

## Producing land cover maps using remote sensing and decision tree algorithm (Case study: Bakhtegan national park and wildlife refuge)

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### Extended abstract

#### 1- Introduction

Land cover mapping is essential in the management of natural resources and environment, land use plan preparation and land capability determination and is considered as one of the main sources in preparing development. National parks and protected areas are important part of Earth's ecosystems and are safe zones for wildlife. These areas have many environmental functions. Since land use and cover changes in each region can

largely effect on ecological functions and processes, Inform of the latest status of this regions plays an essential role in the quality of their management. Bakhtegan national park and wildlife refuge that contain Neyriz wetland, in the east Shiraz, Fars province, has been studied in this paper (Fig 1).

#### 2- Methodology

This paper aimed at improving classification accuracy and image quality improvement processing them based on a model of decision tree algorithm by combining the results of maximum likelihood algorithm. In this paper, a new model was developed for new land cover mapping of Bakhtegan national parks and wildlife refuge. In general, the process of investigation is shown in Figure 2.

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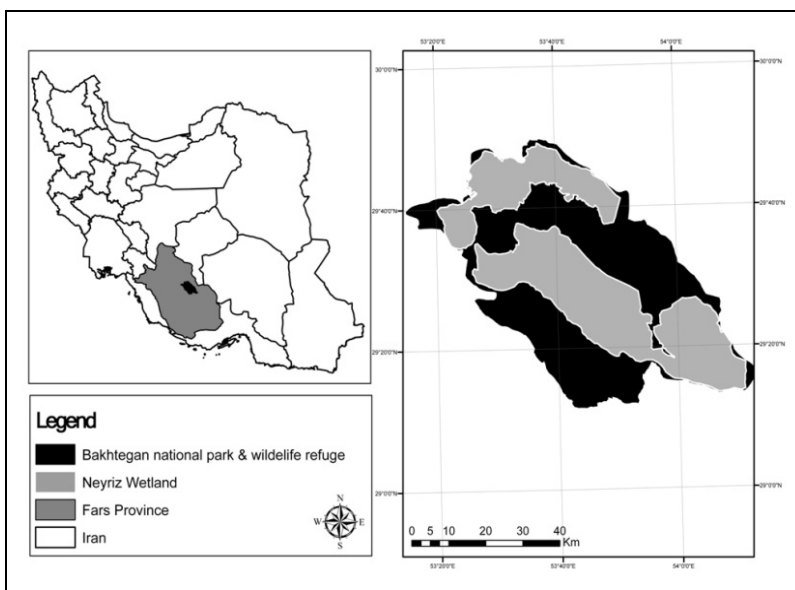


