

ECONOMIC VALUE PREDICTION SYSTEM FOR UNDER-UTILISED CROPS

Supervisory Team

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Research Background

- ◆ Growers rely on such predictions in forming their production plans. Most of the time, the appropriateness of these choices mainly depends on their own knowledge and experience.
- ◆ There are difficulties in designing prediction systems, such as the lack of timely and accurate data collection method and the complexity of the economic model.
- ◆ Machine learning techniques rooted in statistical learning theory and the appropriate implementation of attribute extraction can be useful in the following effort:
 - ◆ Classification of under-utilised crops into categories most clearly related to a cash crop
 - ◆ Prediction of actions and steps needed for under-utilised crops to attain the same level of success as a commercial cash crop
 - ◆ Prediction of region or area (economically and sociologically) where these under-utilised crops can be transplanted accordingly.

Problem Statement

- ◆ Previous research has attempted to determine which cash crops bring the most value per square foot of farm space, partly to aid farmers in making decisions about what to plant.
- ◆ However it is difficult to evaluate the economic value of underutilized crops due to the availability of varieties and crops types not generally found in the marketplace, and the lack of comparison values between cash crops and under-utilised crops, but which are perfectly useful to the grower.

Objectives

The purpose of the proposed Economic Value Prediction study is to determine what factors are most influential in determining underutilized crops success or failure.

- ◆ To address the issues of economic value prediction for under-utilised crops
- ◆ To provide a framework that can be used to identify the potential economic value of under-utilised crops based on a classification comparison with cash crops which are already successful.
- ◆ To identify key factors related to the economic value of crops (both for cash crops and under-utilised crops)

Methodologies

My theory and why it is unique. (Hypotheses)

The proposed system accumulates knowledge by storing classified instances rather than general rules or algorithmic procedures.

- ◆ **Hypothesis1.** Using the support vector machine in the creation procedure of the proposed prototype system is likely to lead to a better classified performance.
- ◆ **Hypothesis2.** Using the support vector machine in the exploitation procedure of the proposed prototype system is likely to lead to a better predictive performance.
- ◆ **Hypothesis3.** The type of the inner-product kernels may have influence on the classification and prediction performance of the support vector machine in this proposed prototype system.
- ◆ **Hypothesis4.** The feature space may have influence on the classification and prediction performance of the support vector machine in this proposed prototype system.

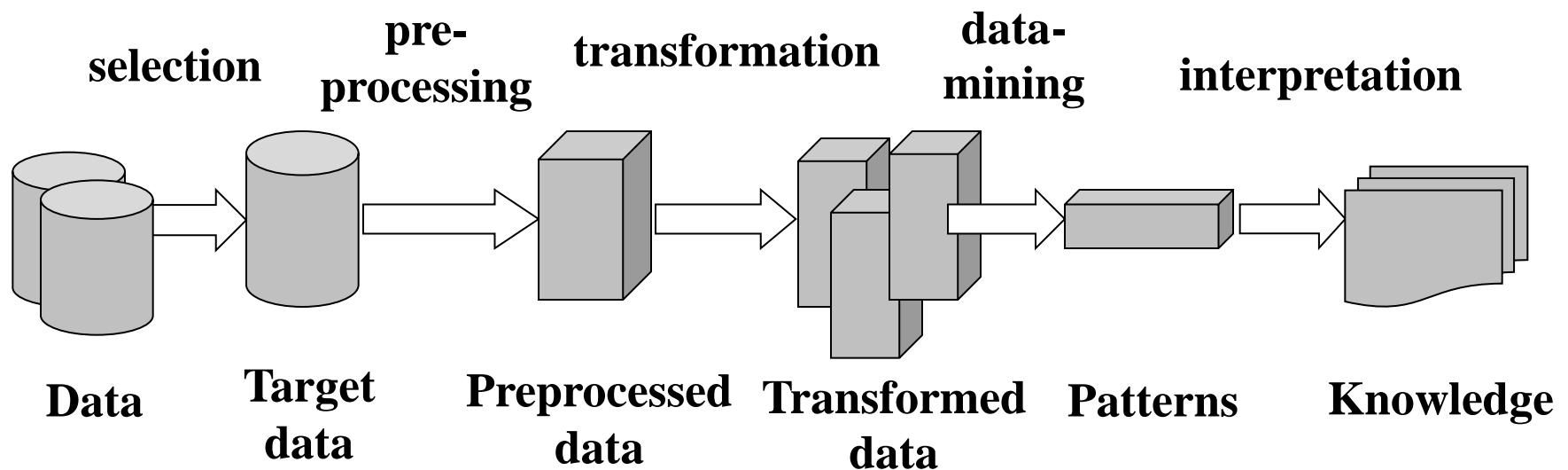
Starting Point

- ◆ **Data Mining**
extracting knowledge from data
- ◆ **Crops Modeling**
coupling of economic models between cash crops and under-utilised crops
- ◆ **Case Based Reasoning**
computer behave like a human
- ◆ **Support Vector Machine**
classification and regression



