Modeling Conceptual Understanding in Image Reference Games

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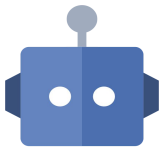
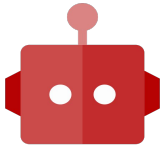
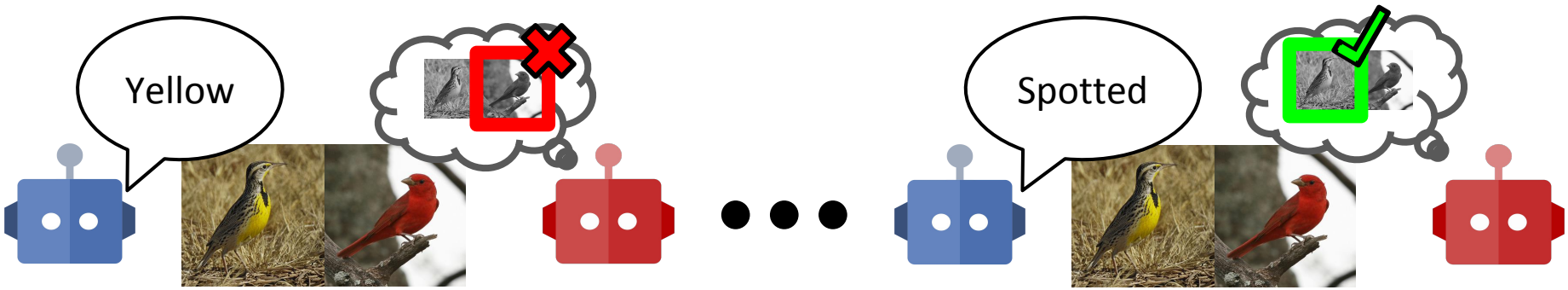
*Equal contribution



