**Chapter 1**

**Introduction**

**1.1 Motivation and Overview**

In the agricultural sciences, images are the important source of data and information. To reproduce and report such data photography was the only method used in recent years. It is difficult to process or quantify the photographic data mathematically. Digital image analysis and image processing technology circumvent these problems based on the advances in computers and microelectronics associated with traditional photography. This tool helps to improve images from microscopic to telescopic visual range and offers a scope for their analysis.

Several applications of image processing technology have been developed for the agricultural operations. These applications involve implementation of the camera based hardware systems or color scanners for inputting the images. We have attempted to extend image processing and analysis technology to a broad spectrum of problems in the field of agriculture. The computer based image processing is undergoing rapid evolution with ever changing computing systems. The dedicated imaging systems available in the market, where user can press a few keys and get the results, are not very versatile and more importantly, they have a high price tag on them. Additionally, it is hard to understand as to how the results are being produced. We have tried to develop a solution which presents classification problem in a most realistic way possible.

Recognition system is a ‘grand challenge’ for the computer vision to achieve near human levels of recognition. The fruits and vegetables classification is useful in the super markets where prices for fruits purchased by a customer can be determined automatically. Fruits and vegetables classification can also be used in computer vision for the automatic sorting of fruits from a set, consisting of different kinds of fruit.

Recognizing different kinds of vegetables and fruits is a recurrent task in the supermarkets, where the cashier must be able to identify not only the species of a particular fruit or vegetable (i.e., banana, apple, pear) but also identify its variety (i.e., Golden Delicious, Jonagold, Fuji), for the determination of it’s price. This problem has been solved by using barcodes for packaged products but most of the times consumers want to pick their product, which cannot be packaged, so it must be weighted. Assignment of codes for each kind of fruit and vegetable is a common solution to this problem; but this approach has some problems such as the memorization, which may be a reason for errors in pricing.