CHAPTER 6

CONCLUSION AND SUGGESTIONS FOR FUTURE WORK

6.1 SUMMARY AND CONTRIBUTIONS

MRI is one of the best methods in brain tumor analysis, but in some cases, radiologists cannot analyze tumors despite their experiences. CAD system presented in this research can assist the medical team and improve the accuracy of detection. Several new methods have been developed for improving the deficiencies that exist in the available tumor recognition system. The principle contributions of this thesis and their advantages are as follows:

- In the pre-processing stage, the proposed tracking algorithm and skull stripping algorithm remove the film artifacts and the non-brain skull region.

- The proposed enhancement technique implemented ACWM filter which removes the noise without disturbing the edges. ACWM filter has achieved highest PSNR value of 23.65dB which assures better enhancement than the other existing techniques.

- Bilateral image segmentation is done using registration segmentation algorithms. RRS-GA and NRRS-GA algorithms have been implemented. RRS is based on similarity measures and NRRS is block based techniques. Here the continuous optimization is performed by GA. The proposed metaheuristic
registration segmentation algorithm is new to the MRI brain image interpretations.

- Single image segmentation is implemented using MRF-MAP-PACO technique to segment the suspicious region from MRI brain images. The proposed method is a robust metaheuristic segmentation algorithm which is based on movement and intelligence of ants. The proposed metaheuristic algorithm introduces the idea of studying only the highly suspicious regions in the MRI brain image instead of studying the whole image, which makes the analysis simpler, faster and more precise. The MRF-MAP-PACO based segmentation algorithm has achieved higher predictive accuracy of 96.89% and much smaller rules than the existing segmentation methods.

- The proposed similarity index based classification system produces good classification when compared to other existing systems. The adopted system does not suffer from the nesting problem which is present in the existing segmentation methods.

6.2  SCOPE FOR THE FUTURE WORK

The thesis established a frame work for the detection of MRI brain tumor which is used to assist the radiologists in brain tumor analysis. However, there are still some possibilities to investigate in this research such as:

- Algorithms are to be generalized for applying in other image modalities like CT and PET.
• Larger datasets can be used that would permit separate training, validation and testing databases with statistically significant results.

• Applying image registration model for multi modality images.

• Extending this work to be applicable for general dataset images. It is expected to produce excellent classification results.

• Further exploration of the effectiveness of the feature selection and extraction can be conducted with large data base in order to evaluate the proposed diagnosis technique.

• The algorithm can be developed with the ability of accessing the host computer in the hospitals via internet to get the patients’ information and images, so that accurate diagnosis can be done at the earliest stage and hence save the human lives and increase their life span.