

Robots Among Us: The Future of Team Performance



Julie Shah, PhD

Associate Professor, Aeronautics and Astronautics
Director, Interactive Robotics Group
Massachusetts Institute of Technology



Vision

Harness the strengths of humans and robots
to accomplish what neither can do alone.



Amazon Robotics



BMW Spartanburg, SC

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.





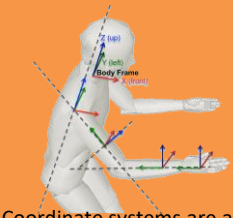
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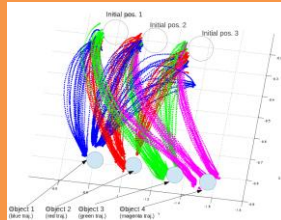
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Method:

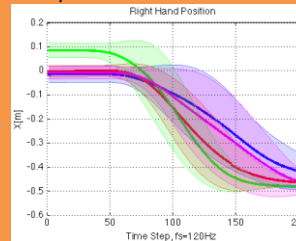


Coordinate systems are assigned to the arm kinematics

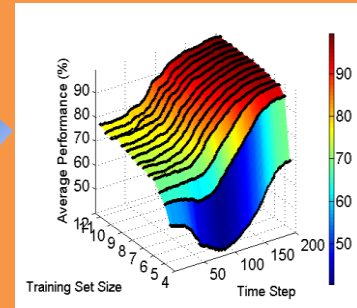
Human motion



Statistical model of each motion class per DOF



Prediction performance



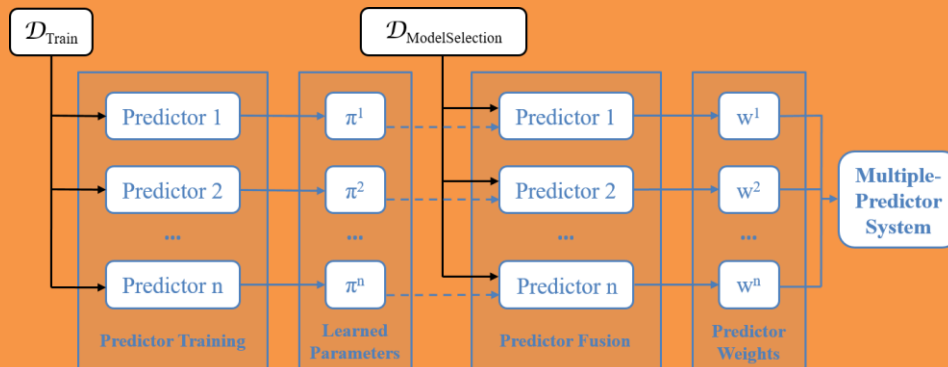
Results:

- 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



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

