Human Pose Estimation withFields of Parts

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Introduction

Human Pose Estimation is crucial for many computer vision applications, including human computer interaction, activity recognition and video surveillance. It is a very challenging problem due to the large appearance variance, non-rigidity of the human body, different viewpoints, cluttered background, self occlusion etc.This task serves as a crucial prerequisite step to many high level vision applications, for example human action recognition [13], and natural human computer interfaces [22]. Therefore, it is among the most studied problems in the field of computer vision.

The main difficulty of pose estimation is the weak local appearance evidence for every single body part. While heads nowadays can reliably be detected, localization of general body parts such as arms, or legs remain challenging. Several factors complicate detection: foreshortening and self-occlusion of parts; differ-ent clothing and light environments lead to variability in appearance; some parts might just be a few pixels in size which makes it hard to encode them robustly.

Most work focuses on the main dimensions of the pose estimation problem:use of discriminative appearance information and stronger models for the spatial body configuration.Fields of Parts (FoP) model; a reformulation of the human pose estimation problem. The FoP model offers a different view on all three dimensions – appearance, structure, and inference. It is inspired by the Pictorial Structures (PS) model, but has different semantics which lead to interesting modeling possibilities. The main idea behind this model is simple:the presence or absence of a body part at every possible location, orientation,and scale of a body part is modelled using a binary random variable.

Abstract

- A reformulation of the human pose estimation problem. This opens up new modelling flexibility and provides a new viewpoint on this well-studied problem.
- An generalization of the inference algorithm. This makes it possible to use efficient mean field inference in the FoP formulation.
- A new estimator that is tailored to pose prediction using a binary CRF formulation.
- Experimentally, we demonstrate that the FoP model with the same set of parameters as previous state-of-the-art achieves a performance increase of 6.0% on the LSP dataset, novel variants improve this even further.

Due to large size of the report with various output images we are having to keep the google

DataSet

The dataset used was the “Leeds Sports Pose” dataset.

https://github.com/chuxiaoselena/StructuredFeature/tree/master/dataset/LSP

https://dbcollection.readthedocs.io/en/latest/datasets/leeds_sports_pose.html

Links

Final Report - https://docs.google.com/document/d/1IO7T_Y6BGXZ3ypN1MVsabPMt5K5XNEpidLkBmMztzbc/edit?usp=sharing

Slides - https://docs.google.com/presentation/d/1bzdZ9rKujh7NEf0r4MojAn0D1r5m-FyOTnQN5Dr6hCg/edit?usp=sharing

GitHub - https://github.com/wintersoldier97/CV_project