ABSTRACT

Image Classification and detecting objects through machine learning is one of the advancements in modern technology. Pedestrian Detection is also one of those extended applications. However, there are many flaws in the existing systems of pedestrian detection. An algorithim we proposed will benefit the flaws in existing systems. Where we can detect the pedestrians using our system without a single flaw.

In our system we use convolutional neural network (CNN) for image classification and R-CNN (Regional CNN) for object detection and IOU helps to measure the accuracy of algorithms used for object detection using bounding boxes. Thus output is validated by detecting the pedestrians exactly. This training cascade classifier improves the machine to overcome the false detections near pedestrians. Experimental results on two widely used pedestrian datasets demonstrate that the proposed training strategy and the CNN based detector can effectively improve the detection rate and the localization accuracy using fewer parameters.

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CHAPTER 1

INTRODUCTION

Pedestrian detection has made significant advances benefiting from the region-based convolutional neural networks. The project introduces a strict matching metric, which is beneficial to selecting well-aligned positive samples A positive sample matches a ground truth only if all its region-IoUs are bigger than a threshold. Secondly, an improved negative example selection strategy using both the classification and localization information is proposed to mine hard negative examples, which can further suppress the false positive detections near the pedestrians. Recently, pedestrian detection has made significant advances benefiting from the region-based convolutional neural networks.

However, training R-CNN with a holistic intersection over union always brings many flawed positive samples. This paper introduces a strict matching metric, which is beneficial to selecting well-aligned positive samples. Specifically, this matching metric is defined on a set of region-IoUs instead of a holistic IoU, which considers the alignments of different part regions in a whole bounding box simultaneously.

A positive sample matches a ground truth only if all its region-IoUs are bigger than a threshold. Secondly, an improved negative example selection strategy using both the classification and localization information is proposed to mine hard negative examples, which can further suppress the false positive detections near the pedestrians. Based on the proposed sample selection strategy, a cascade compact convolutional neural network is proposed for accurate pedestrian detection. Each stage of the CC-CNN is constructed with a compact network that only consists of a small number of parameters, thus making the detector suitable to be implemented on onboard embedded systems.

To get well-aligned positive samples, this paper proposes a novel positive example selection strategy based on the region wise metric, i.e., region-IoU which considers the alignments of different part regions in a whole bounding box simultaneously. First, this strategy defines a pedestrian template and a group of regions based on the importance of pedestrian parts. Then a proposal bounding box is treated as a positive sample if all its regions match the corresponding ones of any ground truth

with IoUs higher than a threshold. By this way, the well-aligned positive samples with the existence of important parts are collected and used for training.

These unsatisfied performances are mainly due to two reasons. First, the training methodologies, especially the positive example selection strategy, are designed for general object detection, which are not appropriate for a specific category, such as pedestrian detection. During the training process of single-stage/two-stages CNN-based detectors most researchers select the positive examples whose IoUs between anchors/proposals and ground truths are higher than a given threshold. Traditional pedestrian detectors treat the ground truth bounding boxes as positive examples during training. Different from them, the single-stage/two-stages CNN based detectors select positive examples based on the overlap between anchor/proposal and ground truth

To further suppress the false positives near the pedestrians, we also proposes an improved negative example selection strategy which selects negative samples using the fused score that combines both the classification score and the overlap value with the ground truth.

THE MAIN CONTRIBUTIONS

(1) We are here to investigate the errors of the state-of-the art R-CNN based pedestrian detector. The localization errors and the background errors are two main failures for current R-CNN based pedestrian detectors. These false detections are mainly caused by the flawed training samples extracted by the holistic IoU.

(2) A region-IoU based positive example selection strategy is introduced to get well-aligned positive samples. Besides, the hard negative example mining method is improved by combining both classification and localization information.

(3) A cascade compact network is proposed for pedestrian detection, in which each stage is constructed by a compact network. It gains a high detection rate and localization accuracy.

(4) The proposed detector achieves leading performances among the state-of-the-art detectors on different data sets. Especially, it gains a significant improvement on detection performance under the stricter localization criterion.

CHAPTER 2

LITERATURE SURVEY

LITERARURE SURVEY

As a method to achieve real-time detection with high accuracy, cascade has been widely used in pedestrian detection .They use a soft-cascade approach to transform a classifier into cascaded ones to gain a detector with high detection performance and efficiency Despite improvements in detection performance, it brings too many parameters when multiple stages are included.

The proposed detector is similarly constructed in the form of cascade R-CNN framework. Differently, benefiting from the modified example selection strategy, a compact network is designed for each attached stage, which gains a similar detection performance but saves the memory costs As a method to achieve real-time detection with high accuracy, cascade has been widely used in pedestrian detection propose of cascade face detection architecture built on CNNs operating at multiple resolutions. A chained cascade network for object detection, where the early cascade stages are used to reject obvious negative detections and the attached contextual stages are used to learn more discriminative features for handling more difficult examples.

