# CHAPTER SIX

# CONCLUSIONS AND RECOMMENDATIONS

## 6.1 Conclusions

Early detection of breast cancer has proven to elevate prognosis and diagnosis to promising levels. However, automatic mass detection, segmentation and classification remain a pervasive challenge in comparison to detection of other types of breast carcinoma. Also, the obscurity faced in accurately differentiating features of normal breast tissue from that of the tumor's provides an exhausting task.

In this study, An ANFIS system graphical user interface (GUI) was created. The system composed of the pattern recognition and classification of masses. An (ROI) was extracted for each image in the entire data sample and were used to calculate the texture features (energy, entropy, contrast, sum entropy, difference variance) that were the input to the classifier. An image is segmented using the watershed segmentation technique once loaded onto the GUI and classified as either malignant or benign with respect to the trained ANFIS classifier. The overall classification accuracy of the proposed system was 98% and an *Az* value of 0.972 was achieved.

## 6.2 Recommendations

Progress in the field of breast cancer research has been massive up to date, however, there is still more room for improvements and overcoming existing challenges. The following are a few pointers and recommendations that can assist in the extension of this work:

- Increasing the data sample and using a huge set of images will be more representative of the problem and increase the effectiveness of the system.
- Extracting more features from the images.
- Developing better enhancement and segmentation methodologies.
- Using different machine learning techniques and compare between them.
- Introduce the art of clinical decision support systems to healthcare facilities in Sudan to augment the diagnosis of this serious disease.