Robots Among Us: The Future of Team Performance

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Vision

Harness the strengths of humans and robots to accomplish what neither can do alone.
Coexistence but *not* Collaboration.
Teamwork is possible because people

- effectively infer
- anticipate
- adjust
Realizing a robot teammate requires the following sequential system capabilities:

1. A system to participate in human team planning to infer the agreed upon idealized shared plan.

2. A system to refine the plan for real contexts through observation and interaction.

3. An online system to rapidly predict the details of future human actions and react accordingly.
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Method:

Coordinate systems are assigned to the arm kinematics

Results:

- More efficient collaboration through time-series classification of human’s next action using motion features.
- Accurate prediction with 400msec of human motion.
Multiple Predictor System

\( D_{\text{Train}} \)

Predictor 1
Predictor 2
\ldots
Predictor n

Predictor Training

\( \pi^1 \)
\( \pi^2 \)
\ldots
\( \pi^n \)

Learned Parameters

\( D_{\text{Model Selection}} \)

Predictor 1
Predictor 2
\ldots
Predictor n

Predictor Fusion

\( w^1 \)
\( w^2 \)
\ldots
\( w^n \)

Predictor Weights

Multiple-Predictor System
With Vaibhav Unhelkar, Pem Lasota, Quirin Tyroller, Rares-Darius Buhai, Laurie Marceau, and Barbara Deml – in collaboration with BMW
DANGER

NO ENTRY

AUTHORISED PERSONS ONLY

ROBOT OPERATING AREA

DO NOT ENTER

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