Abstract

Soft computing is the fusion of methodologies that were designed to model and enable solutions to real world problems, where there are constrains in modelling mathematically.

Soft computing methods have attracted attention of researchers. The research investigations exploiting soft computing approaches have been applied successfully to solve real world problems. The guiding principle of soft computing is based on the exploitation of the tolerance for imprecision, uncertainty, partial truth, and approximation to achieve tractability, robustness and low solution cost.

In this thesis, a computational model is developed that estimate motion from motion-smear. Given a set of motion smeared images of the same scene, the method adapted is to estimate global motion parameters using motion smear information in the frequency domain. Soft computing methods like genetic algorithms have been applied for estimating the motion parameters.

The thesis also covers soft computing methods being applied for video object tracking applications. Video object tracking is the process of locating one or several moving objects in time using optical cameras. In this thesis, fuzzy set theoretic approaches have been presented for detecting multiple moving objects, from a video sequence captured using a stationary camera. The algorithms ensure that the uninteresting forms of change, such as those caused by sensor noise or illumination variation, are rejected. Such changes could result from a combination of factors including appearance, disappearance, movement, or changes of shape of objects in the scene.

Soft computing methods are also applied for the moving cast shadow detection. Detection of moving shadows has generated considerable interest in the computer vision community due to its relevance to video object segmentation, tracking and for many other important applications. A combinational approach for shadow cancellation using fuzzy texture method is proposed. An algorithm for background estimation and multiple object tracking has been formulated and a combinational approach for tracking of multiple objects with shadow cancellation using fuzzy texture method is presented. The algorithm works with color video image sequences obtained from a stationary camera and successfully tracks multiple moving objects.