

Abstract - Frontal Detection of Backpacks in Surveillance Videos

Ian Beatty-Orr

This dissertation presents a system that can classify an individual as wearing a backpack or not based solely on video footage of the individual from the front. None of the published literature available has presented a reliable solution to this problem that will work in varying illumination conditions. Current video surveillance systems are handicapped by the sheer volume of footage they produce. The aim of this project is to aid operators in sifting through this volume by exploring several solutions that will find and highlight backpacks worn by individuals. An exploration is made of the available literature to examine the approaches adopted to solve similar problems. Following this several designs are developed that search for straps in the upper torso region of an individual. As no suitable test data was available a set is constructed as part of this project to enable testing. It consisted of several videos with subjects, garments, backpacks and locations chosen to attempt to accurately represent the population and scenes encountered by a real camera. Each design was tuned to achieve maximum performance and results obtained against this test set. The design process was iterative with later approaches addressing weakness that became apparent in earlier approaches. The results generated are promising with the best approach achieving an accuracy of 79.5%. This demonstrates that computer vision can be used to detect backpacks within a scene.