

Mapping Images to Psychological Similarity Spaces Using Neural Networks

Lucas Bechberger and Elektra Kypridemou

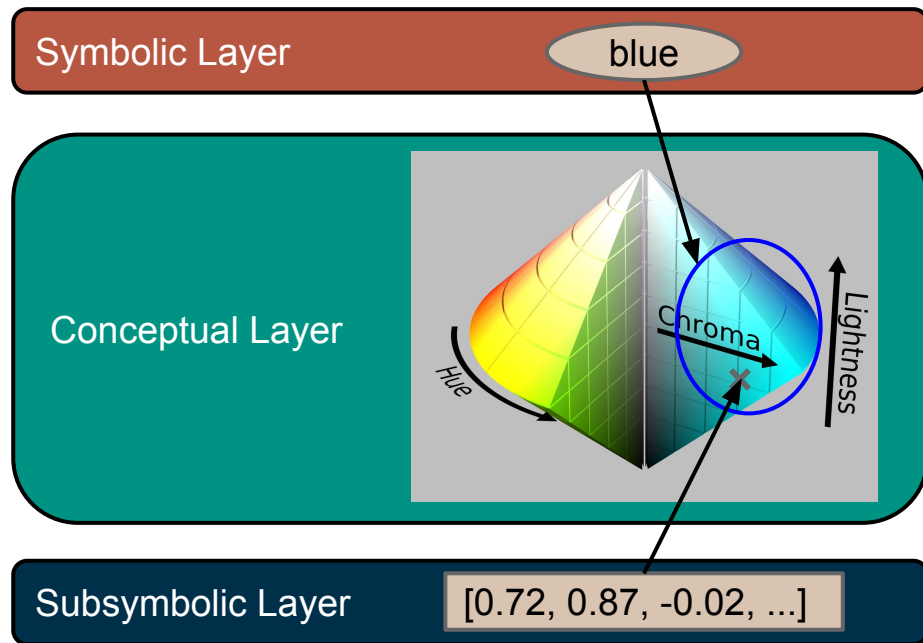
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1. Conceptual Spaces



Features:

- Interpretable dimensions
- Distance = semantic dissimilarity
- Regions = concepts

Obtaining the Dimensions:

- Handcrafting
- Multidimensional Scaling
- Artificial Neural Networks

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2. Multidimensional Scaling (MDS)

