IIT KHARAGPUR

INTER IIT TECH MEET 10.0

25-27TH MARCH 2022

BOSCH'S AGE AND GENDER DETECTION

Over the recent years, detecting human beings in a video scene of a surveillance system is attracting more attention due to its wide range of applications in abnormal event detection, human gait characterization, person counting in a dense crowd, person identification, gender classification, fall detection for elderly people, etc.

BOSCH | MID PREP

PROBLEM STATEMENT

DESCRIPTION

The scenes obtained from a surveillance video are usually with low resolution. Most of the scenes captured by a static camera are with minimal change of background. Objects in outdoor surveillance are often detected in far-fields. Most existing digital video surveillance systems rely on human observers for detecting specific activities in a real-time video scene. However, there are limitations in the human capability to monitor simultaneous events in surveillance displays. Hence, human motion analysis in automated video surveillance has become one of the most active and attractive research topics in the area of computer vision and pattern recognition.

PAIN POINT:

Despite the breakthroughs in accuracy and speed of single image super-resolution using faster and deeper convolutional neural networks, one central problem remains largely unsolved: How do we recover the finer texture details when we super-resolve at large upscaling factors? The behavior of optimization-based super-resolution methods is principally driven by the choice of the objective function. Recent work has largely focused on minimizing the mean squared reconstruction error. The resulting estimates have high peak signal-to-noise ratios, but they are often lacking high-frequency details and are perceptually unsatisfying in the sense that they fail to match the fidelity expected at the higher resolution.

PROBLEM STATEMENT:

Build a solution to estimate the gender and age of people from a surveillance video feed (like mall, retail store, hospital etc.). Consider low resolution cameras as well as cameras put at a height for surveillance.
Hint: Develop a pipeline to apply super resolution algorithms for people detected and then apply gender/age estimation algorithms.
Problem approach:

1. Object Detection: SRGAN algorithms.
2. Classification and estimation: Deep learning and neural networks

(e.g.,https://jonathan-hui.medium.com/gan-super-resolution-gan-srgan-b471da7270ec
Link for full paper: https://arxiv.org/pdf/1609.04802.pdf)

Domains: Super Resolution GAN, DL, Image Processing

GUIDELINES

- Participants can use any open-source dataset or create their own by recording videos (15-20 samples of 1-2 minute videos) and creating a pipeline for further processes. The quality of videos can be manually degraded to mimic low-resolution CCTV footage.
- All the data and algorithms used should be available for commercial usage.
- Any plagiarism will lead to direct disqualification.

SUBMISSION

- GitHub link of the code with proper documentation along with the dataset used. **DEADLINE - 21st March 2022**.
- Submission of the final presentation link clearly explaining the idea utilized for coming up with the solution and results. **DEADLINE - 24th March 2022**.
- The Final Presentation will take place in front of the panel. The date and timings for the same will be conveyed later.

EVALUATION

- The code will be run on our dataset and the accuracy will be evaluated **(Weightage: 50%)**.
- Novelty in the idea used for developing the data pipeline and the solution approach **(Weightage: 25%)**.
- Final Presentation **(Weightage: 25%)**.

Please note that the final presentation should wrap up within 10 minutes, which will be followed by Q&A (5 min).
Send your submissions at this email: submissions@interiit-tech.org.

Team size for this event is maximum 6 participants.
Participation awards shall be awarded to all participants.