Vision navigated robotics has been one of the major research drivers for several decades. Recent technological developments have facilitated improvement in the area and resulted in several successful applications for use in intelligent homes to automotive industry.

The thesis presents investigation into a system for executing the vision based catching in real time. The thesis has five major components, namely, vision-based tracking for pose estimation of the object, kinematics analysis, Kalman based prediction of the trajectories, controller design for executing the catching and experiments in vision based catching.

The basic problem being attempted is to track an object to be manipulated by a set of contacts (fingers). The points of contact with the finger and object change dynamically, making the problem to exhibit a large degree of variability. Detection of edges and the uniqueness of orientation have been augmented here by coloring the sides differentially to focus on the metrology problem as opposed to feature detection problem. Though not central to the theme, a low order of difficulty control strategy for a hardware system to manipulate an object has been implemented as a demonstrator.

It is seen that sub centimetre accuracy in arrival position of objects in flight can be achieved by camera with 1032 by 778 resolution. This is shown to be sufficient to allow prehensile grasping of objects tossed onto the workspace of a system of three Delta manipulators with a finger as an end-effector.