Both of them need extra proposal generation modules. propose of cascade R-CNN architecture for high quality object detection. Despite improvements in detection performance it brings too many parameters when multiple stages are included. The proposed detector is similarly constructed in the form of cascade R-CNN framework.

As a method to achieve real-time detection with high accuracy, cascade has been widely used in pedestrian detection They use a soft-cascade approach to transform a classifier into cascaded ones to gain a detector with high detection performance and efficiency. Most of the cascaded pedestrian detectors use hand-crafted features, such as Haar-like features and HOG. Recently, the combination of the cascade framework and CNNs has been studied in face detection and general object detection. The following content has been studied in order to develop the accurate detection using cnn,which is used here to develop the accurate pedestrian detection.

TITLE: STRENGTHENING THE EFFECTIVENESS OF PEDESTARIN DETECTION WITH SAPITIAL POOLED FEATURES

AUTHORS: Sakrapee Paisitkriangkrai, Chunhua Shen, and Anton van den Hengel

YEAR: 2017

DESCRIPTION: We propose a simple yet effective approach to the problem of pedestrian detection which outperforms the current state-of-the-art. Our new features are built on the basis of low-level visual features and spatial pooling. Incorporating spatial pooling improves the translational invariance and thus the robustness of the detection process. We then directly optimise the partial area under the ROC curve (pAUC) measure, which concentrates detection performance in the range of most practical importance. The combination of these factors leads to a pedestrian detector which outperforms all competitors on all of the standard benchmark datasets. We advance state-of-the-art results by lowering the average miss rate from 13% to 11% on the INRIA benchmark, 41% to 37% on the ETH benchmark, 51% to 42% on the TUD-Brussels benchmark and 36% to 29% on the Caltech-USA benchmark.

TITLE: AN EMPIRICAL STUDY OF PEDESTRAIN DETECTION TECHNIQUES WITH DIFFERENT IMAGE RESOLUTION

AUTHORS: Govardhan.S.D, Vasuki.A

YEAR: 2018 International Journal of Engineering and Advanced Technology (IJEAT)

DESCRIPTION: The designed technique identifies the pedestrian when the whole body of pedestrians appears in system. Pedestrian detection is an essential issue in many applications like robotics, video surveillance and computerized driver assistance. Pedestrian detection techniques are enhanced one, but the detection results of current systems are not adequate to be used in practice. The key issue is to identify the pedestrians, despite large inconsistency of shape and appearance caused by variations in pose, clothing, occlusion and lighting. The detection rate reduces when vehicle or surrounding facilities cover person body parts. For addressing these issues, many pedestrian detection techniques are employed for detecting part of an object.

EXISTING SYSTEM

R-CNN analysis shows that localization error and background error are still the two main errors for Faster R-CNN based detectors. In the following sections, the proposed approach will deal with these two types of errors by introducing a new example selection strategy and a cascade compact CNN. Besides, the annotations of city person's validation data set are manually re-annotated for fairer comparison of different pedestrian detectors. Two types of errors are investigated in this section: false positives and false negatives.In this system there are lost of problems regarding to positive selection and negative selection, they are been mistakenly over lapping each other to over come this method more efficient way has to be developed.

PROPOSED SYSTEM

A cascade compact convolutional neural network (CC-CNN) is proposed for accurate pedestrian detection. CC-CNN based detector can effectively improve the detection rate and the localization accuracy using fewer parameters. The experiment is conducted on the City persons reasonable validation subset. All the false positives are clustered into two categories: background errors and localization errors, To simultaneously eliminate both localization and background errors, a new measurement is introduced to select the negative samples. Specifically, the score of each negative.

DRAWBACKS OF EXISTING SYSTEM:

1.It provides plenty of distractions
2.It is an time effective method
3.Most of the pedestrains are not detected
4.Positives are also recognised as nagatives

ADVANTAGES OF PROPOSED SYSTEM:

1.Improved Image Classification
2.Improved Image Interpretation
3. Improved video classification Performance
4.Efficient at Delivering High-quality Results
5.Reduces the need for feature engineering
6. Strength to pure differences in the data is automatically learned

CHAPTER 3

METHODOLOGY

INTRODUCTION TO PYTHON

Python is a widely used general-purpose, high level programming language. It was initially designed by Guido van Rossum in 1991 and developed by Python Software Foundation. It was mainly developed for emphasis on code readability, and its syntax allows programmers to express concepts in fewer lines of code.

Python is a programming language that lets you work quickly and integrate systems more efficiently.

It is used for:

- web development (server-side),
- software development,
- mathematics,
- System scripting.

WHAT CAN PYTHON DO?

- Python can be used on a server to create web applications.
- Python can be used alongside software to create workflows.
- Python can connect to database systems. It can also read and modify files.
- Python can be used to handle big data and perform complex mathematics.
- Python can be used for rapid prototyping, or for production-ready software development.

WHY PYTHON?

- Python works on different platforms (Windows, Mac, Linux, Raspberry Pi, etc).
- Python has a simple syntax similar to the English language.
- Python is a language that we can use in integrated systems efficiently.