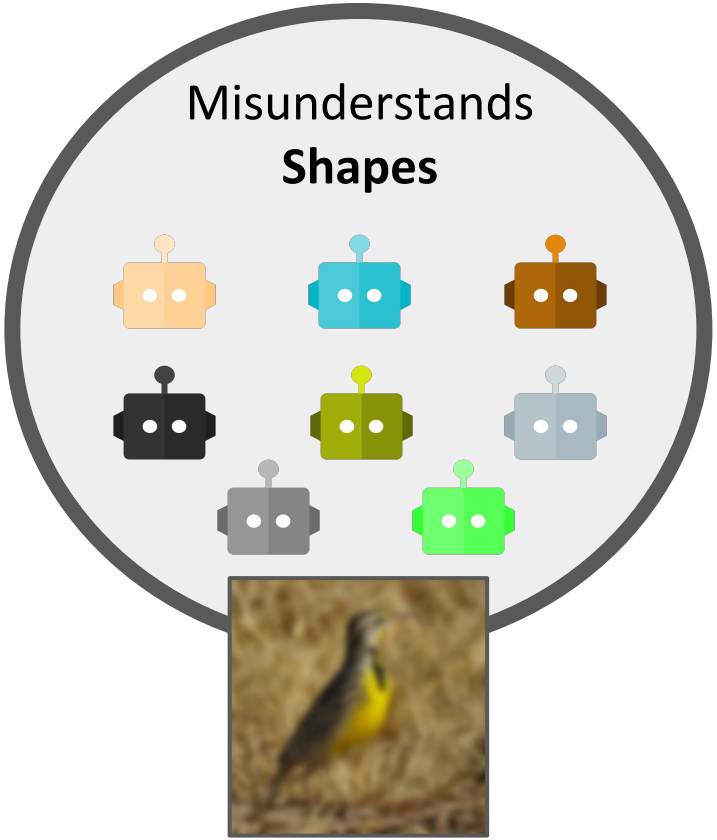


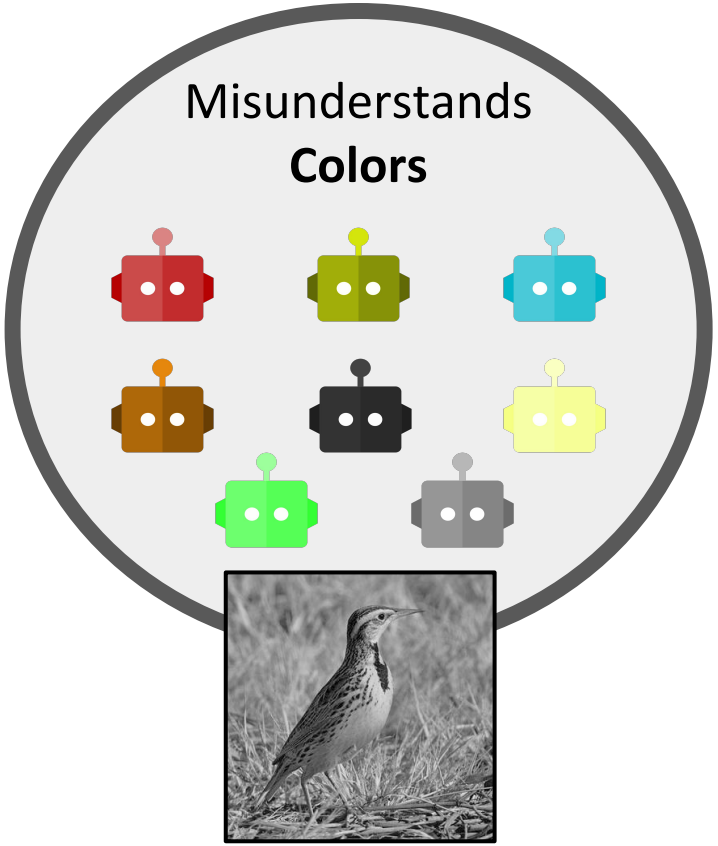
Yellow

Yellow


Yellow
Spotted

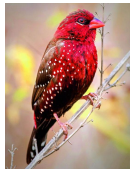
Listener Clusters

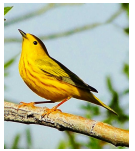




