

A density-based approach for effective pedestrian counting at bus stops

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Abstract

Accurately counting people waiting at bus stops is essential for automated bus fleet scheduling and dispatch. Estimating the passenger demand in regular open bus stops is a nontrivial problem because of the varying conditions, such as illumination, crowdedness, people poses, to name a few. This paper presents a simple, but very effective approach to estimate the passenger count using people density estimates. People density is obtained from foreground segmentation using a Gaussian mixture background model. A linear model, which is employed to correct the densities due to perspective scaling for people far from the camera position, yields the final people count estimates. The approach is compared to the well-know Viola-Jones detector and shown to yield better people count estimates despite its simplicity, because it is more robust to occlusions, pose changes, and due to the fact that it does not attempt to find body parts. The proposed method is general and can be employed to count people in other public spaces, such as buildings.

Keywords

Image edge detection, Object detection, Face detection, Lighting, Cameras, Yield estimation, Detectors, Space technology, Cybernetics, USA Councils.