FACULDADE ENGENHARIA

Departamento de Informática

Human Recognition in Surveillance Settings - Human Segmentation

Project Proposal

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Objectives

The recognition of humans using images collected from surveillance scenarios is still an open research problem due to the poor quality of the data. The poor quality of the data arises from various factors such as low resolution, adverse weather conditions, insufficient lighting, occlusions, motion blur, and variable human pose. These issues can severely degrade the visibility and clarity of human subjects, making it difficult for automated algorithms and human operators to identify them reliably.

Figure 1: Typical conditions in surveillance settings, where recognition faces severe problems due to poor data quality (source: https://www.biometricupdate.com/)

To address these problems, this project will contribute to the development of a method capable of compensating the degradation factors in the images acquired in these scenarios by learning a mapping from degraded images of a subject to its 'normal' version, i.e., the image of the subject without variations in pose, lighting, occlusions, and motion-blur.

To help learning this mapping, the segmentation of the human body in its distinct parts may allow the learning of independent mappings. Accordingly, this project intends the development of a method for human body segmentation.

Tasks

T1: Study the state-of-the-art on human segmentation in surveillance scenarios and understand the functioning of general deep learning approaches. (0.5 month)

T2: Acquisition and annotation of a novel dataset comprising images from subjects with arbitrary degradation factors and images with controlled degraded factors (2 months).

T3: Development and assessment of human segmentation approaches in the dataset collected. (2 months).

T4: Tests and debugging (0.5 month).

T5: Report writing (0.5 month).

Academic Prerequisites

- Interest in the field of Artificial Intelligence and Computer Vision.
- Proficient in Python or with an interest in learning.

Expected Results

- Dataset
- Computational Prototype
- Project Report