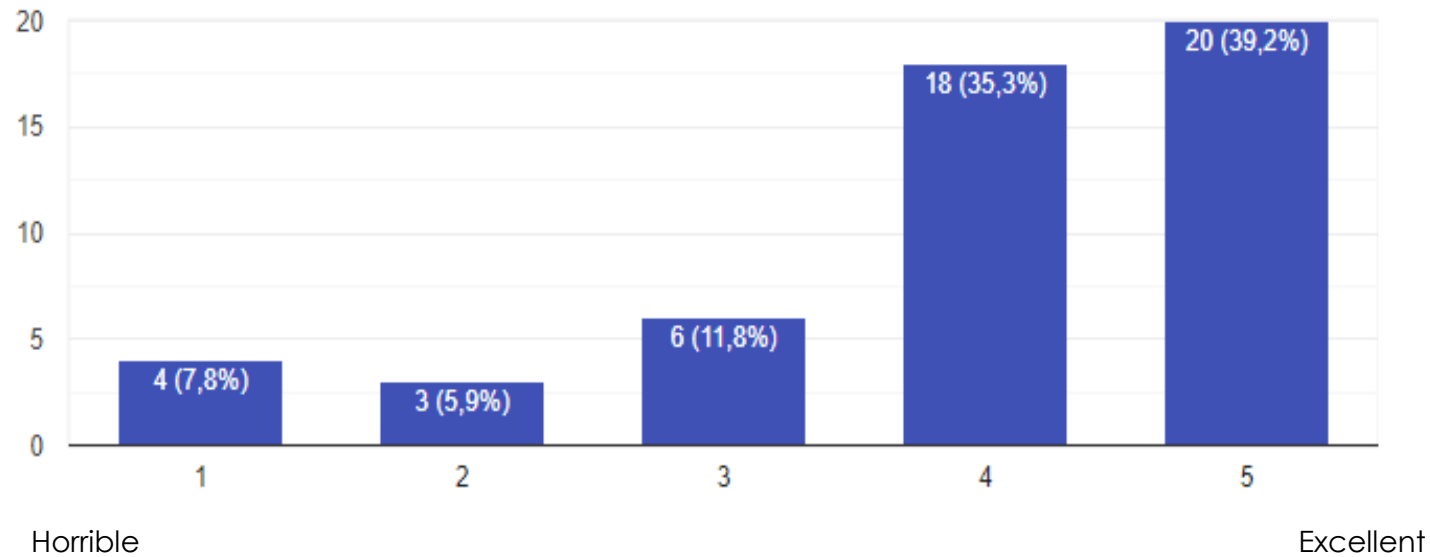
Initial User Research

What \ Who	< 30 years old	Middle age	> 60 years old
Without paying	27	6	4

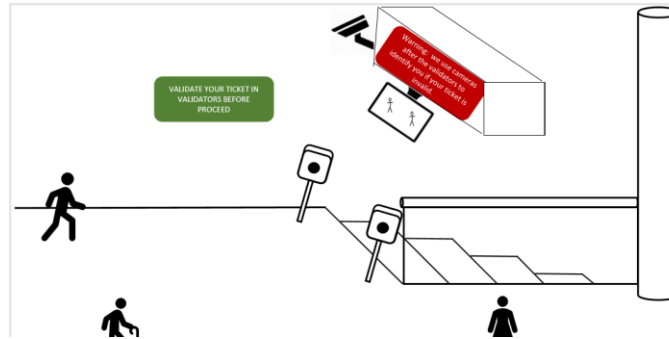
User
Research

Field
Observation

How would you feel if you knew you were being monitored to validate your ticket?