Speaker

x_t^k

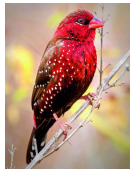


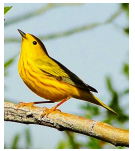


x_c^k

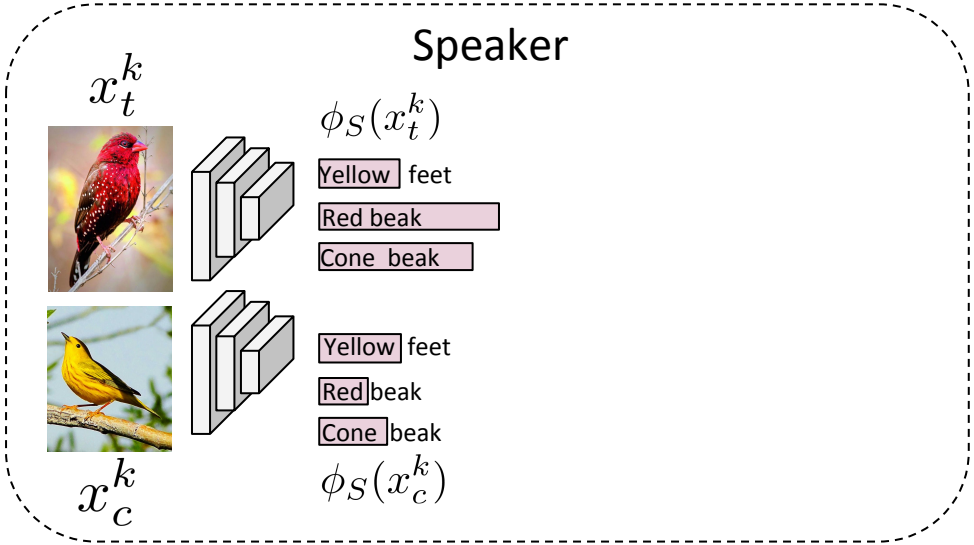
Listener

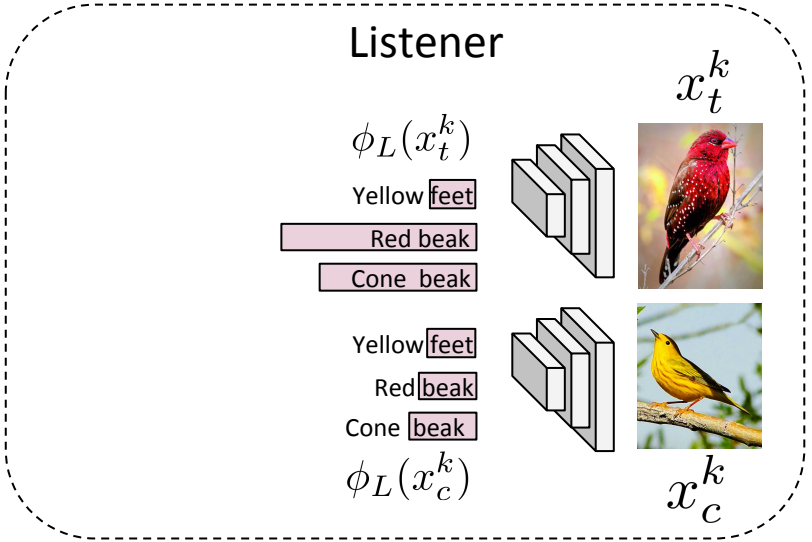