1) Psychological experiment

similarity judgments

2) Average across participants

matrix

3) Multidimensional Scaling

space

dimensions

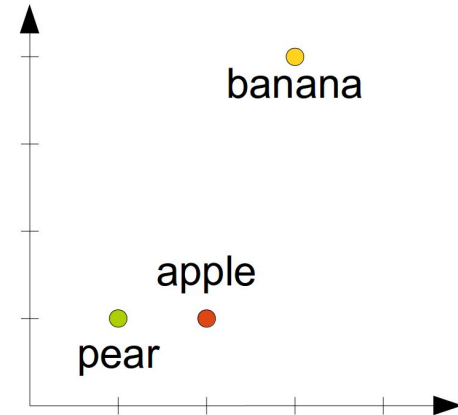


Psychological grounding



Dealing with unseen inputs

distance	apple	pear	banana
apple	0.0	1.0	3.2
pear	1.0	0.0	3.6
banana	3.2	3.6	0.0



2. Multidimensional Scaling (MDS)



64 images

SpAM & MDS

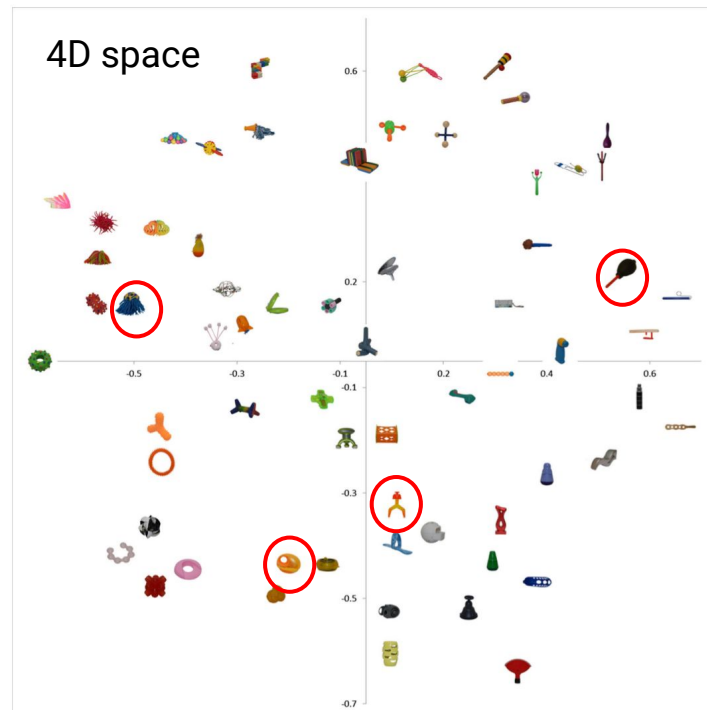
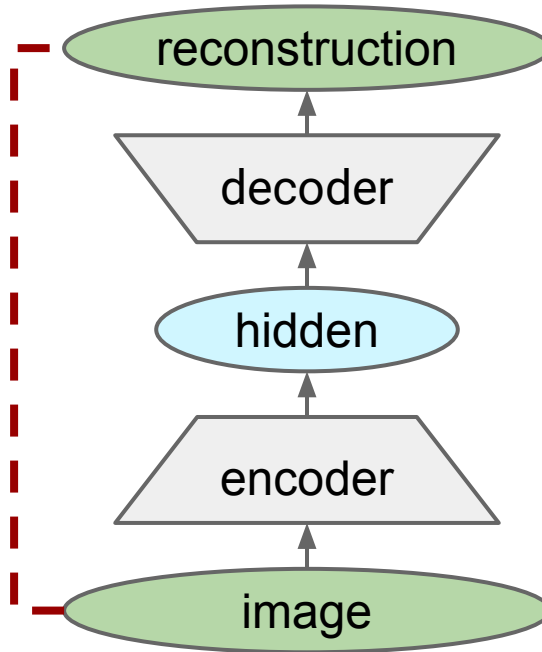
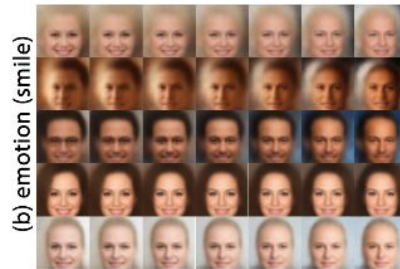


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3. Artificial Neural Networks

