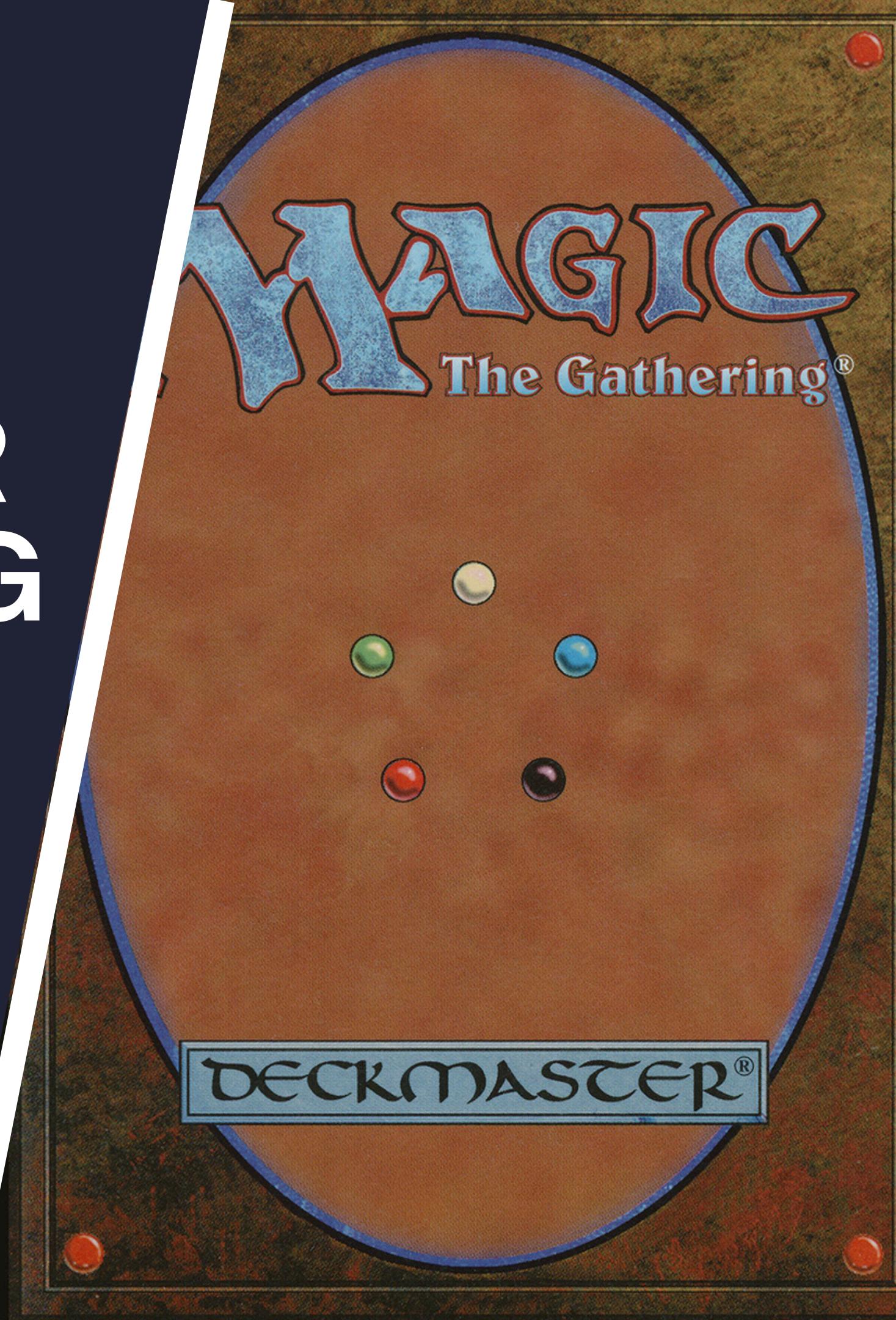


LEARNING WITH GENERALISED CARD REPRESENTATIONS FOR MAGIC: THE GATHERING

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Johannes Kepler University Linz, University of Alberta

IEEE Conference on Games 2024



Inkmoth Nexus



Land



• Add ♦.

1 : Inkmoth Nexus becomes a 1/1 Blinkmoth artifact creature with flying and infect until end of turn.
It's still a land.

045 R

SLD • EN JOSHUA HOWARD



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The background features a dark navy blue gradient. Overlaid on it are several large, semi-transparent circles in shades of teal, orange, and yellow. These circles overlap in various ways, creating a sense of depth and motion.

