



C30 Investigation on Height Estimation of Persons in Surveillance Video

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The objective of this paper is to investigate measurement errors when determining the height of an individual in a video image. The author will present the conclusions of a study on height estimation of persons in video footage.

At the Netherlands Forensic Institute, a technique is in use to estimate the height of a questioned person in a surveillance video. This technique is based on the original footage, using 3D computer models and reference images from foils taken at the crime scene. If the person is fully displayed and the original recording equipment is still unchanged, the height of the questioned person appearing in the video image can be determined.

The height of the foils in the video images is measured using a 3D object, in most cases a thin cylinder. The object was placed in the 3D computer model by an operator estimating the position of the feet and the top of the head. The real height of the foils is measured at the scene using a ruler. The mean difference between the real and the measured height in the video image is used as a correction for the measurements of the questioned person. The standard deviation of these differences is used to determine the margin of error for the measurement of the questioned person.

With this technique the main sources of errors are:

- Difference in gait and pose of the foils and the questioned person.
- Interpretation of the operator: where are the feet and the head of the person?

To get a better knowledge of these errors and their effects an experiment has been performed. The experiment includes measurements on 24 people recorded by surveillance cameras of the institute. On recording days, individuals' height was also measured by the investigators. Factors that were being varied were the following:

- Operators: Four operators measured the height of the persons in the video images
- Cameras: Three different camera views were used
- Different points in time during the day: people were measured on footage at entry of the institute in the morning and at departure from the institute in the afternoon.

The same measurements were repeated by the same operators a few months later using a slightly different technique. In this technique the top pixel of the head of the person in the video image was defined as the top of the head.

The results and conclusions of this experiment will be presented.

Height Measurement, Surveillance Video, 3D Computer Models