

Exceptional Gestalt Mining (EGM)

in collaboration with the Algorithms group

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Introduction

Magic: The Gathering (MTG, or *Magic* for short) is a turn-based collectible card game, where prior to playing the game proper, one builds a synergistic deck from a set of available cards; in the actual game of Magic, each player uses their own deck (which is typically constructed from the same set, but not necessarily the same sample from the set: some ways of deck construction involve chance or a drafting mechanic).

A crucial feature of Magic’s gameplay is the “mana system”. Some of the cards are *lands* that produce mana of a certain *color*¹ (white, blue, black, red, or green). This mana is a resource used to play other cards called *spells*, which actually produce game effects as indicated on the card. This typically advances the game state in a manner that brings the player closer to their end goal. A game of Magic can be won in various ways, most prominently by reducing the opponent’s life points from the starting total of 20 down to zero (or below) and by depleting the opponent’s deck; other win conditions also exist, as specified by individual cards.

In this project we investigate the concept of *gestalt*: a total that is bigger than the sum of its parts. We seek combinations of cards, that work better when they are in decks containing a bigger coalition of colors: we will deem the combination of cards interesting, if its performance in the multicolor combination is substantially better than its performance in subcoalitions of fewer colors.

Current Status

An initial paper on Exceptional Gestalt Mining (EGM) [1] was published at the 2021 Workshop on Machine Learning and Data Mining for Sports Analytics. It finds some moderately interesting subgroups of cards on a dataset of the Kaldheim Traditional Draft, but it leaves much more data underexplored. For instance, we know for each game which colors were observed from the deck of the opponent (possibly a subset of all colors in their deck); it stands to reason that certain card coalitions work better when opposed by certain colors than when opposed by others. We also know how many turns each game took (gestalt in faster/slower decks), and in what win rate bracket the player resides (gestalt for experienced/novice players); incorporating such information in EGM may uncover further interesting subgroups. Extensions are possible along many axes; feel free to incorporate your own knowledge of MTG.

¹Most of our descriptions of the game are not completely accurate. With over 20000 distinct cards there is an exception to almost any generalization. In this case: some lands can produce mana of multiple colors, or produce no mana at all. Our descriptions only serve to illustrate the context of the dataset.

Requirements

A certain amount of affinity with MTG is desired; doctor Van Dijk has quite some knowledge about the game, but two know more than one. When done well, we expect this project to lead to a follow-up publication at the next MLSA workshop.

Nota Bene

A student from the previous year is currently writing a MSc thesis on expanding EGM. This needs not be a problem: the EGM problem space is big enough to accommodate about a dozen master theses. But it's good to be aware of this.

References

- [1] W. Duivesteijn, T. C. van Dijk: Exceptional Gestalt Mining: Combining Magic Cards to Make Complex Coalitions Thrive. In: Proceedings of the 8th Workshop on Machine Learning and Data Mining for Sports Analytics, pp. 191–204, 2021.