

Questions Decision Modeling - Prof. Jan Vanthienen

A. Decision Table Modeling

This is a decision table of type A (hit indicator is A, Any). This means that rules can overlap, but the outcomes of overlapping rules are equal.

1. Which rules overlap?
2. Produce a version without overlapping rules, maintaining the order of the conditions.
3. Optimize the order of the conditions and obtain a unique hit table with a minimal number of rules.

Eligibility				
A	Pre-Bureau Risk Category	Pre-Bureau Affordability	Expert Review	Eligibility
1	ACCEPT	TRUE	-	ELIGIBLE
2	-	-	ACCEPT	ELIGIBLE
3	-	FALSE	DECLINE	INELIGIBLE
4	DECLINE	TRUE	DECLINE	INELIGIBLE

Answers:

1. Only rules 1 and 2 overlap. The case (accept, true, accept) is present in both rules.
2. Here are two tables of type U(nique), with non-overlapping rules. The first one reads like a tree (from left to right). The second one is fine, but is a little harder to interpret. The second one is often a little more compact.

Eligibility				
U	Pre-Bureau Risk Category	Pre-Bureau Affordability	Expert Review	Eligibility
1	ACCEPT	TRUE	-	ELIGIBLE
2		FALSE	ACCEPT	ELIGIBLE
3				DECLINE
4	DECLINE	-	ACCEPT	ELIGIBLE
5			DECLINE	INELIGIBLE

Eligibility				
U	Pre-Bureau Risk Category	Pre-Bureau Affordability	Expert Review	Result
1	ACCEPT	TRUE	-	ELIGIBLE
2	-	FALSE	ACCEPT	ELIGIBLE
3	-	FALSE	DECLINE	INELIGIBLE
4	DECLINE	TRUE	ACCEPT	ELIGIBLE
5	DECLINE	TRUE	DECLINE	INELIGIBLE

3. When the order of the conditions is changed, a contracted unique hit table can be designed with 4 rules. Expert Review will be put first. Affordability or Risk Category can be in any order, the result is still 4 rules.

Eligibility				
U	Expert Review	Pre-Bureau Affordability	Pre-Bureau Risk Category	Eligibility
1	ACCEPT	-	-	ELIGIBLE
2	DECLINE	TRUE	ACCEPT	ELIGIBLE
3			DECLINE	INELIGIBLE
4		FALSE	-	INELIGIBLE

B. Decision Modeling

In the Cloud

Airline Alliance 'In the Cloud' developed an extensive loyalty program and defined the following sets of business rules:

Occasional travelers are travelers that have not registered permanently. After the flight, their transaction data are rendered anonymous and are not applicable to the loyalty program. Registered customers enjoy the benefits of the program. These customers can be divided in different categories based on the number of air miles travelled in the last two years (called status miles). The upper limit to the number of status miles for each class was determined as follows (customers belong to the highest applicable class): regular member (35.000), frequent flyers (100.000), senators (600.000) and HON circle members (all other customers).

Flight rewards are given according to the following rules:

- Number of air miles = flight distance, for regular members or frequent flyers in economy and for regular members in business class.
- Number of air miles = $1.5 * \text{flight distance}$, for regular members in first class, for frequent flyers in business class of first class and for senators in economy.
- Number of air miles = $2 * \text{flight distance}$, for senators in business or first class.
- HON circle customers are granted access to the lounge, and can acquire extra privileges on top of air miles:
 - Number of air miles = $2 * \text{flight distance}$, for HON circle members in economy
 - Number of air miles = $2 * \text{flight distance} \& \text{ company solutions}$, for HON circle members in business class
 - Number of air miles = $2,5 * \text{flight distance}$, for HON circle members in first class

Management still has to approve this program and expects a clear overview of the business rules: a set of decision tables.

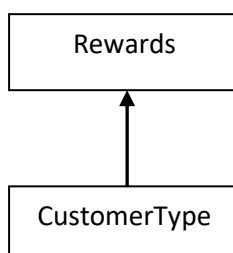
Represent the business logic in this policy using a decision model with one or more decision tables.

1. Draw the Decision Requirements Graph
2. Construct the decision tables.

Answers:

The decision model contains two decisions: Rewards and CustomerType. Rewards depends on CustomerType.

1. Decision Requirements Graph



2. Decision Tables

Rewards

Customer type	Anonymous	Member		Frequent traveler		Senator		Hon Circle		
Class of service	-	Econ or Bus	First	Econ	Bus or First	Econ	Bus or First	Econ	Bus	First
0 * distance	X	-	-	-	-	-	-	-	-	-
1 * distance	-	X	-	X	-	-	-	-	-	-
1,5 * distance	-	-	X	-	X	X	-	-	-	-
2 * distance	-	-	-	-	-	-	X	-	-	-
2* distance & lounge access	-	-	-	-	-	-	-	X	-	-
2* distance & lounge access & company solutions	-	-	-	-	-	-	-	-	X	-
2*5 distance & lounge access	-	-	-	-	-	-	-	-	-	X

Customer type

Registered	Yes				No
Number of status air miles last two years	$x < 35.000$	$35.000 \leq x < 100.000$	$100.000 \leq x < 600.000$	$X \geq 600.000$	-
Customer type := anonymous	-	-	-	-	X
Customer type := member	X	-	-	-	
Customer type := frequent traveler	-	X	-	-	
Customer type := senator	-	-	X	-	-
Customer type := Hon circle	-	-	-	X	-