User Research Survey



User Research

Storyboards

Target users

	1. Accidental evader	2. 'It's not my fault' evader	3. Calculated risk-taker	4. Career evaders
Occurrence	Rare	Occasional	Fairly often	Always
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User Research

Detailed description of the solution

- ▶ Thermal cameras filming the area with access control equipment



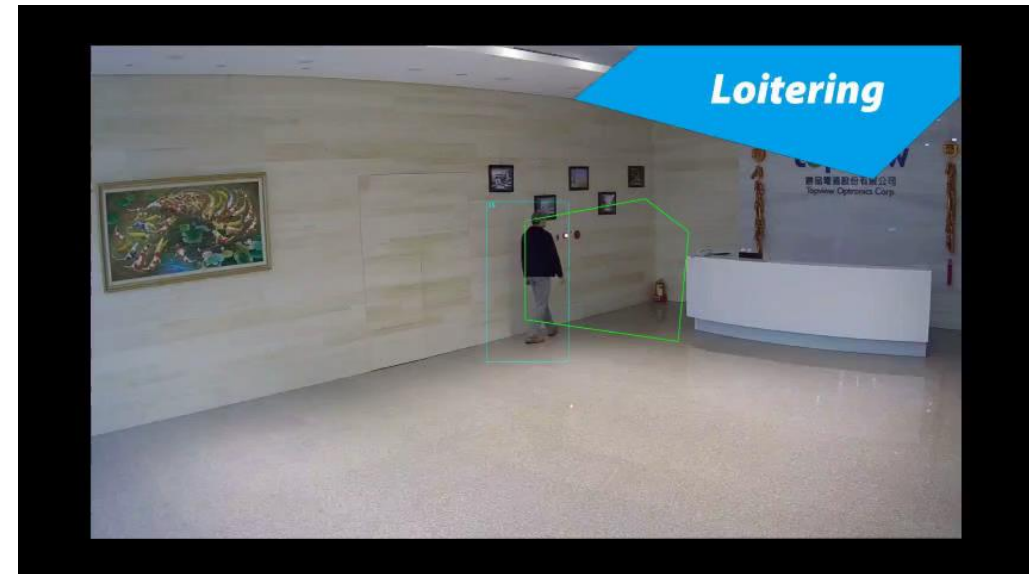
Detailed description of the solution

- ▶ Screens displaying what cameras are capturing
- ▶ Specific Regions of Interest (ROI) are drawn by the system to easily identify customers