Data Mining

◆ KDD process



Crops Modeling

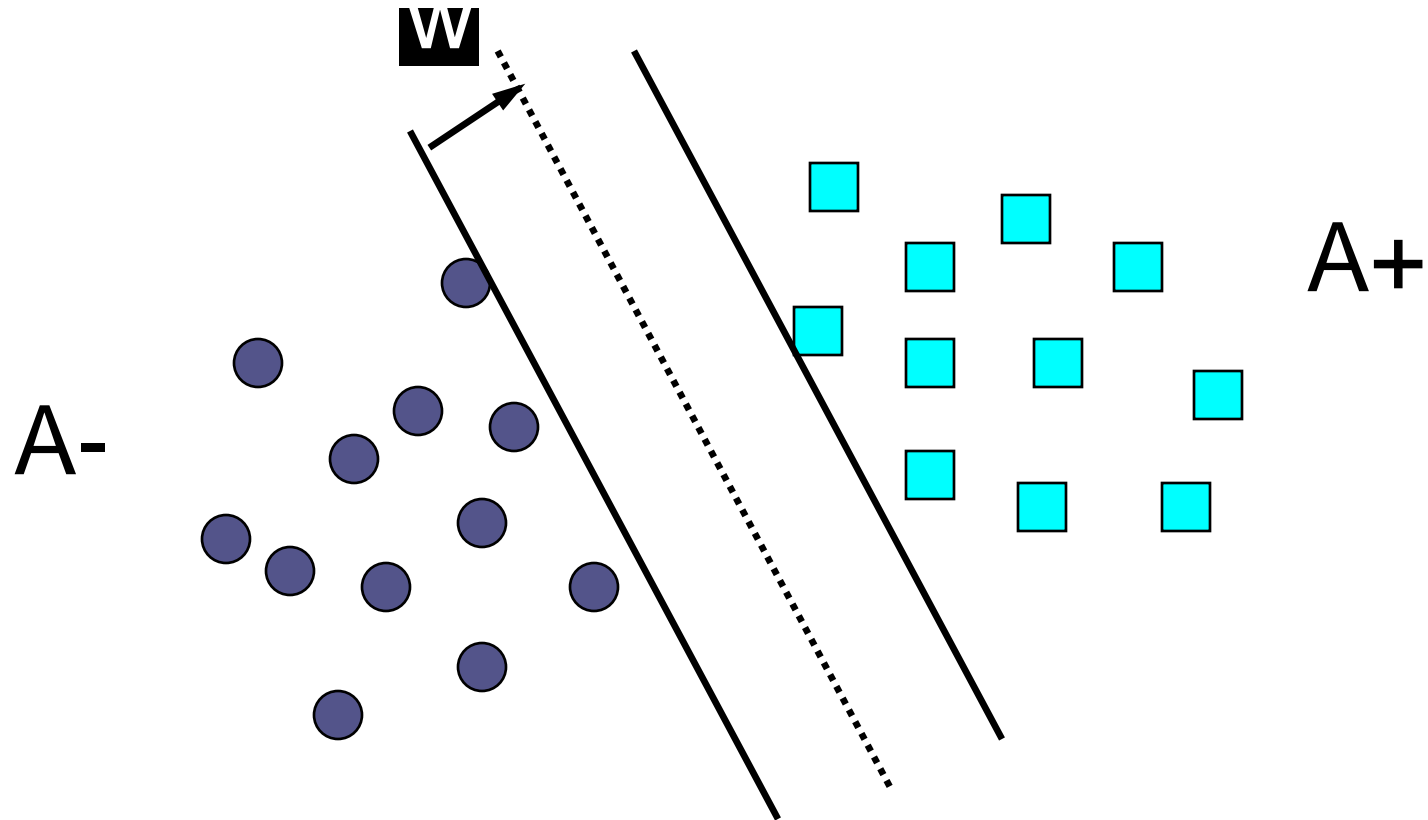
Crop model — the explicit representation of all relevant aspects of a model crop's economic value
(Yield, revenue, Chemical Cost, Seed Cost, Profit, etc.)

