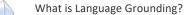


## What is Language Grounding?

Language often refers to the world



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Grounding is tying language to non-linguistic things (e.g., databases, vision, sound)

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- Grounding is tying language to non-linguistic things (e.g., databases, vision, sound)
- Today we will talk about grounding into visual environments:





"Add the tomatoes and mix"

"Take me to the shop on the corner"







### Grounding

### · (Some) possible things to map language to:

• Low-level percepts: red means this set of RGB values, loud means lots of decibels on our microphone, soft means these properties on our haptic sensor...



# Grounding (Some) possible things to map language to: • Low-level percepts: red means this set of RGB values, loud means lots of decibels on our microphone, soft means these properties on our haptic sensor... · High-level percepts: cat means this type of pattern

 (Some) possible things to map language to: \* Low-level percepts: red means this set of RGB values, loud means lots of decibels on our microphone, soft means these properties on our haptic sensor...

Grounding

- High-level percepts: cat means this type of pattern
- Embodiment (effects on the world): go left means the robot turns left, speed up means increasing actuation



## Grounding

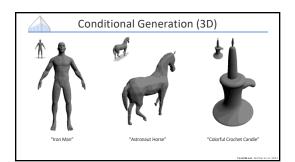
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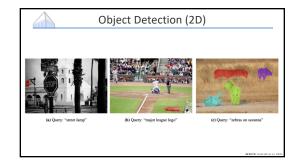
## Grounding

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- For a nice taxonomy, related work, and examples, see Experience Grounds Language [Bisk et al. 2020]

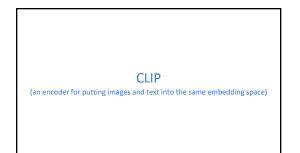


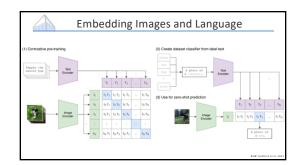


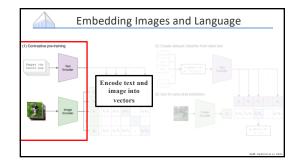


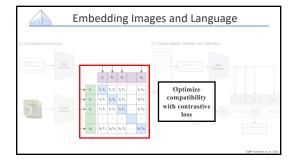


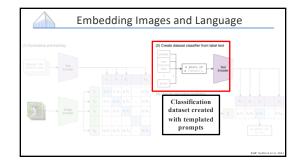


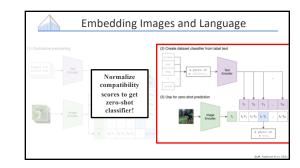


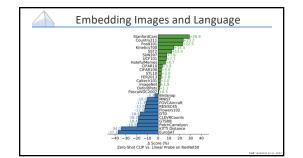




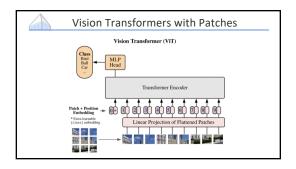


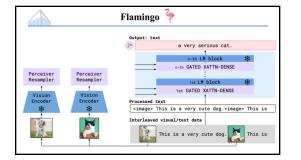












$\wedge$			Flamin	go 🦩			
	Input Prompt						P Completion
	This is a chinchilla. They are mainly found in Chile.		This is a shiba. They are very popular in Japan.	1	This is	$\rightarrow$	a flamingo. They are found in the Caribbean and South America.
<b>H</b>	What is the title of this painting? Answer: The Hallucinogenic Toreador.	2	Where is this painting displayed? Answer: Louvres Maseum, Paris.		What is the name of the city where this was painted? Answer:	$  \rightarrow  $	Arles.
	Oatput: "Underground"	CONGRESS 🎆	Output: "Congress"		Output:	$  \rightarrow  $	"Soulomes"
2+1	2+1=3	5+6	5+6=11	3×6		$\rightarrow$	3x6=18