x_t^k



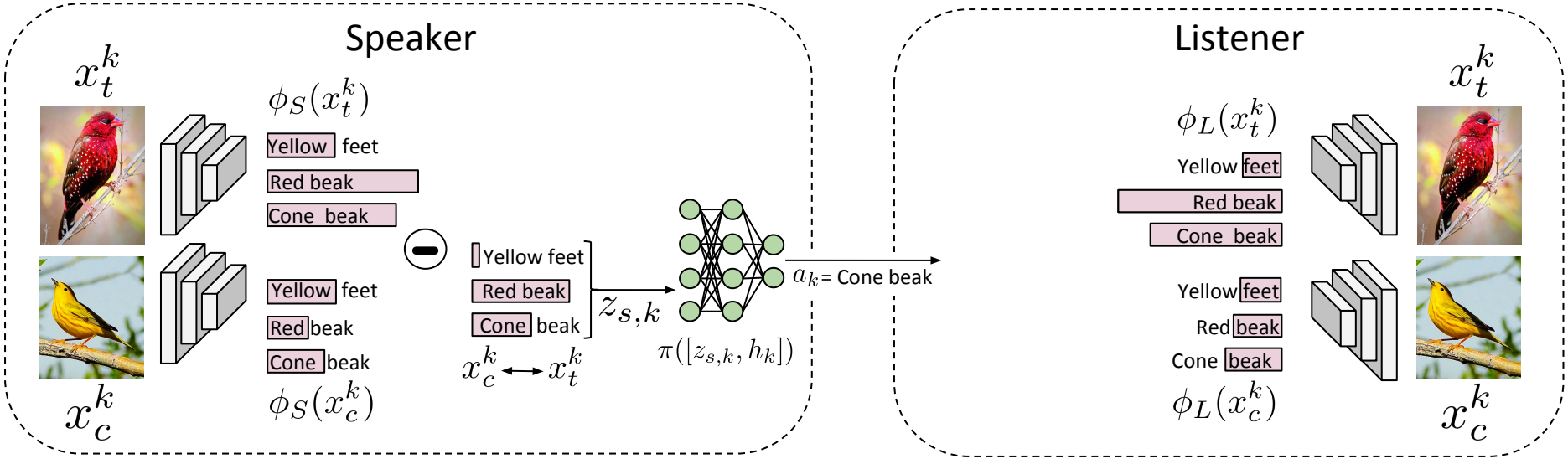


x_c^k

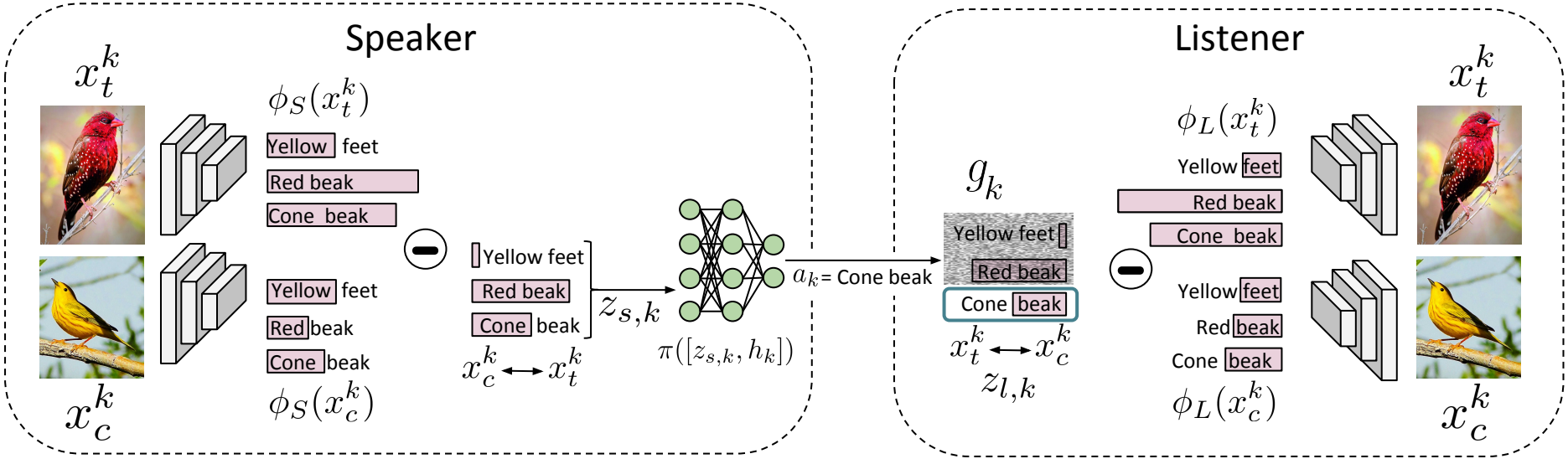




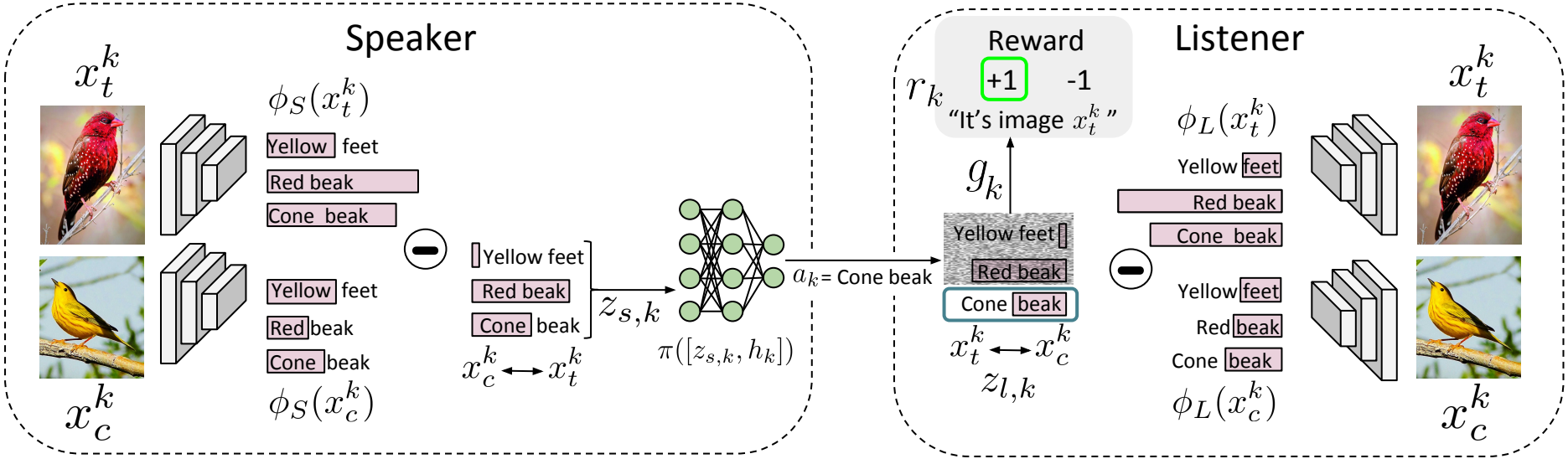
Predicting attributes