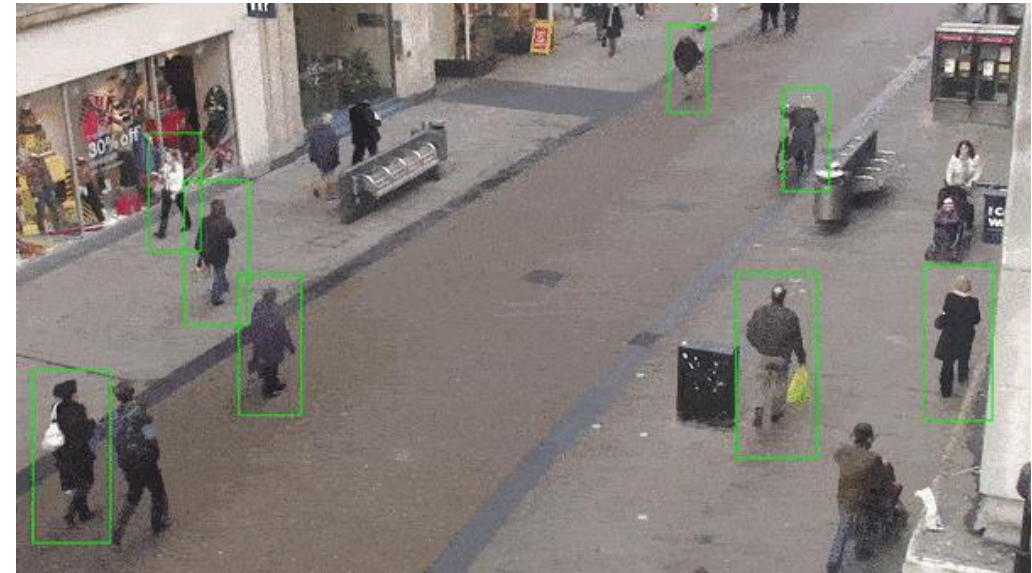
Detailed description of the solution

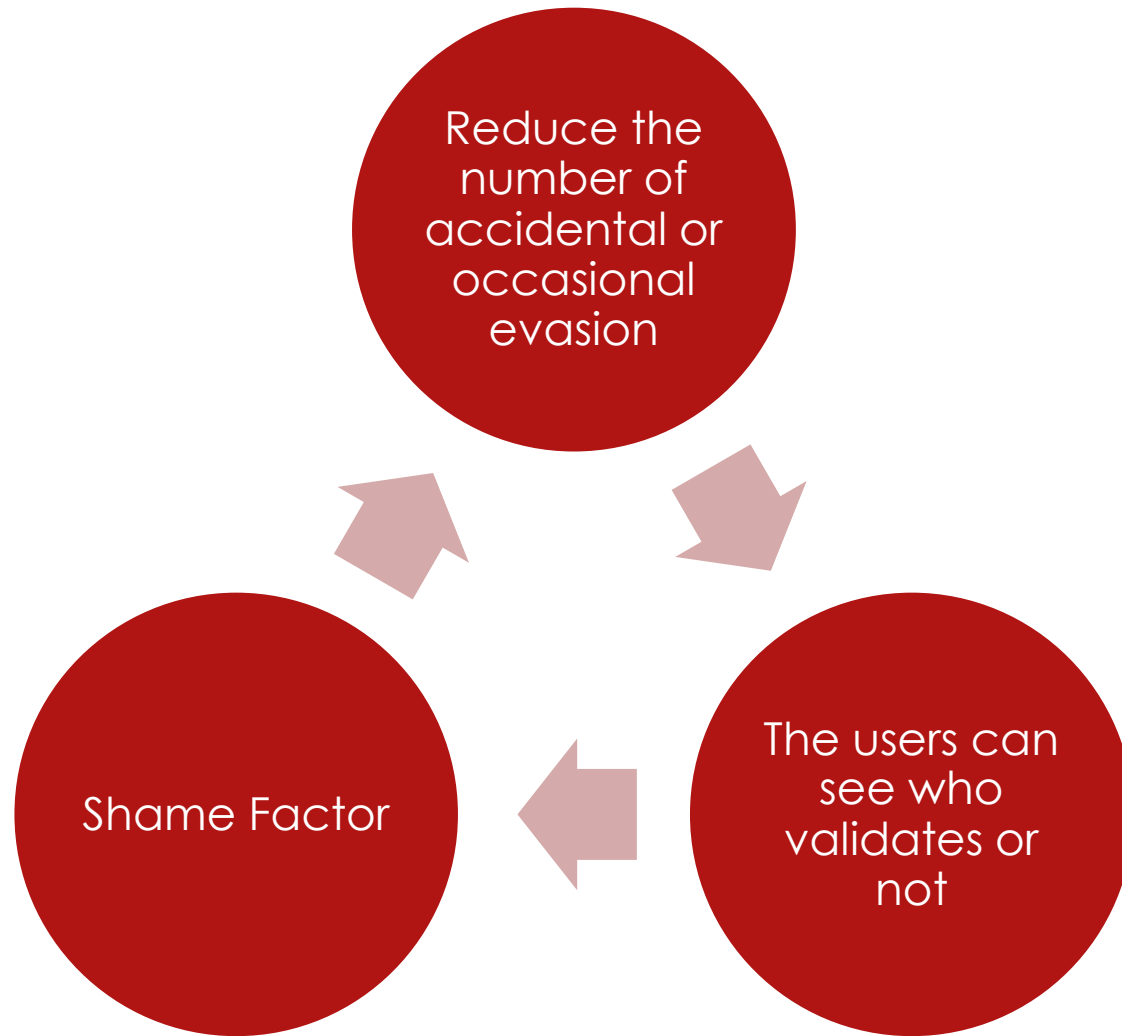
- ▶ The system identifies when a customer enters the ROI
- ▶ If there's no validation occurring in the closest equipment, the customer is an invalid one



Why this works?

- ▶ Human detection systems
- ▶ Thermal makes humans easy to detect
 - ▶ Even if the humans try to hide his body with an object





Why this works?

A photograph of a busy train station platform. In the center, a yellow and grey train is stopped. People are walking on the platform. Above the train, there are signs for 'INFORMAÇÕES' and line numbers 1, 2, 3, 4, 5, 6. To the right, there are digital display boards showing train schedules. The station has a high, arched glass and steel roof.

Thank you!

Questions?

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