CHAPTER 2

PROBLEM STATEMENT

In this research work, it is proposed to develop a simple heuristic along with evolutionary algorithms to have an efficient CBIR system. The primary and secondary objectives are:

1. Primary Objective : To reduce the semantic gap problem in content based image retrieval

2. Secondary Objective : To analyze the content based image retrieval techniques to ensure the effectiveness of the proposed approaches during image indexing and retrieval

2.1 PRIMARY OBJECTIVE

The majority of researchers believe that the main problem in the content based image retrieval is called "semantic gap." A human compares two images based on their semantics, whereas a retrieval system relies on comparison of feature vectors corresponding to visual image features. So, feature selection
plays a vital role in CBIR system. This leads to the formulation of the first problem statement.

2.1.1 PROBLEM STATEMENT 1

To identify the best low level features that meet the requirement of a robust, efficient, computationally simple and suitable content based image retrieval.

The solution to this problem statement is addressed in Chapter 3. This work intends to reduce the semantic gap by using minimum number of features such as region and statistical (mean and standard deviation) for content based image retrieval.

2.2 SECONDARY OBJECTIVE

One of the main tasks for CBIR systems is similarity comparison, extracting feature of every image based on its pixel values and defining algorithms for comparing images. These features become the image representation for measuring similarity with other images in the database. Images are compared by calculating the difference of its feature components to other image descriptors in the database. Based on similarity value, images are ranked for retrieval. This leads to the formulation of the second problem statement.
2.2.1 PROBLEM STATEMENT 2

In order to retrieve the desired images from a large image database, the development of an effective and efficient algorithm has been proposed for image indexing and retrieval. Nowadays evolutionary algorithms have been used in almost all the fields such as science, engineering and technology. In this work, heuristic approaches with evolutionary algorithms such as Genetic Algorithm and Particle Swarm Optimization Algorithm have been proposed for similarity comparison in CBIR system.

This problem statement is described in Chapters 4 and 5. Also, a comparative analysis is being carried out to ascertain the effectiveness of the proposed approaches with the existing method in Chapter 6.

2.3 SUMMARY

In this chapter, the primary and secondary objectives of the proposed content based image retrieval system are explained in detail. To reduce the semantic gap, region and statistical features such as mean and standard deviation are used. Heuristic approaches such as GA and PSO are proposed to measure the similarity between query and candidate images.