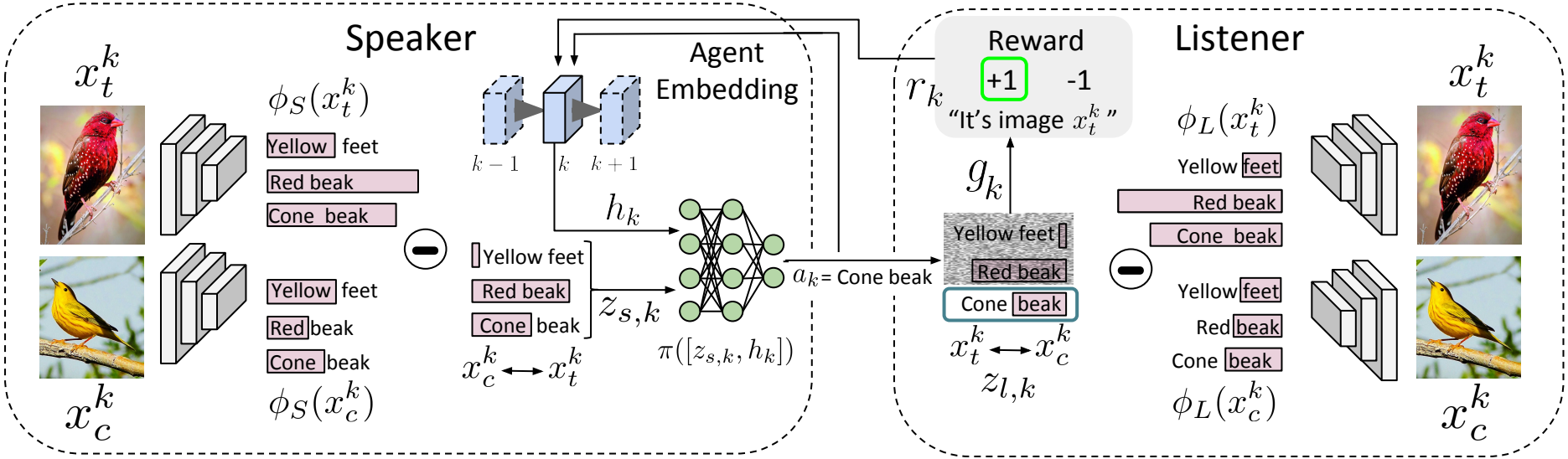
Selecting one attribute



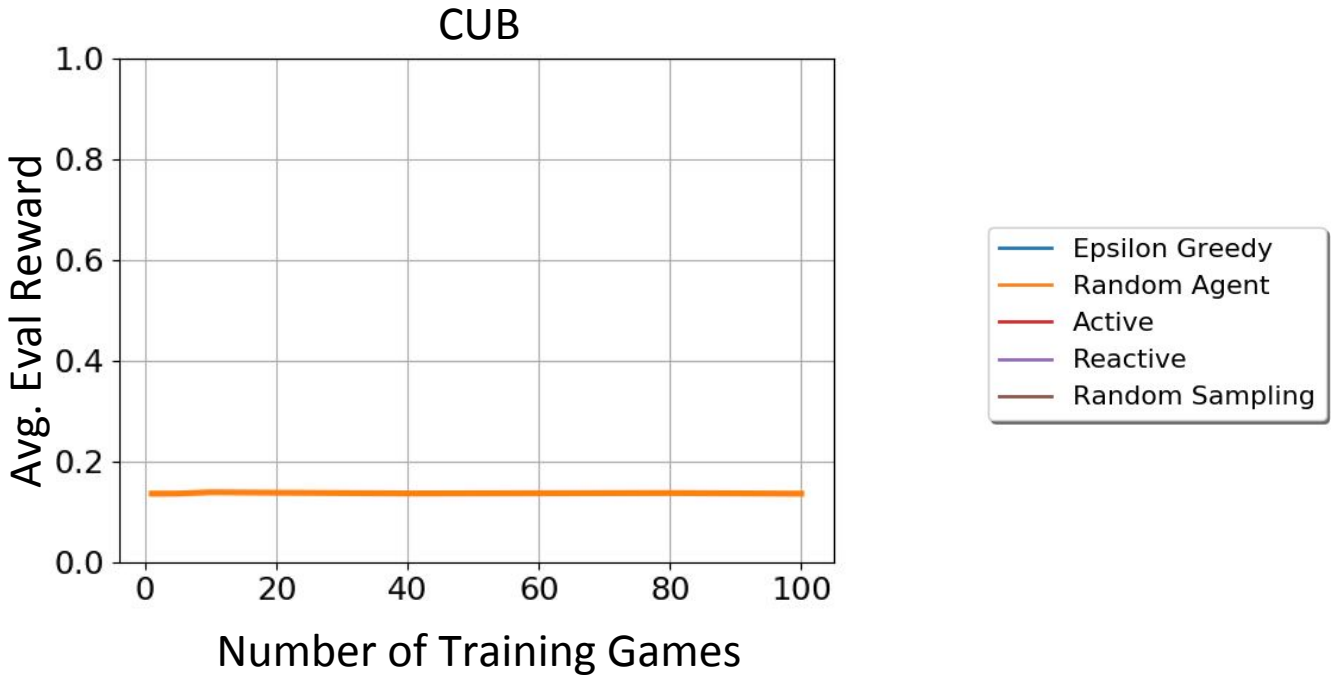
Listener guesses



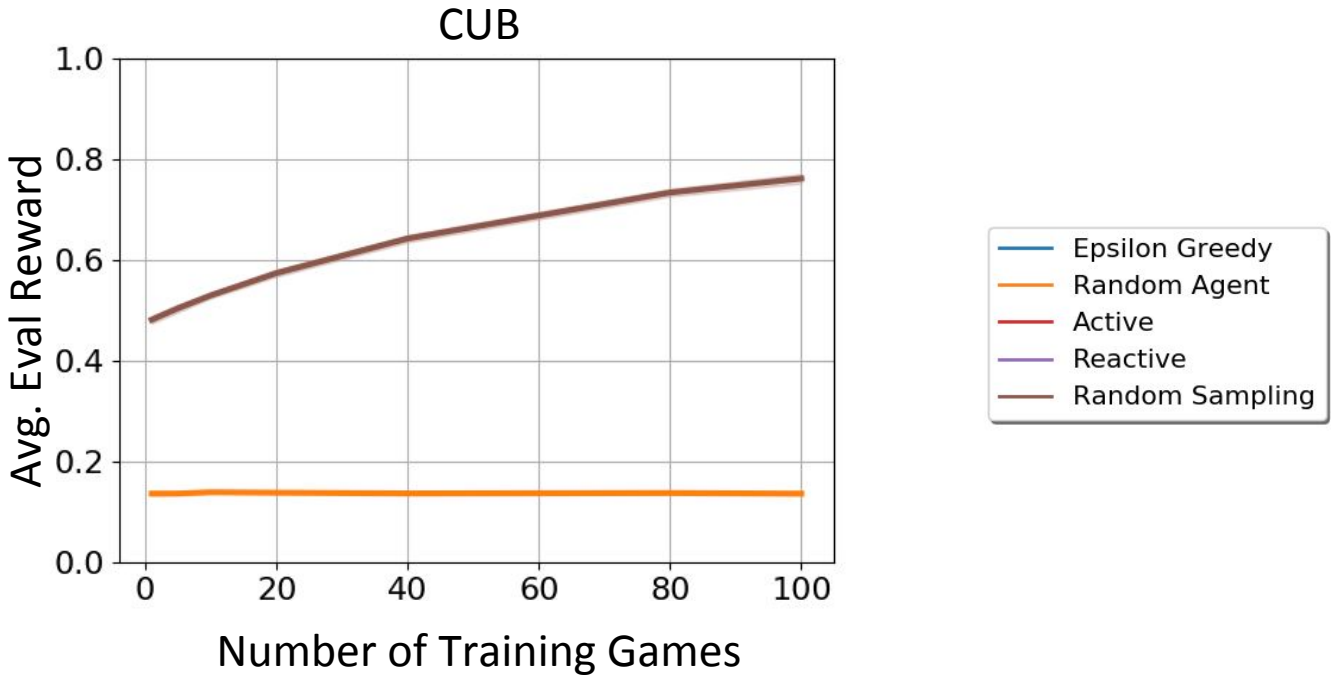
+1 match, -1 mismatch



Speaker incorporates game into history