DECKBUILDING



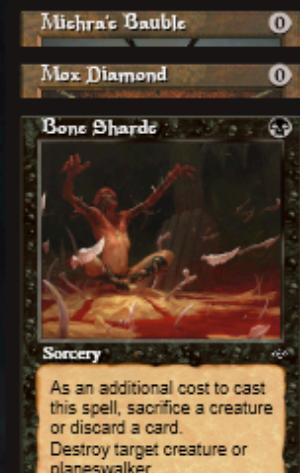
Booster
2/3 13 Cards Available
Select 1 (0 remaining)

0:40

SUBMIT



17 Total 5 Creatures 4 Land 8 Other



Last Selected: Mox Diamond

2

1

1

1

2

3

4

1

2





Booster
2/3 13 Cards Available
Select 1 (0 remaining)

0:40

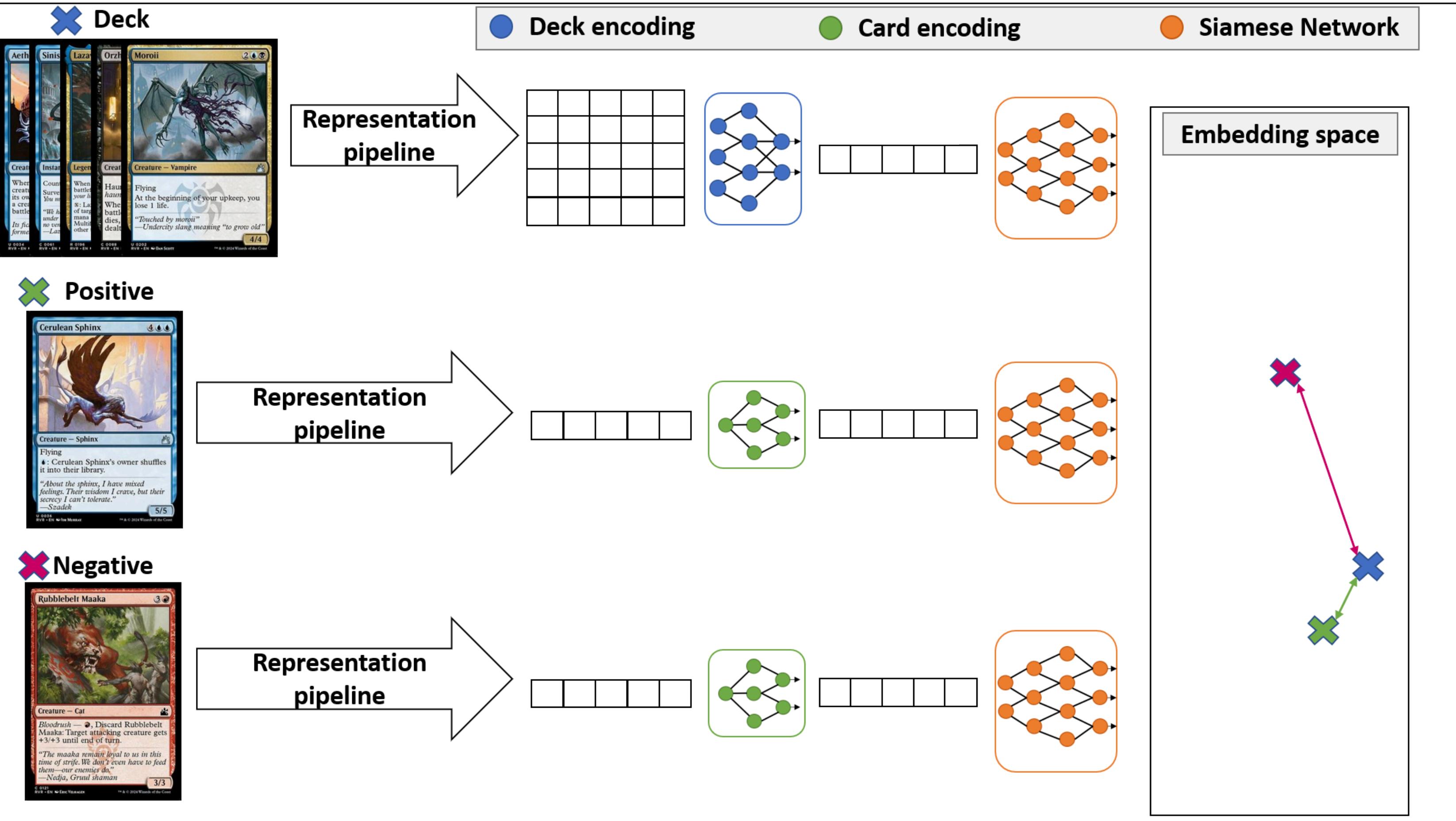
