Akif Berber
Lisa Goerke
Arianne van de Griend

Germonda Mooij
Ralitsa Spasova
Kai Standvoß

Advanced Research Methods — Research Proposal

Do human prototypicality ratings correlate with neural network categorization?

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1 Methods description

We use a pretrained neural network architecture called VGG16 which is trained on Imagenet. From the 1000 learned categories we select 10. We then use the network to classify images of those categories retrieved from Flickr. The network will output a probability for the classification of each category. 10 images per category are chosen evenly distributed over the output probabilities. These images will be presented to human participants. They are asked to classify the images and rate them according to their prototypicality.

In the analysis both the prototypicality rating and classification reaction time is compared to the neural networks classification probability. As a baseline, we perform pixel based clustering on the images.

2 Available materials

Images from Flickr are downloaded. The neural network architecture VGG16 is used. Participants are chosen among course participants. For the experiment, PsychoPy is used.

3 Tasks, date and responsible persons

Task	Date	Responsible persons
Finalize research plan	12/09/2016	Group
Literature research		All
Select categorisations for images	12/09/2016	Group
Gathering images from Flickr		Germonda
Check for biases in images of Flickr and Image-Net (lighting conditions, variance)		Germonda
Run images through neural network		Kai
Analyse results of NN		Group
Pick 10 images/category from NN distribution		Group
Design experiment		Group
Implement experiment		Lisa
Pilot study		Ralitsa
Possible redesign		Group
Actual study	17/10/2016	Group
Clustering on images and/or statistical classification	After picking of images, before analysis	Arianne
Analysis		
Preparing presentation	07/11/2016	Group
Writing report		Group