Parameterized attribute selection policies incentivised to adapt faster to listeners.



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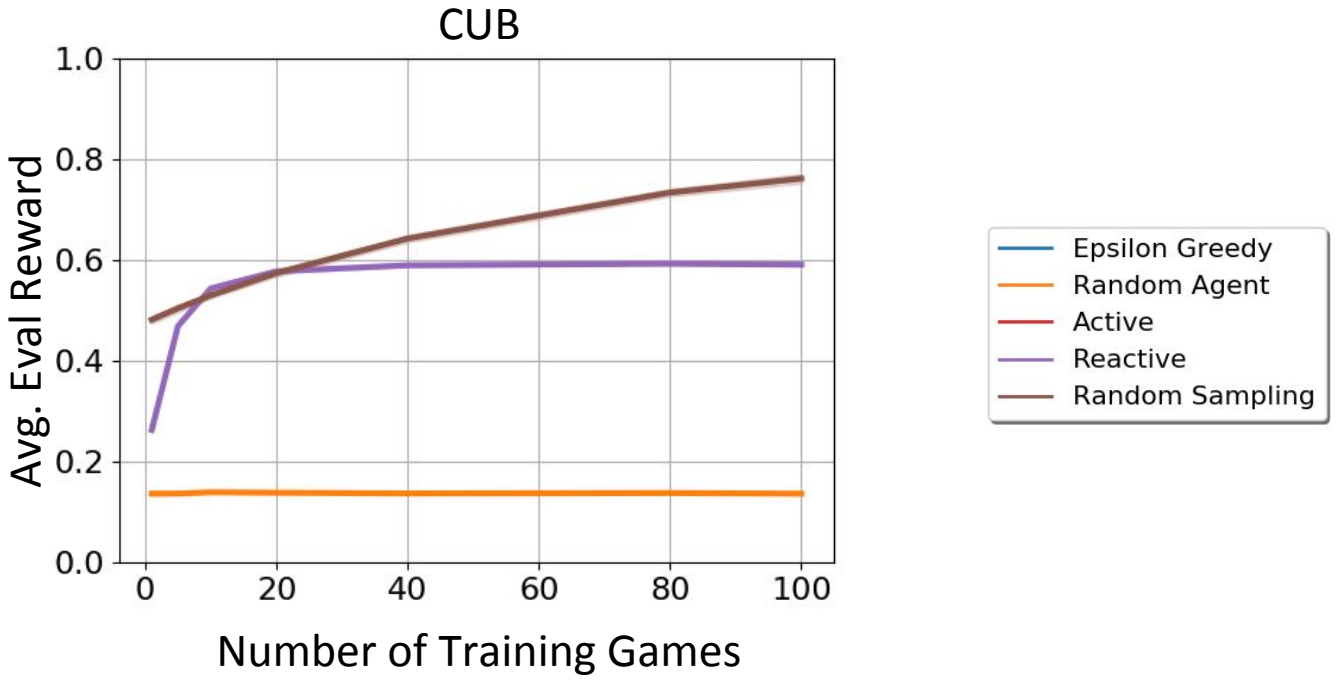

