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BACKGROUND

Ad hoc Teamwork refers to any multiagent domain where agents have to cooperate without prior interaction. Majority of current work in ad hoc teamwork does not use communication. We extend work on a new problem setting, Communication in Ad hoc Teamwork (CAT).

SOMALI CAT

- **S**equential **O**ne-shot **M**ulti**A**gent **L**imited **I**nquiry
- Represented with **Tool Fetching Domain**
  - **Worker** goes to work station
  - **Fetcher** brings tool to station
  - Required **tool/station** are **unknown** to fetcher
  - Fetcher can **query** worker

DEFINITIONS

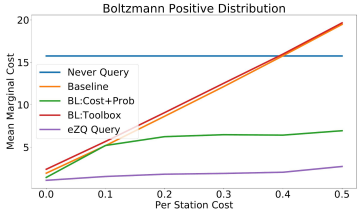
- EDP -> Expected time before plans of one policy diverge from another
- Expected Zone of **Information** (eZ_I) = {t | t < EDP(pi_1|pi_2)}
- Expected Zone of **Branching** (eZ_B) = {t | t > EDP(pi_2|pi_1)}
- * Expected Zone of **Querying** (eZ_Q) = $eZ_I \cap eZ_B$

METHODS

Never asks any queries:
- *Never Query*

Z_Q Baseline + heuristics:
- *Baseline,*
- *BL:Cost+Prob,*
- *BL:Toolbox*

Uses eZ_Q to determine the value of query:
- *eZ_Q Query*



Averaged over 100 random domain instances in 20x20 grid.
eZ_Q Query outperforms all other strategies

Direct Communication Improves Plan Recognition in Ad Hoc Teamwork

Title: Expected Value of Communication for Planning in Ad Hoc Teamwork

William Macke, Reuth Mirsky, and Peter Stone

Take a picture to **download** the **full paper**
https://www.cs.utexas.edu/~pstone/Papers/bib2html-links/AAAI21-Macke.pdf

The University of Texas at Austin
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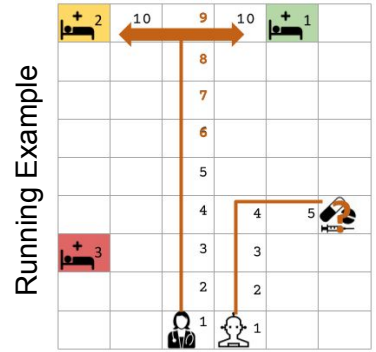
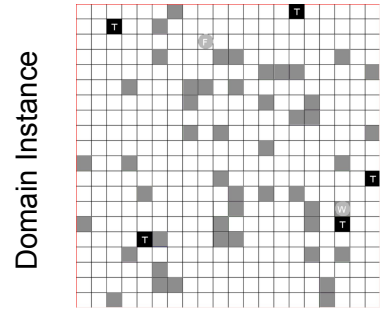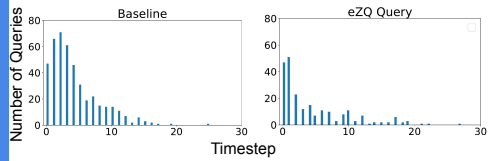
8	6 / 10	5.57 / 9	5.14 / 8	4.71 / 7	4.29 / 6	3.86 / 5	3.43 / 4	3 / 3
7	4.33 / 9	4 / 8	3.67 / 7	3.33 / 6	3 / 5	2.67 / 4	2.33 / 3	2 / 2
6	2.4 / 8	2.2 / 7	2 / 6	1.8 / 5	1.6 / 4	1.4 / 3	1.2 / 2	g_1
5	2.75 / 4.5	2.5 / 4	2.25 / 3.5	2 / 3	1.75 / 2.5	1.5 / 2	1.25 / 1.5	1 / 1
4	3.33 / 3.33	3 / 3	2.67 / 2.67	2.33 / 2.33	2 / 2	1.67 / 1.67	1.33 / 1.33	1 / 1
3	4.5 / 2.75	4 / 2.5	3.5 / 2.25	3 / 2	2.5 / 1.75	2 / 1.5	1.5 / 1.25	1 / 1
2	8 / 2.4	7 / 2.2	6 / 2	5 / 1.8	4 / 1.6	3 / 1.4	2 / 1.2	g_2
1	9 / 4.33	8 / 4	7 / 3.67	6 / 3.33	5 / 3	4 / 2.67	3 / 2.33	2 / 2
	1	2	3	4	5	6	7	8