

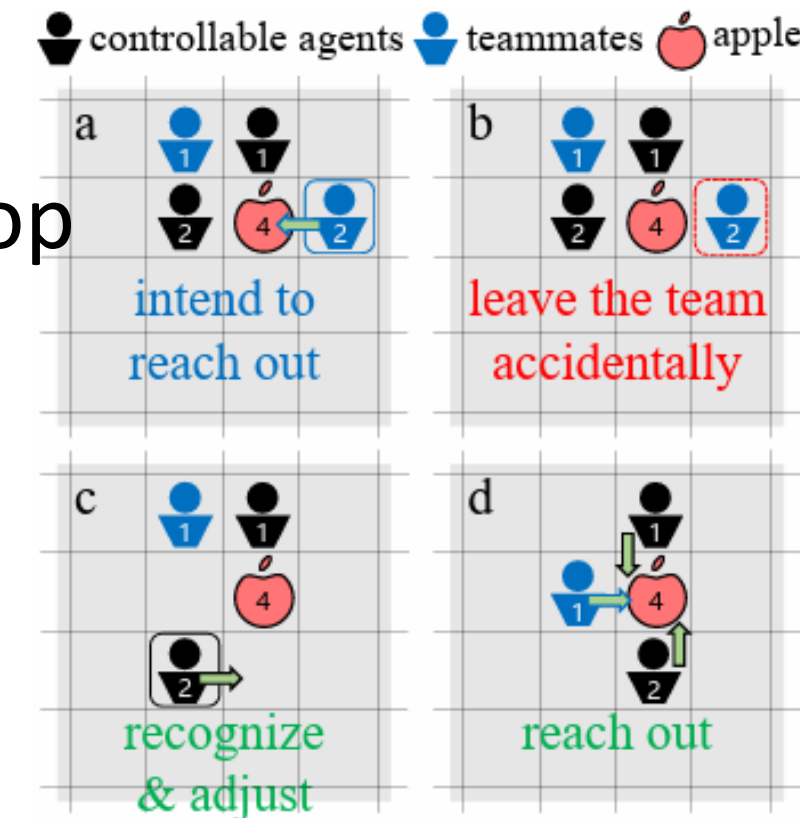
Fast Teammate Adaptation in the Presence of Sudden Policy Change

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Introduction

The Multi-Agent system may sustain non-stationary due to **sudden change** of the teammates' policies, leading to poor performance and miscoordination.

We formulate an **open Dec-POMDP** and develop a new framework Fast teammates adaptation (**Fastap**) to address the problem.



Method

CRP-based Infinite Mixture

- How to deal with **infinite** groups of teammates?
- Instantiate a DPMM with **Chinese Restaurant Process**.

Centralized Contextualization Learning

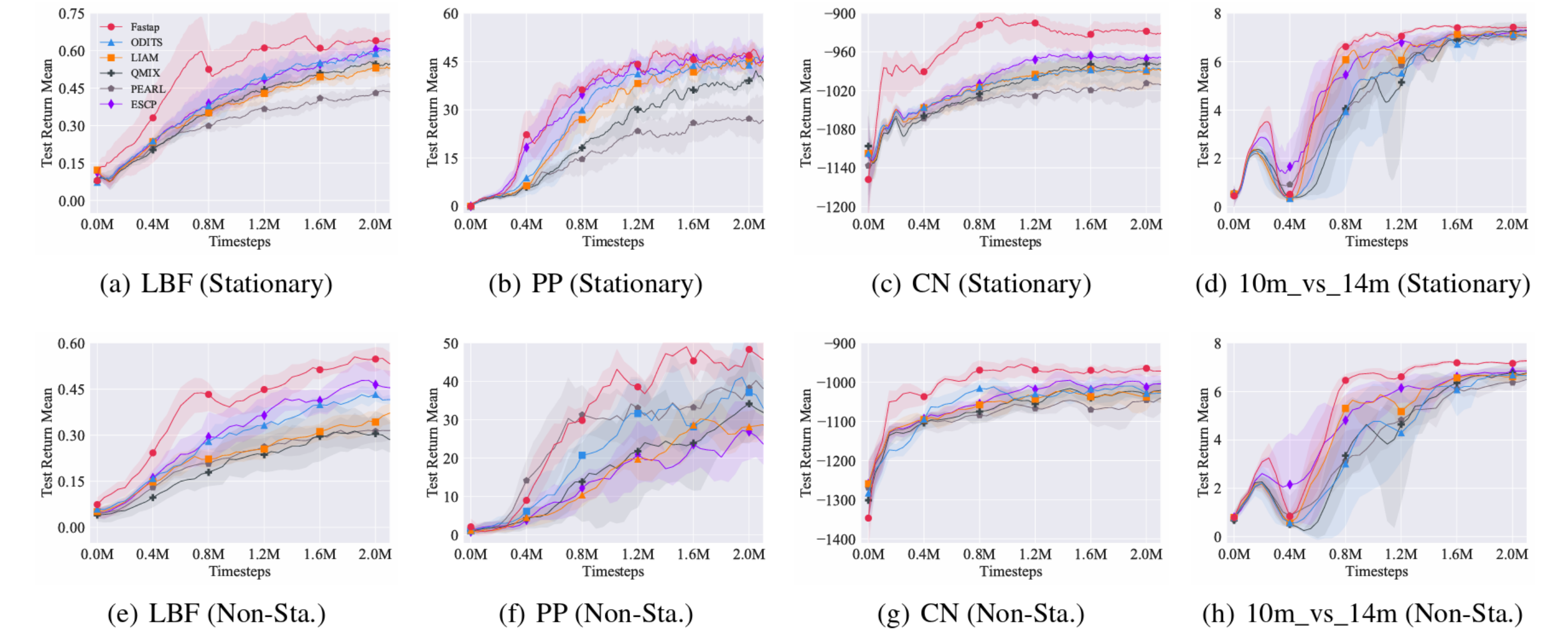
- Learn a global context encoder which is able to **identify and track the sudden change** of teammates.