SUBMIT

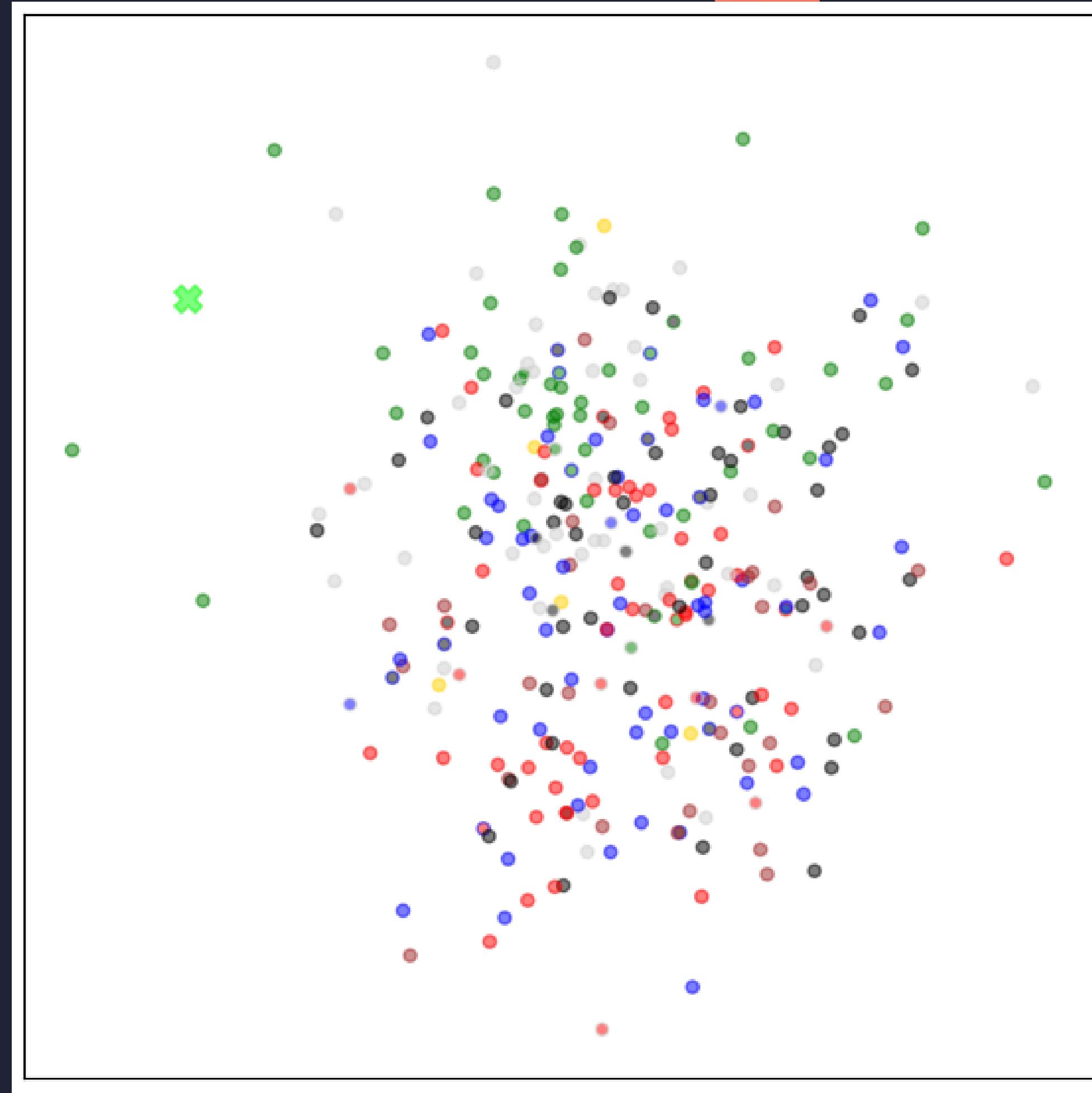


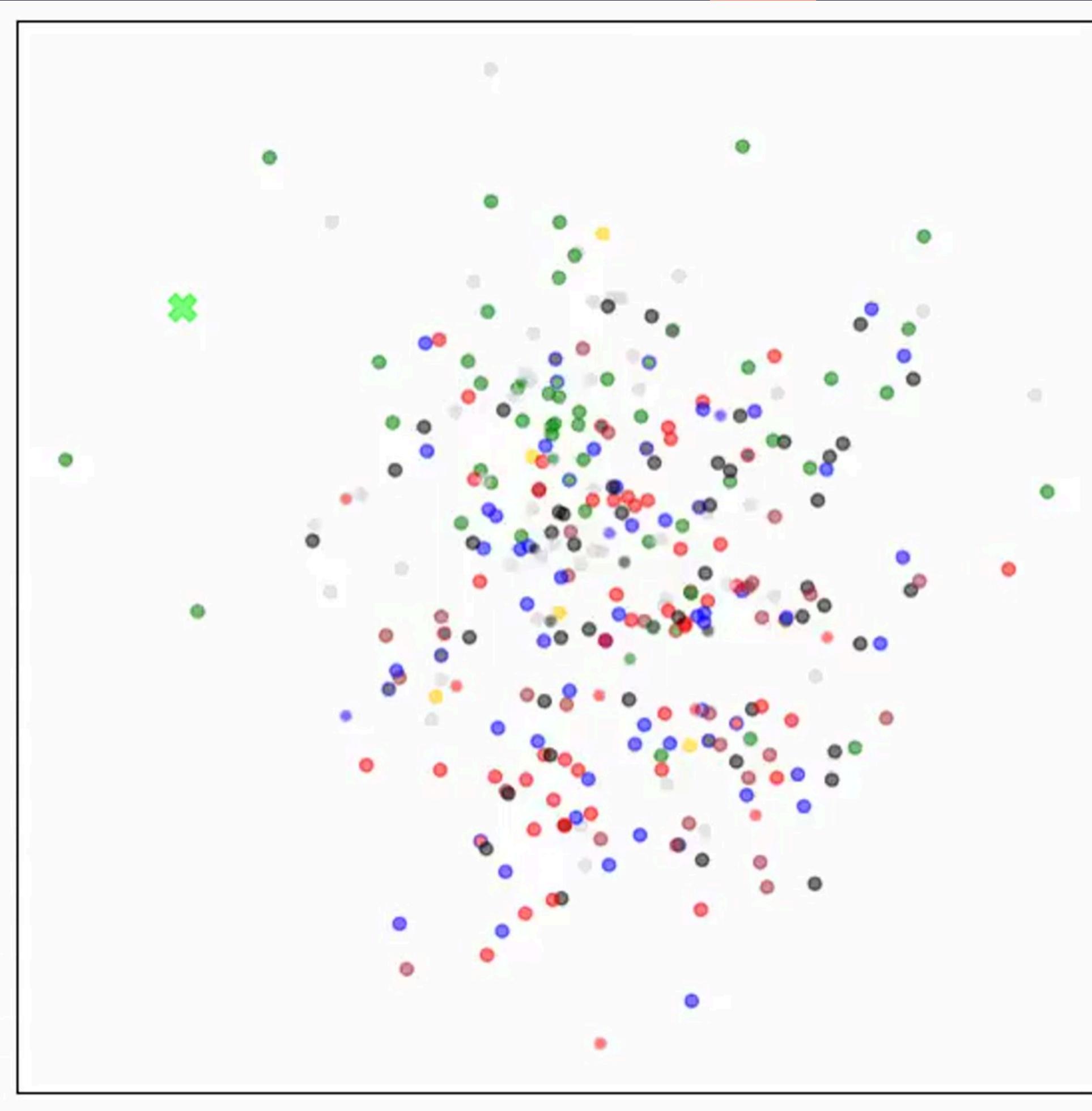
17 Total 5 Creatures 4 Land 8 Other

Last Selected: Mox Diamond









The background features a dark navy blue gradient. Overlaid on it are several semi-transparent, overlapping circles in shades of teal, orange, and yellow. These circles are positioned in the upper left and lower right quadrants, creating a sense of depth and motion.

REPRESENTATION

Underdark Explorer

4



Creature – Lizard Warrior



Menace (*This creature can't be blocked except by two or more creatures.*)

When Underdark Explorer enters the battlefield, you take the initiative.

