

Abstract

In the project, the approach to a carefully engineered, practically realized system to recognize dynamic scenarios in video is considered for development. The project starts with a detailed study on the various aspects of common sense reasoning, especially Qualitative Spatial reasoning and Qualitative Spatio-Temporal Reasoning; Image Processing concepts, and getting adapted to the open source computer vision library OpenCV. Based on a framework for representation and reasoning with high level semantics of motion sequences, I have tried to design and implement the architecture for a complete system which can recognize spatio-temporal behaviors from an input video. The framework uses two widely accepted qualitative abstractions of spatial aspects viz. orientation and direction. Objects are considered to be two dimensional and these are abstracted as rectangles with sides parallel to the axes of projection. Any possible synchronized or unsynchronized motion sequence of two or more spatial objects can be represented and recognized. Though the framework has been proposed in connection with motion sequences, it is general enough for representation of higher level semantics of spatio-temporal scenarios using qualitative abstractions. While research literature has focused on using Hidden Markov Models for recognition of spatio-temporal behavior patterns, and this approach using formal grammar for recognizing and learning behavior patterns, seems to have a promising future for video analysis and video surveillance.

A complete implementation and analysis i.e. handling occlusions between objects, is left as a future enhancement of this project.