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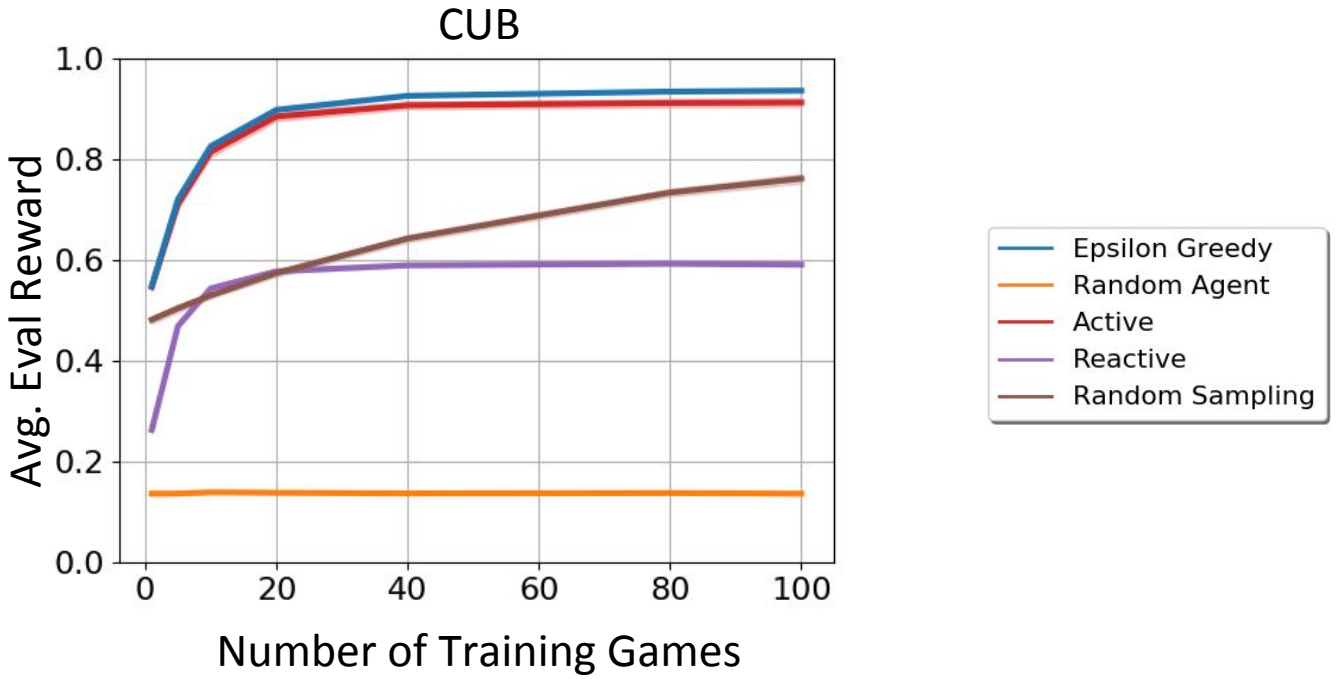