“Keep your fancy magic. All I need is a hook and a sturdy length of rope.”

5/3

Natural
language

Visual

Categorical



Numerical

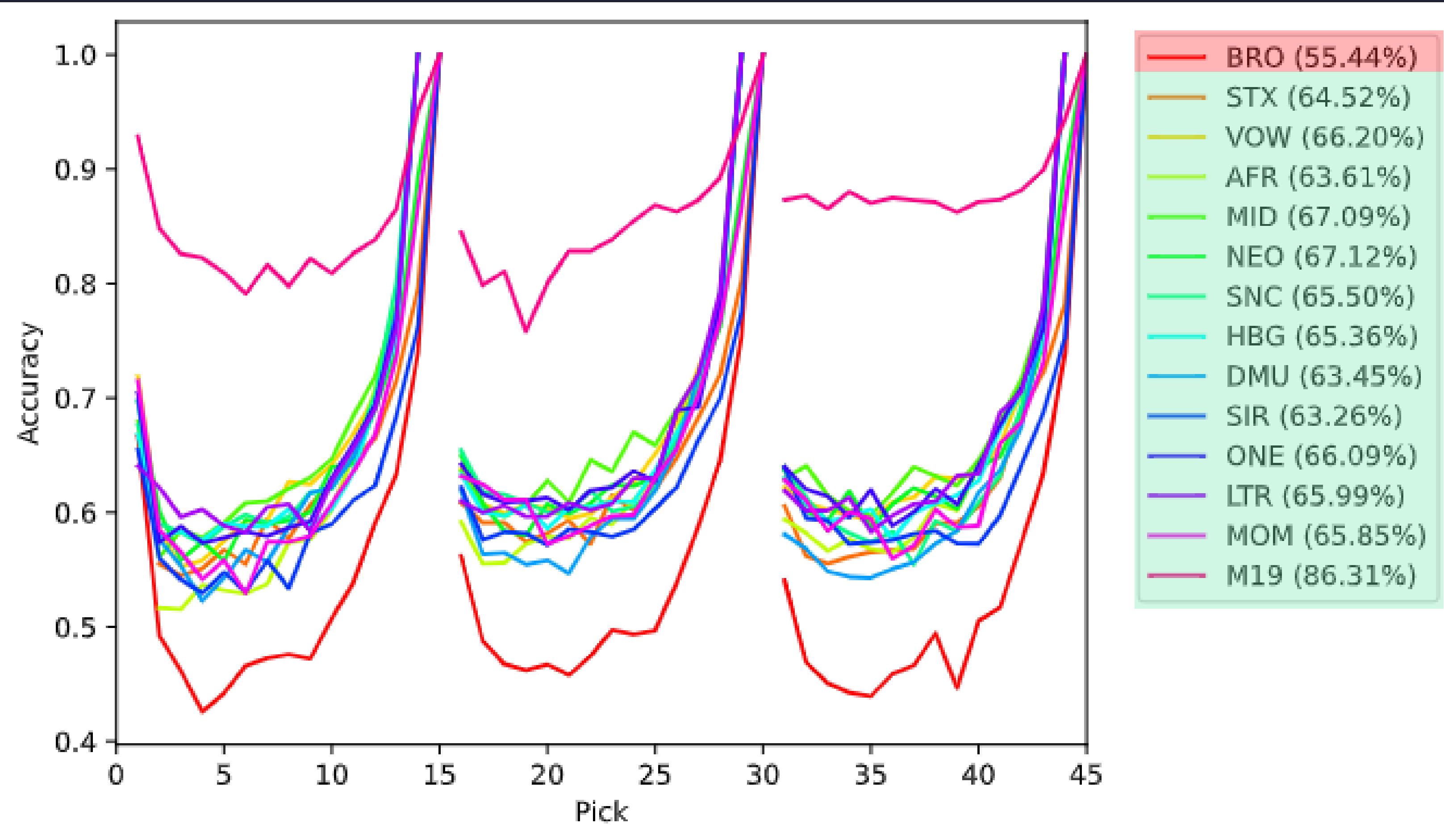
Categorical

Natural
language

Numerical

Representation	Test accuracy on known cards (NEO)	Test accuracy on unknown cards
Random vectors		
Latent image encodings		
Card meta statistics		
Feature encodings		
Features + Image + Meta		

