

Decision Analysis report 2 - UTA

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1 Data set

The data set contains preference information about 15 video games, collected mostly from Steam and DM's judgements. The goal is to recommend what the DM's resources of time and money should be dedicated towards.

1.1 Criteria

There are 9 criteria in the data set. All of them are discrete.

price: full cost of the game, taken from its Steam store page (given in PLN, for Polish market). Cost type. Minimum value in the data set: 0 (for "Path of Exile", a free to play game), maximum value: 249.00 ("ELDEN RING")

positive_reviews_percentage: gain, 0-100 scale

number_of_reviews: gain, 1085 ("Nebuchadnezzar") to 880572 ("Terraria")

system_requirements: cost, 1-10 scale

content_volume, gameplay, audio, graphics: all gain, 1-10 scale

position_on_wishlist: cost, 0 (game already owned) - n (maximum value in the data set: 8, "Gears Tactics")

2 Discussing consistent model results

The solver was able to quickly determine a consistent model. The provided pairwise comparisons seem to be easy to realise - only 3 out of 9 marginal value functions make significant use of the 2 available breakpoints. The remaining 6 use only one of them to differentiate between the top performances on the corresponding gain-type criteria. This might be due to the sparseness of the data in some ranges of criteria values - e.g. there is only one alternative that would fall into the "worst bucket" (has a value between 1 and 4) in the **gameplay** category.

3 Comparing UTA and PROMETHEE II rankings

Both rankings produced no indifferences. The resulting Kendall's tau was $\tau \approx 0.657$. This is below the threshold of 0.75 typically considered to be sufficient to accept two rankings as similar. Some highlights of comparing the rankings example-by-example:

- "Terraria" ranks first in both
- "Gears Tactics" ranks last (15th) in both
- "Divinity: Original Sin 2" jumped all the way from 9th in PROMETHEE II to 3rd in UTA

- "Superliminal", "Rogue Legacy 2", "Nebuchadnezzar", "Last Epoch", and "Gears Tactics" are among the bottom 5 in both rankings
- "Geometry Dash", and "Path of Exile" are consistently ranked near the top

Top 5:

Position	PROMETHEE II	UTA
1.	Terraria	Terraria
2.	Portal 2	Path of Exile
3.	Geometry Dash	Divinity: Original Sin 2
4.	Path of Exile	Geometry Dash
5.	Bloons TD 6	Slay the Spire

Bottom 5:

Position	PROMETHEE II	UTA
11.	Superliminal	Last Epoch
12.	Rogue Legacy 2	Nebuchadnezzar
13.	Nebuchadnezzar	Rogue Legacy 2
14.	Last Epoch	Superliminal
15.	Gears Tactics	Gears Tactics

Other than radically changing criteria weights (which was not done to preserve continuity with the previous project), the thing that seems to have the greatest impact on the UTA ranking are the provided pairwise comparisons, especially if they include one alternative particularly often, or go against the ranking that would be obtained without the given comparison.