

# Tailgating Detection

Problem Statement 3  
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# Contents

1. The Problem
2. The Solution
3. Technical details
4. USP - Our Unique Selling Point

# The Problem

- Tailgating (also known as piggybacking) is one of the most widespread security breaches affecting businesses today and often goes undetected. Tailgating can be simply described as the passage of unauthorised personnel, either forced or accidental, behind that of an authorised user.



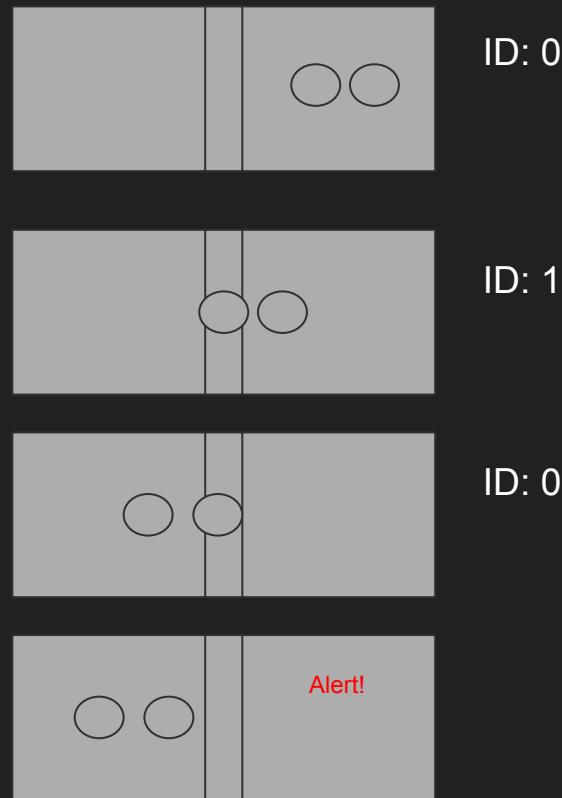
# The Solution

- Using **object detection and by detecting people** as they enter a certain zone whilst cross referencing with ID info obtained at the door, we can determine tailgating.
- Our solution is to use a simple yet effective Deep learning model to detect people in real time and draw a bounding box around them, and then cross reference with the ID details at the gate/door.

# The Solution

1. A person with a valid ID using the gate.
2. Unauthorized person behind tailgates with the previous employee.
3. The system reads one ID card, and looks to allow 1 person, as soon as it detects the second person with number of ID cards still as 1. It sends out the alarm

This is just the simple case

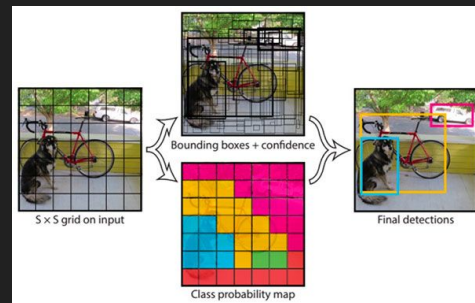


# Technical Details

- Traditional tailgating systems use sensors attached to door and sometimes cameras to detect a object moving through a particular space, but very few systems actually detect a person
- The traditional system fails when there is a huge crowd or pushing, or if a person enters with a object (like a suitcase or something, some sensors read the entry of the object as a person if it is sent in first by mistake)
- Say a person comes in with a suitcase and pushes it by mistake, it will read that and not the person

# Technical Details

- Usage of object detection models with architecture similar to **RetinaNet**, **YoLo**.
- Not using those models directly as they are huge and require decent computing resources.
- Therefore we will design a lightweight model with same architecture as the SoTa object detection models and train it only on Humans, thus reducing size and computing resources required by the model



# USP

What makes us stand out?

- Generally Object detection models are huge and **require high computing resources**, we will build a **lightweight model** for this
- An extra feature, where the persons face can be cross checked with the ID card picture (if available) using a Siamese Network
- Siamese networks can train on limited data and basically give similarity score between two images
- This adds extra layer of security



# USP

- Current methods of tailgate detection are not always effective.
- There are the cheaper ones that use sensors, but not as effective. There are expensive ones that are good, but use specialised equipment and need maintenance
- Not everyone can purchase the expensive ones
- Our model is **cheap, yet effective**, all you need is a **CCTV placed in front**
- It also has a good potential to add more features

Thank You