Decentralized Team Situation Recognition

- Learn **informatively consistent** local embeddings based on **mutual information objective** and auxiliary objectives.

Experiments

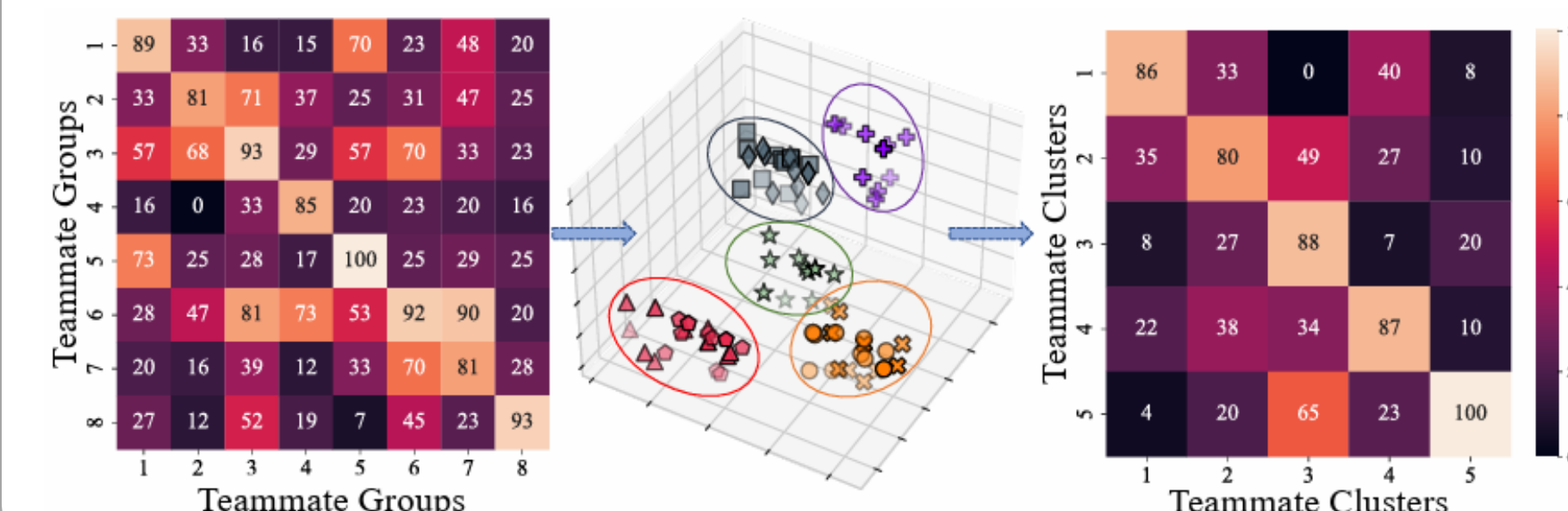
Performance Comparison on Multiple Benchmarks



- Fastap** achieves the **best performance** on all benchmarks in both conditions and suffers from the **least performance degradation**.

Comparisons in (OOD) Non-stationary Setting

U	Fastap	Fastap_wo_CRP	ODITS	LIAM	QMIX	PEARL	ESCP
stationary	0.642 ± 0.008	0.594 ± 0.015	0.637 ± 0.008	0.597 ± 0.029	0.569 ± 0.033	0.507 ± 0.021	0.618 ± 0.040
$U[5, 8]$	0.562 ± 0.012	0.400 ± 0.020	0.352 ± 0.002	0.415 ± 0.026	0.306 ± 0.038	0.288 ± 0.019	0.404 ± 0.026
$U[6, 7]$	0.567 ± 0.001	0.444 ± 0.314	0.487 ± 0.022	0.454 ± 0.157	0.444 ± 0.221	0.333 ± 0.000	0.556 ± 0.125
$U[2, 9]$	0.484 ± 0.285	0.222 ± 0.133	0.416 ± 0.182	0.401 ± 0.078	0.443 ± 0.205	0.205 ± 0.114	0.514 ± 0.314
$U[3, 6]$	0.518 ± 0.136	0.366 ± 0.217	0.444 ± 0.314	0.388 ± 0.283	0.353 ± 0.272	0.264 ± 0.066	0.502 ± 0.120
$U[3, 3]$	0.384 ± 0.272	0.246 ± 0.141	0.342 ± 0.118	0.362 ± 0.208	0.222 ± 0.314	0.243 ± 0.172	0.271 ± 0.157



- Fastap** achieves **robust** policy in OOD setting.
- CRP helps acquire **clear boundary** of teammate behavior.

Workflow