- ◆ **This process is equipped with:**
 - ◆ The Individual Crop Model stores economic characteristics.
 - ◆ The Domain Model is a conceptual representation of the economic model.
- ◆ **Put models into SVM to get Crop Class**

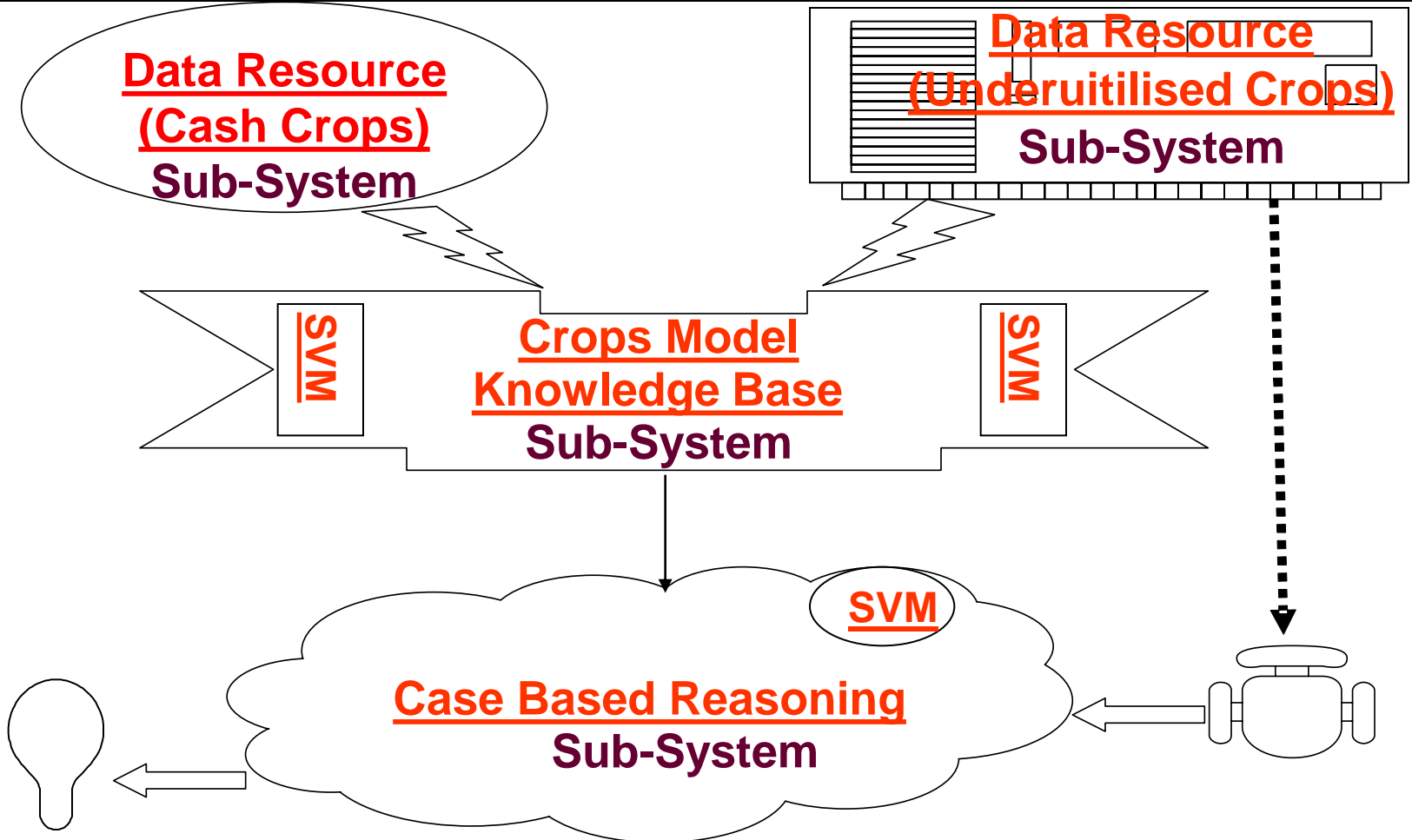
Case Based Reasoning

- ◆ **RETRIEVE** the most similar cash crop cases;
- ◆ **REUSE** the information and knowledge in that case to solve the problem
- ◆ **REVISE** the proposed solution if necessary, and
- ◆ **RETAIN** the new economic value information as part of a new case.

Support Vector Machine



Topological Structure



Flow Chart Of Research Activities

