Analysis and Prediction of Regional Environment Based on Feeling of People

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Extended Abstract

1. Purpose of the Research

Traditional environmental models are classified into two categories: physical or chemical models, and economic models. This research tries to include the feeling of residents, who can be good environmental sensors, into the model so that it becomes more understandable widely. This paper proposes a new approach to develop rule-based models based on not only statistical data but also the feeling of residents.

Especially, the paper focuses water environment for which the residents have some feeling that is very difficult to measure with chemical sensors. Based on the statistical data and a questionnaire survey, the paper explores the relation between environmental conditions and the feeling of residents, and then develops soft models to predict water quality. The field treated in this study is the southern part of Ishikawa prefecture where our JAIST is located.

2. Contents of the Paper

After a brief survey on related works, the paper introduces the questionnaire surveys that we carried out in August and in December 2000 in Kaga area of Ishikawa prefecture. The questionnaire related to water quality includes:

You see birds and fish around the waterside you often visit.

You can swim or do fishing or go boating there.

You can eat fish cached there.

You can go camping or barbecue there.

The color of water is brown.

There are sources of pollution around there.

You see plants such as reed.

The paper analyses these soft data comparing with the hard data that includes statistical data of areas and BOD (Biochemical Oxygen Demand) concentrations.

Based on the statistical data, the paper classifies the areas in the southern part of Ishikawa prefecture. After several try and errors, we have the following 6 clusters:

Cluster 1: Kanazawa

Cluster 2: Matto, Nonoichi, Neagari, Mikawa, Terai, Kawakita

Cluster 3: Unoke, Torigoe, Kawachi

Cluster 4: Uchnada, Nanatsuka

Cluster 6: Shiramine, Oguchi, Yoshinodani

For each cluster, a rule-based model is developed to predict water quality such as:

If people often see birds and fish then BOD is very low.

Furthermore, the paper tries to develop linear regression models in the consequence part.

3. Future Works

Future works should includes:

1. Development of better regression models after classifying rivers.
2. Detection of the relation between total evaluation and items of evaluation.
3. Investigation of the relation between attitudes of residents and their evaluation of environment.
4. Rethinking of items of questionnaire in order to get more accurate feeling of people.