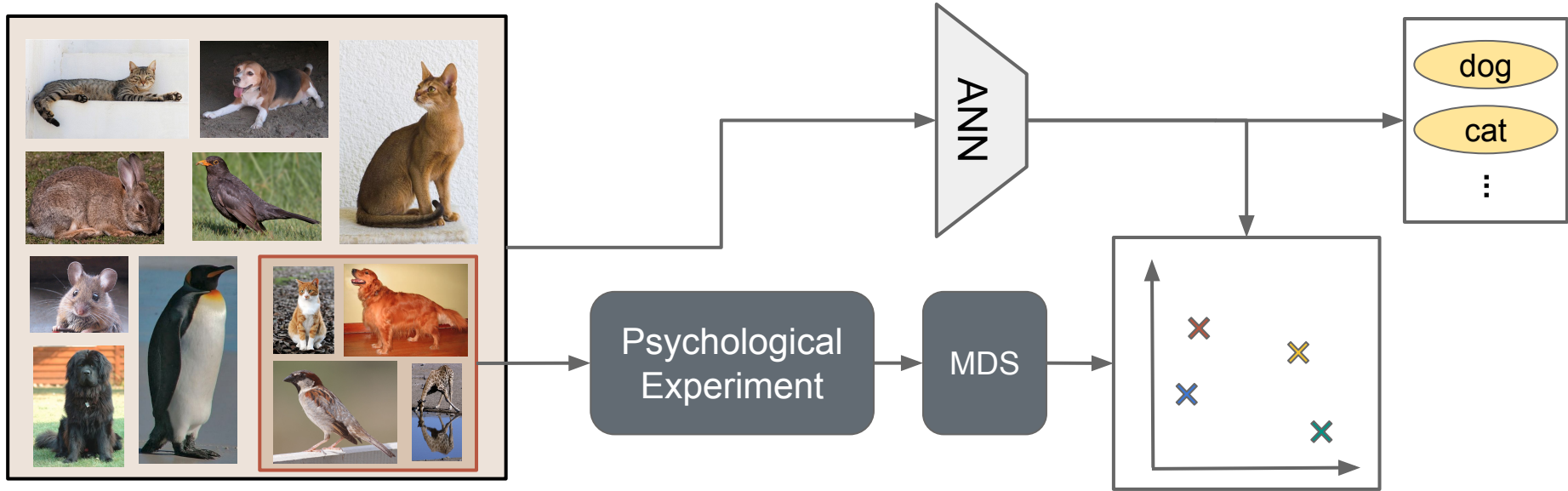


+ Dealing with unseen inputs
— Psychological grounding

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- + Psychological grounding
- + Dealing with unseen inputs