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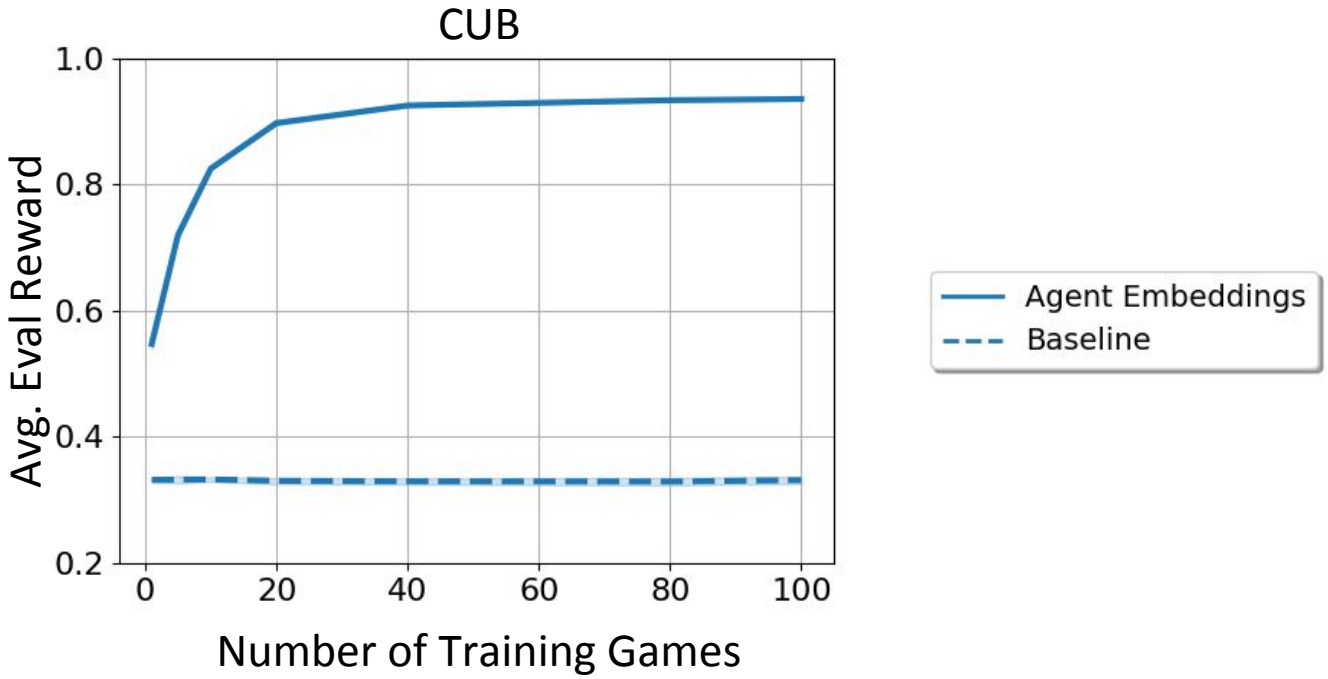
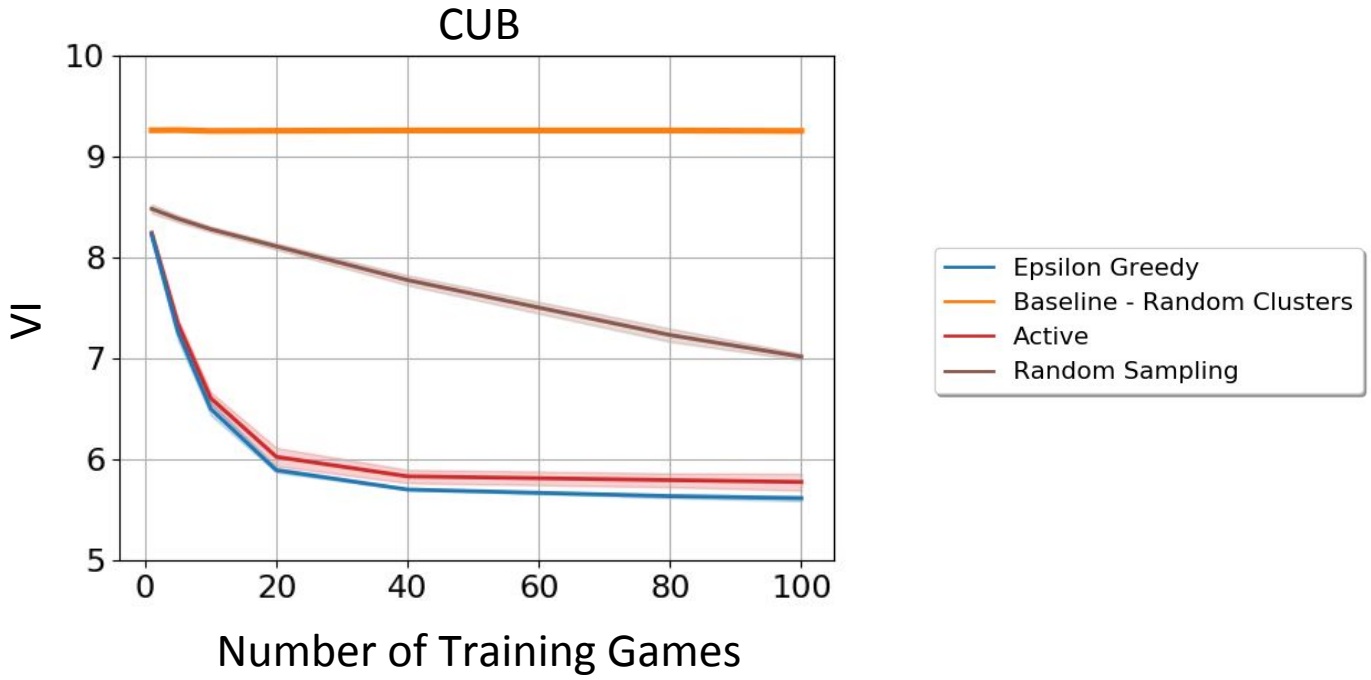


Modeling listener crucial for maximizing game performance.

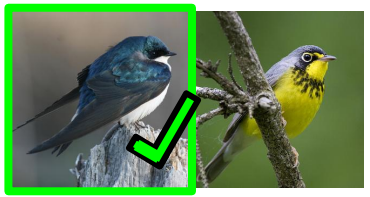


Parameterized policies embed agents with greater correspondence to ground truth clusters.

$$VI(C, C') = H(C) + H(C') - 2I(C, C')$$

Discrim.	Brown back	Blue underparts	Rufous belly	Yellow wing
Chosen	Brown back	Blue underparts	Rufous belly	Yellow wing
Game 1				

Discrim.	Brown back	Blue underparts	Rufous belly	Yellow wing
Chosen	Brown back	Blue underparts	Rufous belly	Yellow wing
Game 1				
Discrim.	Orange leg	Yellow belly	Rufous crown	Yellow belly
Chosen	Spotted belly pattern	Spotted back pattern	Rufous crown	Solid belly pattern
Game 10				

Discrim.	Brown back	Blue underparts	Rufous belly	Yellow wing
Chosen	Brown back	Blue underparts	Rufous belly	Yellow wing
Game 1				
Discrim.	Orange leg	Yellow belly	Rufous crown	Yellow belly
Chosen	Spotted belly pattern	Spotted back pattern	Rufous crown	Solid belly pattern
Game 10				
Discrim.	Orange beak	Yellow belly	Yellow wing	White belly
Chosen	Duck-like shape	Has eyebrow	Solid belly pattern	Forked tail shape
Game 100				
	x_t x_c	x_t x_c	x_t x_c	x_t x_c

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East Hall B+C

Poster #79

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