Fig 1: Area of study

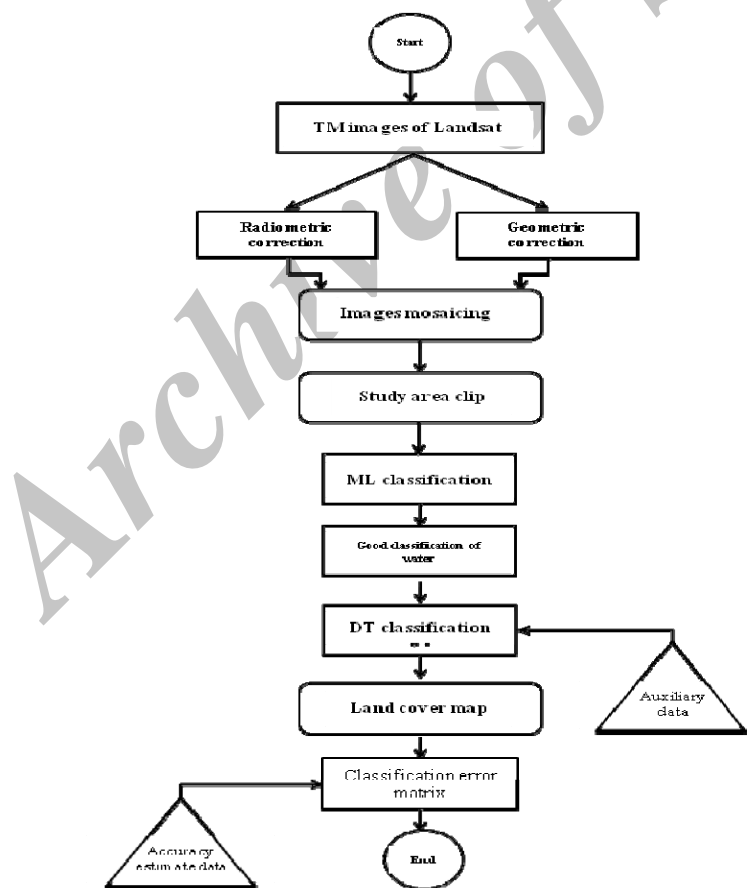


Fig 2: Land cover mapping process in this study

Two kinds of data sources were used to land cover mapping for 2010 in this region: (1) TM images of landsat satellite from early summers of 2010 and (2) Digital elevation model (DEM). The radiometric correction was applied on images by using histogram matching method. Histogram matching is a method in image processing for color adjustment by using the image histogram.

### 3- Discussion

Model function is branch that consists of four levels of decision making that ultimately five types of cover including agricultural land, pasture, water, salt and barren land will determine.

In this article, DEM, vegetation indices and water index is used to raise

the accuracy of decision tree classification algorithm.

With model-based decision tree algorithm, regional land use map for 2010 with high accuracy were obtained (Fig.3). To evaluate the accuracy of image classification, the GPS ground control points had been harvested from the area were used. Overall accuracy, users and producer's accuracy, and Kappa statistics were extracted from the error matrix. User and producer accuracy of classification is high and between 82 to 97 percent. Overall accuracy of classification is 92.72 % and Kappa statistic value obtained 90.73%. Areas of each class were calculated in square kilometer and percentage (Fig 4).

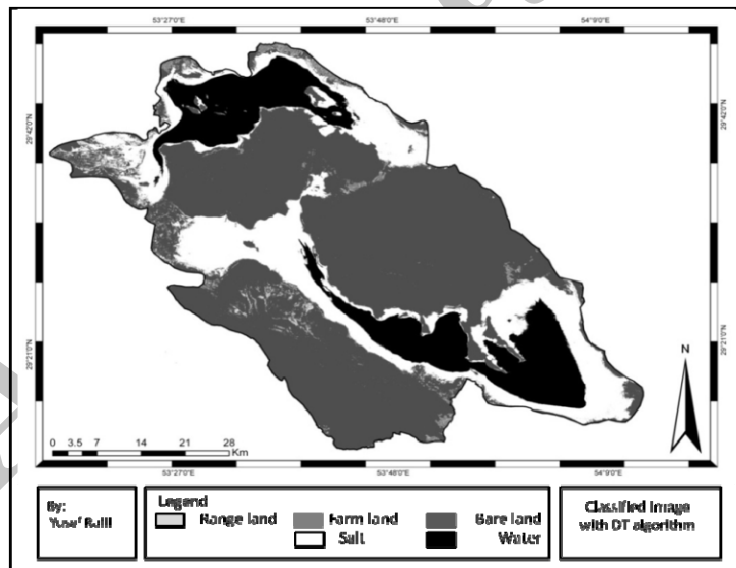


Fig 3: Land cover map of study area with DT algorithm

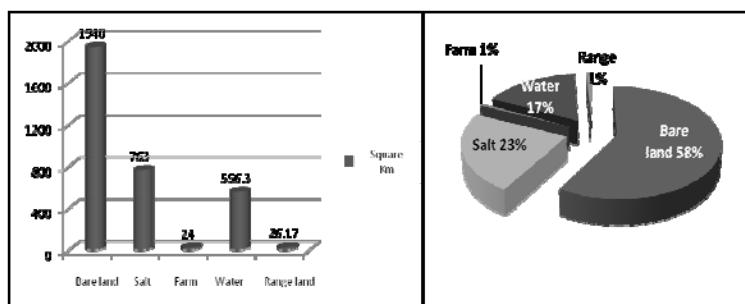


Fig 4: Classes area and ratio

#### 4- Conclusion

In this study land cover map of Bakhtegan national parks and wildlife refuge was prepared through development of a model based on decision tree algorithms and its combination with classification results of maximum likelihood.

The results of this study indicate that vegetation indices separate vegetation cover from no vegetation cover and agricultural lands from range lands with high accuracy. The amounts of water index and reflective values of band 4 separated the water from other classes well. In the final stage, bare lands separated by using maximum likelihood classification results and the values of the slope and altitude. This indicates the high flexibility of the DT-based algorithm model by using different sources of data and different algorithms. The results show that using combination methods and auxiliary data in images classification greatly increases the classification accuracy.

**Key words:** Land cover, Bakhtegan, Remote sensing, TM images, Decision tree algorithm

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