4. Our Proposal

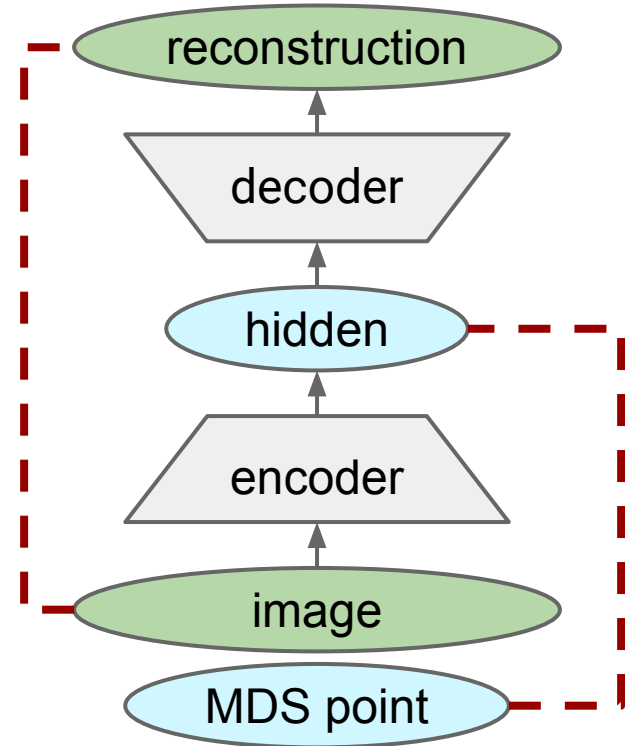
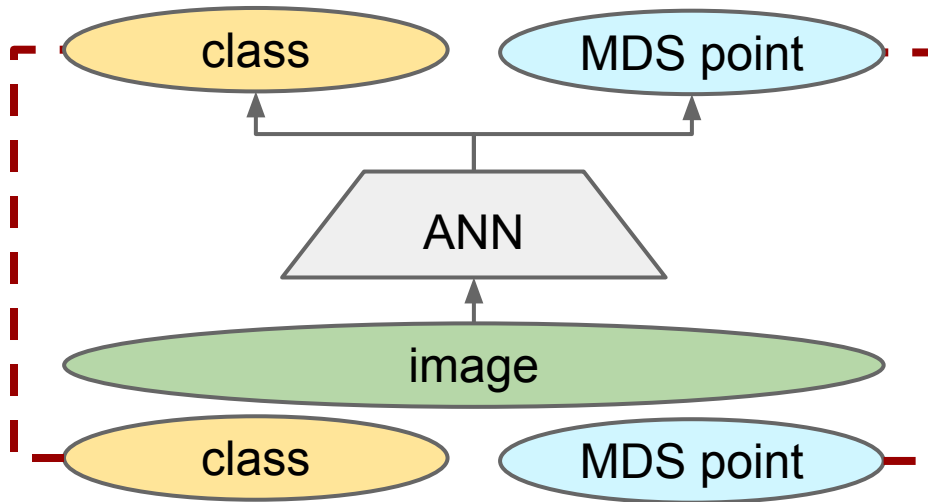
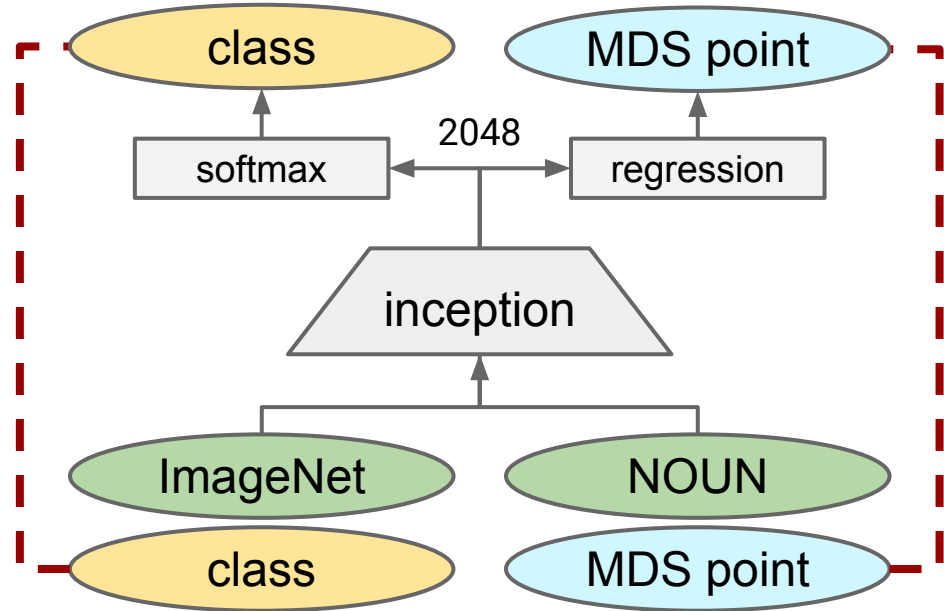
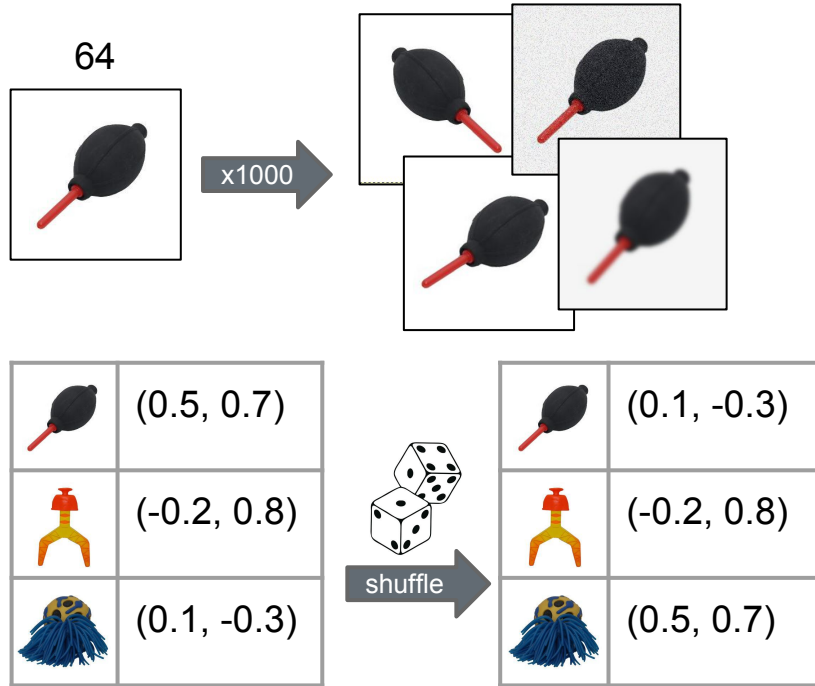