Representation	Test accuracy on known cards (NEO)	Test accuracy on unknown cards
Random vectors	67.87%	23.79%
Latent image encodings	68.09%	31.10%
Card meta statistics	64.73%	42.14%
Feature encodings	67.76%	33.57%
Features + Image + Meta	68.00%	42.87%



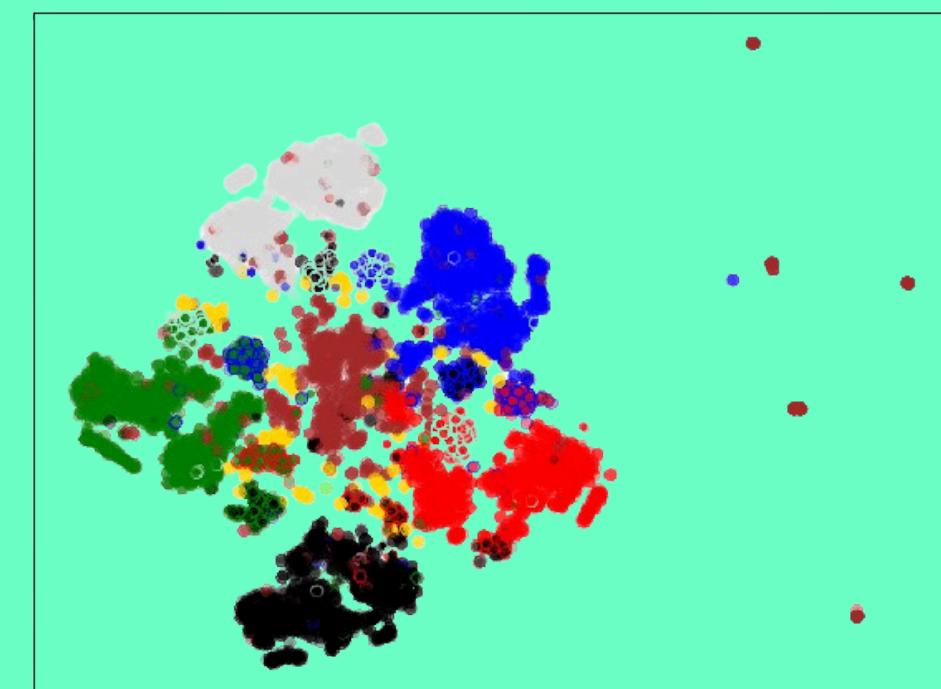


USE-CASES

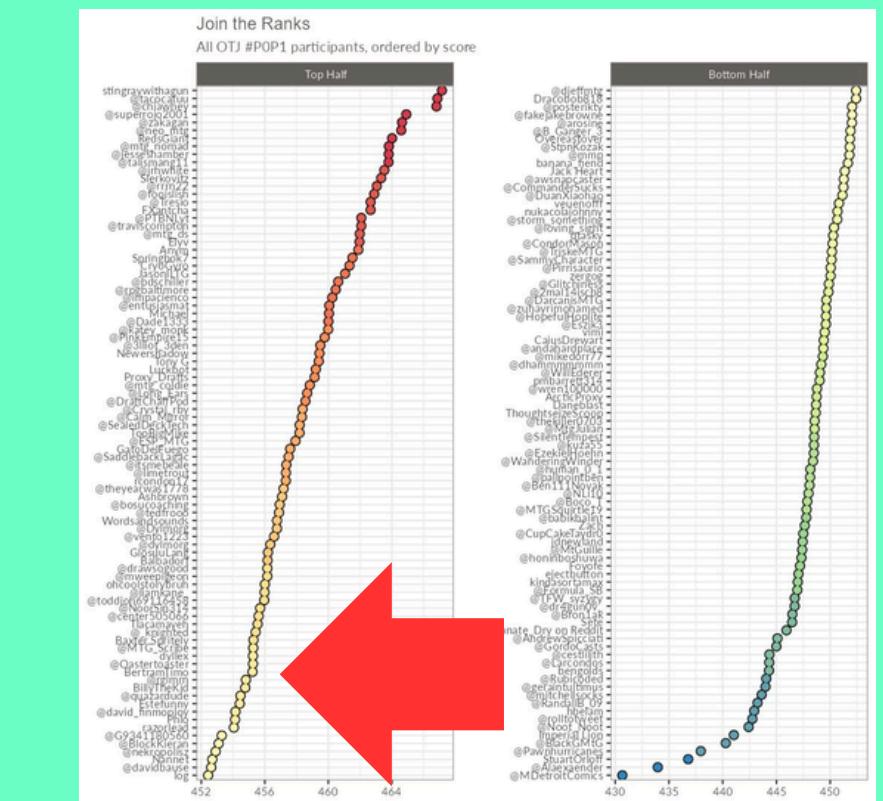
Preferences > Predictions



Meaningful embedding



Real-world applicable



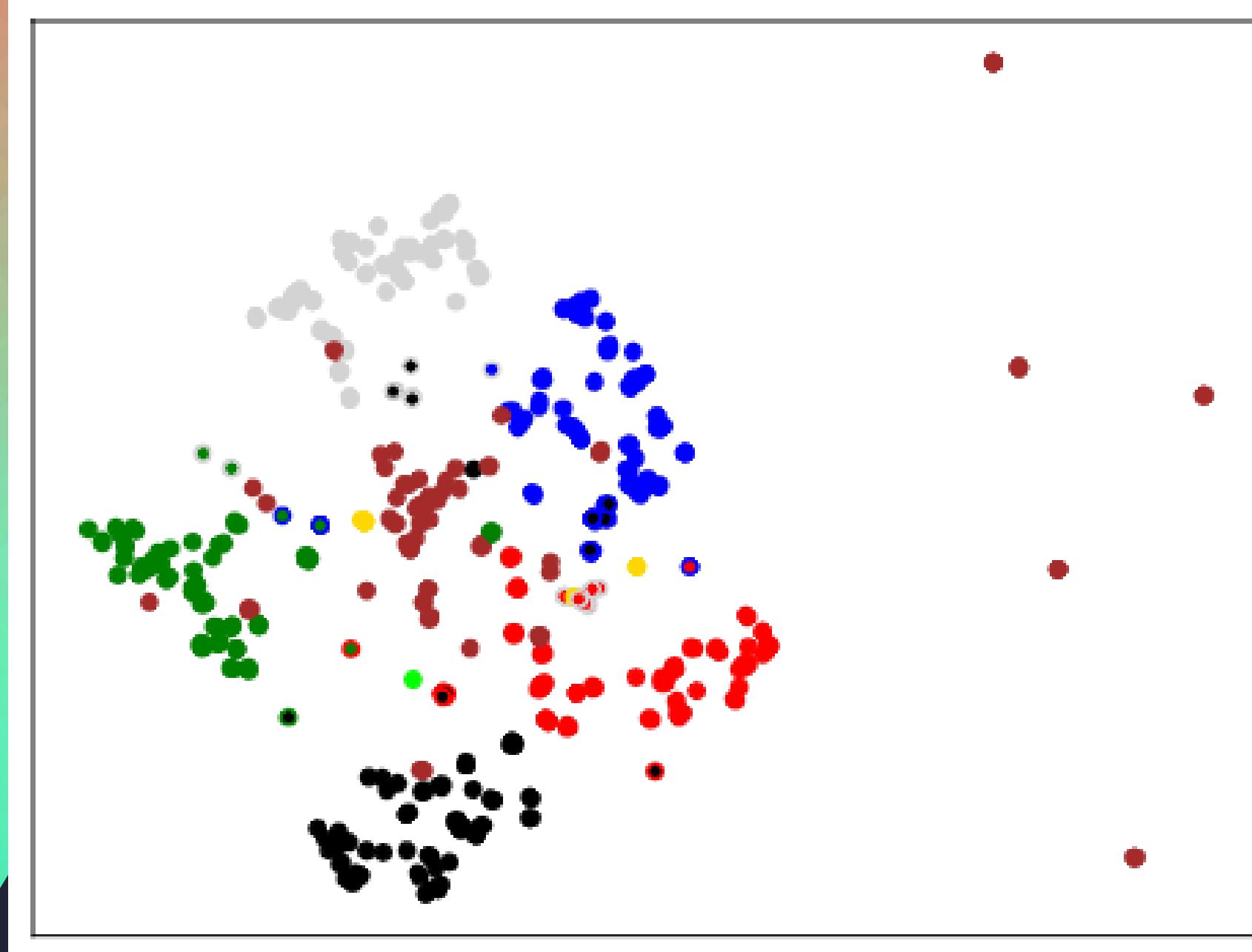


THANK YOU!

TBERTRAM@FAW.JKU.AT

@BERTRAMTIMO

Known (NEO)



Unknown (BRO)

