Data Mining Application On the domain of Birds Migration Research: routes and habitats

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1. Introduction

Satellite Telemetry Tracking Data
More than 0.7 millions birds migration data has been accumulated since 2007.

Inferences of Problems
- Discovery of Bird Habitat
- Analysis on the Site Connectedness between Habitats
- Identification of Migration Routes

Demonstration
Visualize our results on the GIS

2. Problem Set Up

Input: Bird Migration Data

Model:
- Clustering: Intuitively, a potential habitat is a region where wild bird species prefer to stay a long time, and it mathematically corresponds to a dense region of points over the entire area.
- Association Rule: As birds' migration between the habitats can be considered as a sequence pattern, we apply an existing sequence mining technique to discover interesting associations between the habitats. This is the goal of the association rules analysis.

3. Method

- Hierarchy Clustering Based On DBSCAN

4. Results

A. Bird Habitat Spatial Distribution

B. Site Connectedness of Bar-Headed Goose

C. Migration Routes of Bar-Headed Goose

5. Conclusion

Our cluster based approach for discovering the bar headed goose approximately depicts the geographical distribution of this species of wild water bird. Both of the cluster results in 2007 and in 2008 match greatly, which indicates that some certain habitats, such as the Qinghai Lake, DaLing Lake and the Tibet river valley, are of vital importance for some species.

What is more, the discovered migration routes are critical for finding an adequate compromise between habitat protection and economic development in the regions along their migration routes. Wide areas of MCP prove that it is necessary to build a broad network to cover the different core region areas. The clustering results displayed in the GIS pave the way for human beings to construct a systematic nature reserve in future.

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