

A Dichotomy of Visual Relations

Submission ID 3000304
Submission Type Oral Presentation
Topic Cognitive Science
Status Submitted
Submitter Matthew Ricci
Affiliation Brown University

SUBMISSION DETAILS

Presentation Type Either Poster or Oral Presentation

Presentation Abstract Summary Convolutional neural networks (CNNs) have achieved state-of-the-art performance in image classification (He et al., 2015). However, a growing body of work indicates that CNNs still struggle on visual rule-learning tasks (Fleuret et al. 2011, Gulcehre & Bengio, 2013, Ellis et al. 2015). Currently, our understanding of precisely which rule-based problems are hard or easy for CNNs is limited. Here, we conducted a systematic analysis of CNN performance on the 23 problems of the Synthetic Visual Reasoning Test (SVRT), while varying network hyperparameters. We find that one group of SVRT problems is easily solved by most networks, whereas another group is not solved at all. We propose that the soluble problems of this dichotomy rely only on spatial relations. Intractable problems, on other hand, require same-different judgments, in which image regions must be compared. We conclude by sketching a novel cognitive architecture designed to solve visual reasoning problems.

Paper Upload (PDF) [CCN2017_final.pdf](#)

Co-author Information

* Presenting Author

| First Name | Last Name | Affiliation | E-mail |
|------------|-----------|------------------|------------------------|
| Matthew * | Ricci * | Brown University | mattgricci@gmail.com |
| Junkyung | Kim | Brown University | junkyung_kim@brown.edu |
| Dan | Shiebler | TrueMotion | dan@gotruemotion.com |
| Thomas | Serre | Brown University | thomas_serre@brown.edu |

Keywords

Keywords
 Visual relations

| |
|------------------------|
| Convolutional networks |
| Attention |
| Memory |
| Reinforcement Learning |
| Mental imagery |