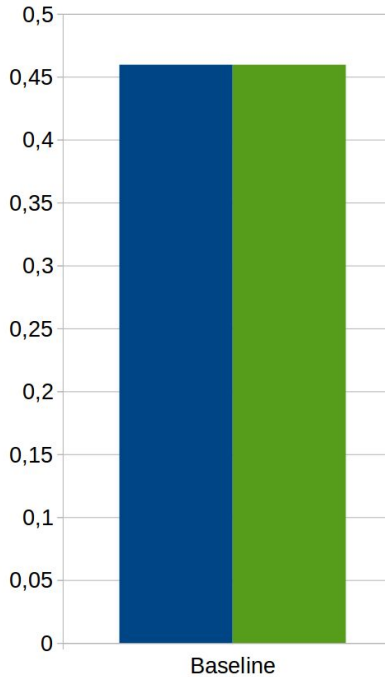
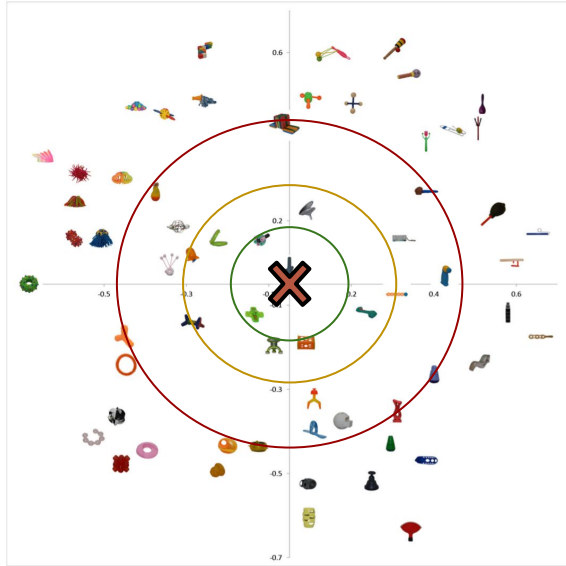
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5. Feasibility Study



5. Feasibility Study

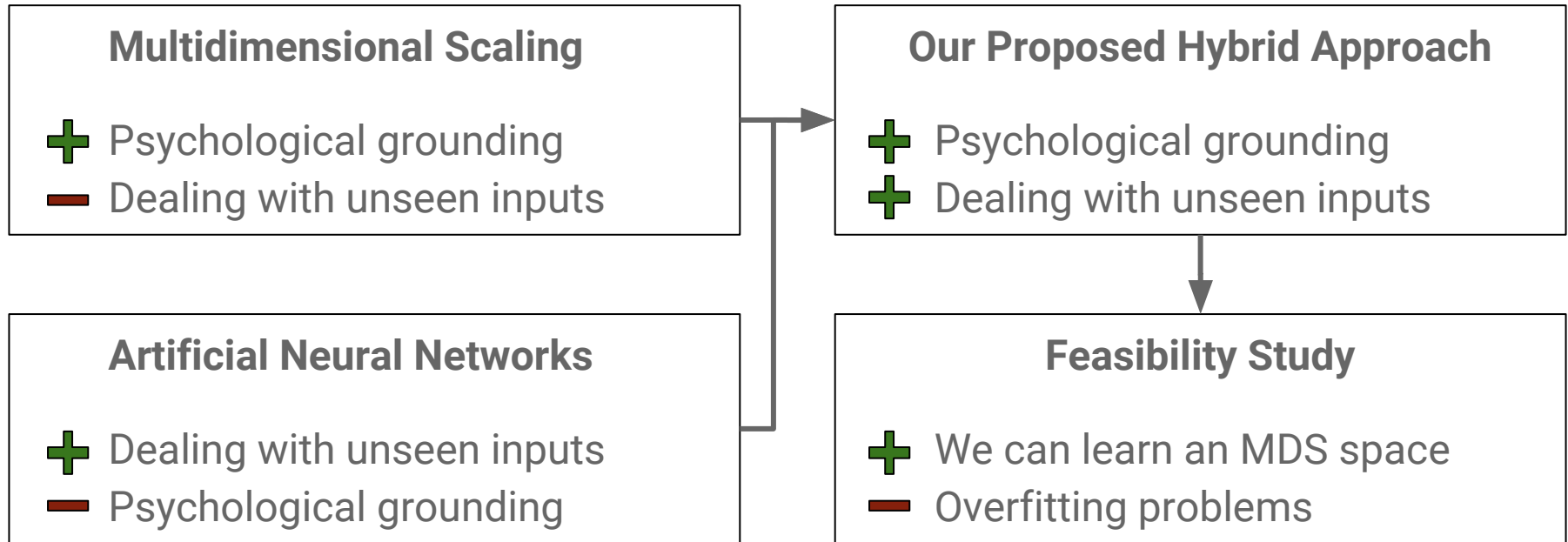


■ RMSE on Training Set ■ RMSE on Test Set

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Take-Home Message



Thank you.

Questions?

<https://github.com/lbechberger/LearningPsychologicalSpaces>

Test Error for Different Number of Dimensions

