Title:	Visual Seeking with Gray and Thermal Imagery
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Abstract:	In this thesis, we present an approach of target tracking using gray and thermal im- ageries. There are a number of fundamental di erences between information content of visible and infra-red sequences like very poor (Signal to Noise Ratio) SNR, low dynamic range, dynamic nature of target signatures, dependence upon scene thermodynamics and e ect of sun glint which make the job of tracking more tedious in thermal domain. Infrared (IR) missile is a well proven passive system in which the heat generated by the target is detected for tracking and interception. In this thesis, missile seeker hav- ing multi spectral imaging system for capturing registered gray and thermal images is simulated. To provide an aid for selecting target manually, Gaussian Mixture Model (GMM) based background subtraction algorithm is used to detect the moving objects in a scene before the launch. IR signatures of target are more prominent than back- ground and clutter, and this contrast is commonly used as a clue for tracking. After missile launch, back projected image utilizing 2D histogram model of target is used by Continuously Adaptive Mean shift (CAMSHIFT) algorithm for tracking. Initially the target looks small but as the missile approaches it, its appearance gets clearer. To damage the target the most, interception should be achieved to that part of the target which is most vulnerable. We have chosen the tank as target. Hough transform based ellipse detection is used to detect tank hatch which creates more destruction on interception. CAMSHIFT and Hough transform are well proven algorithms, and their implementation makes our process simpler.