



**BRABANT
HACK_26**

**TRACK
DEEP TECH**

DEMCON

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SHADOWS: DETECTION BEFORE APPEARANCE

How can we use synthetic data to train computer vision models to detect people based solely on their shadows, enabling accurate prediction of their exact location and walking direction before they actually enter the camera frame?

CASE CONTEXT

Conventional detection systems only react once a person has physically entered the camera view, causing valuable reaction time to be lost in situations where every second counts. In this case you will challenge computer vision models to infer the presence and intent of a person through indirect evidence, their shadow, representing an important step towards proactive safety solutions for autonomous vehicles and intelligent surveillance systems.



WHAT DO TEAMS BUILD?

You are expected to deliver a working proof of concept, demonstrating through an algorithm or technical model that shadows can be translated into accurate bounding boxes representing the location of a person. Teams will use the provided synthetic dataset, which includes accurate ground truth annotations. The dataset consists of images in which only a person's shadow is visible, while the person themselves remains outside the frame. The goal is to determine the person's off-screen location using only the shadow. Bonus points are awarded if the model is also able to predict the person's walking direction.

You are expected to present the results in a dashboard or technical demo, visualizing the predicted location of the detected person, with additional recognition for correctly predicting walking direction.

WHAT DOES DEMCON PROVIDE?

Demcon provides a synthetic dataset containing:

- Shadows of individuals
- Off-screen bounding box locations
- Walking direction of the person

SUCCESS CRITERIA

The success of the solution is primarily measured by the average deviation between the predicted bounding box and the actual (ground truth) off-screen position of the person. A winning solution minimizes this error margin. Bonus points are awarded for accurately predicting walking direction.

Additionally, the solution must be suitable for real-time applications within a clearly defined scenario (for example: a self-driving car in a residential area, or security surveillance in a dark alley). Teams are also expected to present a plan outlining how the concept could be further developed into a full-fledged product.

CONTACT

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