

MICS-2 Algorithmic Decision Theory

Alice's best choice: A case study

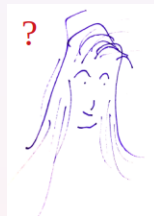
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Introduction

1. The decision problem
2. The performance tableau
3. Building the best choice recommendation



Reference :

Eisenführ, Fr., Langer, Th., and Weber, M., **Fallstudien zu rationalem Entscheiden**, Springer 2001, pp. 1 – 17.

The authors propose an MAVT type decision aid.

The decision problem

- Alice D., 19 years old German student finishing her secondary studies in Köln, desires to undertake foreign languages studies.
- She will probably receive her "Abitur" with satisfactory and/or good marks.
- She would not mind staying in Köln, yet is ready to move elsewhere if necessary.
- She wants to start her further studies immediately after receiving her Abitur.

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The decision problem – continue

- The length of the higher studies do concern her, as she wants to earn her life as soon as possible.
- Her parents however agree to financially support her studies fees as well as her living costs during her studies.
- Alice is seeking a decision aid concerning the study orientation to choose.

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Potential decision actions

Diploma	Institution	City
Qualified translator (TD)	University (Uni D)	Düsseldorf
Qualified translator (TD)	Higher Technical School (FH K)	Köln
Qualified translator (TD)	Higher Technical School (FH M)	München
Graduate interpreter (ID)	Higher Technical School (FH K)	Köln
Qualified translator (TD)	University (Uni SB)	Saarbrücken
Graduate interpreter (ID)	University (Uni SB)	Saarbrücken
Qualified translator (TD)	University (Uni HB)	Heidelberg
Graduate interpreter (ID)	University (Uni HB)	Heidelberg
Specialized secretary (SS)	Chamber of Commerce (HK K)	Köln
Foreign correspondent (CE)	Chamber of Commerce (HK K)	Köln

Decision objectives that concern Alice

- Distance to her parents (to minimize)
- Interest of the study place (to maximize)
- Financial dependency on her parents (to minimize)
- Do interesting further studies (to maximize)
- Professional perspectives (to maximize)
- Occupational prestige (to maximize)

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Performance criteria

1. Optimal study place
 - a. proximity to her parents
 - b. Big city
2. Costs for studying
3. Interesting study program
4. Professional perspectives
5. Professional income
6. Occupational status

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Performance Tableau : 1. Study place

City	distance in km	inhabitants
Köln	0	1 014 910
Heidelberg	275	140 000
Düsseldorf	41	567 396
München	631	1 241 272
Saarbrücken	269	195 943

Commentary

For Alice, nearer to Köln and more inhabitants are better.

Performance Tableau : 2. Costs for studying

Program	Annual costs (in €)			length (years)
	living	fees	total	
Qual. Trans. (Uni D)	12 000	400	12 400	4,5
Qual. Trans. (FH K)	0	400	400	4
Qual. Trans. (FH M)	12 000	400	12 400	4
Grad. Interp. (FH K)	0	400	400	4
Qual. Trans. (Uni SB)	12 000	400	12 400	4,5
Grad. Interp. (Uni SB)	12 000	400	12 400	4,5
Qual. Trans. (Uni HB)	12 000	400	12 400	4,5
Grad. Interp. (Uni HB)	12 000	400	12 400	4,5
Spec. Secr. (HK K)	0	4 000	4 000	2
For. corr. (HK K)	0	4 000	4 000	2

Commentary

Alice needs to minimize the studying costs.

Performance Tableau : 3. Interesting study program

Program	Grades (0-10)
Qualified translator (Uni D)	5
Qualified translator (FH K)	5
Qualified translator (FH M)	4
Graduate interpreter (FH K)	8
Qualified translator (Uni SB)	5
Graduate interpreter (Uni SB)	8
Qualified translator (Uni HB)	5
Graduate interpreter (Uni HB)	8
Specialized secretary (HK K)	1
Foreign correspondent (HK K)	2

Commentary

Alice has graded all the potential study programs on an ordinal scale from 0 (worst) to 10 (best)

Performance Tableau : 4. Professional perspectives

Program	Grades (0-10)
Qualified translator (Uni D)	7
Qualified translator (FH K)	7
Qualified translator (FH M)	7
Graduate interpreter (FH K)	9
Qualified translator (Uni SB)	7
Graduate interpreter (Uni SB)	9
Qualified translator (Uni HB)	7
Graduate interpreter (Uni HB)	9
Specialized secretary (HK K)	4
Foreign correspondent (HK K)	4

Commentary

Alice has graded all the programs on an ordinal scale from 0 (worst) to 10 (best).

Performance Tableau : 5. Expected professional income

Diploma	expected annual income (€)
Qualified translator (Uni)	45 000
Qualified translator (FH)	35 000
Graduate interpreter (FH)	35 000
Graduate interpreter (Uni)	45 000
Specialized secretary (HK)	30 000
Foreign correspondent (HK)	30 000

Commentary

Alice has "googled" this information.

Performance Tableau : 6. Occupational prestige

Diploma	SIOPS
Qualified translator (Uni)	62
Qualified translator (FH)	62
Graduate interpreter (FH)	62
Graduate interpreter (Uni)	62
Specialized secretary (HK)	44
Foreign correspondent (HK)	44

Commentary

From the SIOPS (Standard International Occupational Prestige Scale), Donald Treiman 1977/78.

Weighing the performance criteria

Rank	Criterion	Id	Weight
1	Study place (1)	DD	100
2	Content of the study program (3)	F	80
3	Net professional income (5) - (2)	RN	70
4	Prestige (6)	PR	60
5	Professional perspectives (4)	PP	30

Commentary

Alice used the “swing weights” methods from the MAVT for estimating the significance of the performance criteria.

Best choice : MAVT global result

Id	Program	global score
TD-UD	Qualified translator (Uni D)	0.742
TD-FH-K	Qualified translator (FH K)	0.798
TD-FH-M	Qualified translator (FH M)	0.452
ID-FH-K	Graduate interpreter (FH K)	0.934
TD-USB	Qualified translator (Uni SB)	0.605
ID-USB	Graduate interpreter (Uni SB)	0.775
TD-UHB	Qualified translator (Uni HB)	0.598
ID-UHB	Graduate interpreter (Uni HB)	0.767
SS-HK-K	Specialized secretary (HK K)	0.447
CE-HK-K	Foreign correspondent (HK K)	0.481

Commentary

The best studying program for Alice, following the MAVT approach, appears to be a_4 : Graduate interpreter (FH K).

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Commentary

*The best studying program for Alice, following the MAVT approach, appears to be **a₄ : Graduate interpreter (FH K)**.*

Questions for further decision aid analysis

1. Establish, following the Rubis approach a complete performance tableau.
2. Are all the six criteria taken into account preferentially independent ?
3. What performance discrimination thresholds could be applied on the criterion scales ?
4. Do we observe considerable performance differences potentially triggering veto or counter-veto situations ?
5. Alice considers all decision objectives to be of a same importance to her ?
6. Study in detail the outranking situations observed between the three best alternatives (ID-FK-K, TD-FK-K, ID-USB) following from the MAVT analysis.
7. Compute the Rubis best choice recommendation with the RubisRestServer.
8. How confident or convincing is the Rubis best choice recommendation ?

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