Grounded language understanding: Varieties of contextual grounding

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Stanford Linguistics

CS224u: Natural language understanding
Our task: Color description in context

<table>
<thead>
<tr>
<th>Context</th>
<th>Utterance</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="blue.png" alt="Blue" /></td>
<td>blue</td>
</tr>
<tr>
<td><img src="darker_blue.png" alt="Darker Blue" /></td>
<td>The darker blue one</td>
</tr>
<tr>
<td><img src="teal.png" alt="Teal" /></td>
<td>teal not the two that are more green</td>
</tr>
<tr>
<td><img src="dull_pink.png" alt="Dull Pink" /></td>
<td>dull pink not the super bright one</td>
</tr>
<tr>
<td><img src="not_regular_greens.png" alt="Not Regular Greens" /></td>
<td>not any of the regular greens</td>
</tr>
<tr>
<td><img src="purple.png" alt="Purple" /></td>
<td>Purple</td>
</tr>
<tr>
<td><img src="blue.png" alt="Blue" /></td>
<td>blue</td>
</tr>
</tbody>
</table>

Stanford Colors in Context corpus (Monroe et al. 2017)
Discriminative image labeling

Mao et al. 2016
Discriminative image labeling

Mao et al. 2016
Discriminative image labeling

Mao et al. 2016
Discriminative image labeling

A little dog jumping and catching a frisbee

A big dog running

Mao et al. 2016
Discriminative image captioning

Vedantam et al. 2017; Cohn-Gordon et al. 2018
Discriminative image captioning

Vedantam et al. 2017; Cohn-Gordon et al. 2018
Discriminative image captioning

Vedantam et al. 2017; Cohn-Gordon et al. 2018
Machine translation

She chopped up the tree. → Elle coupa l’arbre.

She chopped down the tree. → Elle a abattu l’arbre.

Cohn-Gordon and Goodman 2019
Machine translation

She chopped up the tree. → Elle coupa l’arbre.

She chopped down the tree. → Elle coupé l’arbre.

Elle a abattu l’arbre.

Cohn-Gordon and Goodman 2019
Machine translation

She chopped up the tree. → Elle coupa l’arbre.

She chopped down the tree. → Elle coupé l’arbre.

Elle a abattu l’arbre.
Generating and following instructions

(a) Base Speaker

walk forward four times

go forward four segments to the intersection with the bare concrete hall

(b) Base Listener

walk along the blue carpet and you pass two objects

Fried et al. 2018
Collaborative problem solving

Tellex et al. 2014
Collaborative problem solving

Help me!

Tellex et al. 2014
Collaborative problem solving

Hand me the leg

Tellex et al. 2014
Collaborative problem solving

Hand me the white leg on the table

Tellex et al. 2014
Optical character recognition


