CHAPTER 7

CONCLUSIONS

7.1 INTRODUCTION

In recent days, innovation and development of spatial, spectral, radiometric and temporal resolution satellite remote sensing sector produces very enormous pathway for the large scale mapping of urban feature. This is highly needed for updated and fast urban planning and management (includes urban infrastructure) to handle the highest rate of urban growth in all over the country. In this context, higher resolution remote sensing data of Quickbird data issued for the creation of feature by object oriented image analysis approach through segmentation and image classification. The segmentation parameter were optimized using fuzzy approach and fuzzy membership function were developed. The accuracy assessment is done and the results are discussed in the earlier chapter. The conclusions of the above work is given below.

7.2 GENERAL

1. The merged data product of higher resolution satellite data produces visually convincing details of urban feature and intum prone for time consuming of manual delineation (comparative with digital image classification) and complexity for digital image classification.
2. For the preparation of data set, the merge data product (PAN + MSS) and Digital Surface Model (DSM) of the study area were used.

3. The multi-resolution segmentation tool has been utilized to create the image object and its semantic information. The color, shape, compactness, smoothness and scale parameter were used to define object size, shape and grouping of pixels.

4. The collateral data (DSM) is highly useful for the extraction of building feature which is otherwise so difficult in the conventional method (roof top and road were classified as same) and it is a long felt need of the urban remote sensing field.

5. The prepared data sets, methods and technique is suited for the higher spatial remote sensing data.

6. The above applied research work can be in practice on urban remote sensing field to produce large scale urban mapping.

7.3 SPECIFIC CONCLUSION

1. Using the Multi-resolution image segmentation approach, the object noise (lamp post, small water tank etc) gets eliminated rather than the individual class compared to the traditional classification method.

2. The multi-resolution segmentation parameters were optimized to keep as benchmark for further image segmentation.

3. The semantic information obtained from the image object was very much sophisticated tool to classify the urban features
such as building, road, vegetation and open area using spatial properties, texture and neighbor objects.

4. For the building feature scale parameter’s fuzzy membership function graph has been followed the similar trend with the other study area for three levels and had nearly 5% of variation. Its shape, color, compactness and smoothness parameter has variation as the above. This is because, the size of the building at Anna University is higher than the average size of the building at Adyar.

5. For road feature, the scale parameter has deviation in variation from 5% to 20%. This is because the size of the road at Adyar is higher compared to the Anna university area. The above were similar for the other parameters too.

6. For the open area feature, the FMF for all the parameter followed the previous study area with less than 5% deviation.

7. The knowledge base rule set was created for the image object classification on the object base semantic information. The significant elements were identified and its ranges were fixed for all features such as building, vegetation, road and open area.

7.4 **SCOPE FOR FUTURE RESEARCH**

In this work DSM created from aerial photographs has been used to differentiate building feature from other features. If the demographic and economic data is used in addition to the DSM, further classification of the building such as residential and commercial could be thought of.
Urban areas are complicated and therefore, additional efforts are needed and different settings have to be investigated in order to find out whether additional features are needed and how to specify parameters for situations that may appear in different types of cities.

Buildings, green spaces, roads, water surface and covered impervious areas have been successfully extracted by this system. Land use spatial units have been obtained by spatial reasoning based on the extracted land-cover object. Pre object land use classification has been made with high degree of accuracy. These achievements have been accomplished using the developed semi-automatic approaches. Further research is needed to develop automation, in fullest possible manner.

The extracted land-use and land-cover objects such as buildings, roads are in an uneven shape, because of the presence of the vegetation as well as the presence of the noise in the data. So, further research is needed to reshape the extracted objects.

The Digital Elevation Model was created using the aerial photographs which is time consuming process. Instead of that the LIDAR data can be used, which will be very time effective process.