**Crowd Identification for Intelligent Surveillance.**

SHORT INTRODUCTION

Ensuring security in crowded public spaces—such as events, transport hubs, and city centers—is a major challenge. Large gatherings can lead to safety risks like violence, stampedes, or unauthorized access.

To improve safety, we propose the development of an intelligent system for **real-time crowd identification** and **activity analysis**. Using computer vision and AI, this system would monitor crowd density, detect unusual behavior, and alert authorities to potential threats.

Key features include:

* Live video surveillance integration
* Crowd counting and movement tracking
* Suspicious behavior detection
* Real-time alerts for rapid response

Such a system would enhance situational awareness, reduce response time, and help maintain public safety more effectively.

LITERATURE REVIEW

Our models will be tested on the ShanghaiTech dataset which is a large-scale crowd counting dataset. It consists of 1198 annotated crowd images. The dataset is divided into two parts, Part-A containing 482 images and Part-B containing 716 images. Part-A is split into train and test subsets consisting of 300 and 182 images, respectively. Part-B is split into train and test subsets consisting of 400 and 316 images. Each person in a crowd image is annotated with one point close to the center of the head. In total, the dataset consists of 330,165 annotated people. Images from Part-A were collected from the Internet, while images from Part-B were collected on the busy streets of Shanghai.

Approaches are various:

Convolutional Neural Networks – in this case it uses non-linear function. It can count people in the image. The network's structure consists of two fully connected layers and five convolutional layers.

VGG-16 – some kind of CNN with 21 layers and small convolutional filters (3x3). It gives us a density map.

Multi-stage ConvNet - detecting suspicious and unusual activities during the CCTV surveillance. It warns authorities about this kind of activities. The flaw of the system is possibility of many false warnings.

YOLO – counting people on the image.

Methods: Fully Convolutional Networks, Long Short-Term Memory

Pytania: co jest zmienną niezależną przy estymacji mapy gęstości?

Skąd wiemy, ile osób jest na obrazku?

References:

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