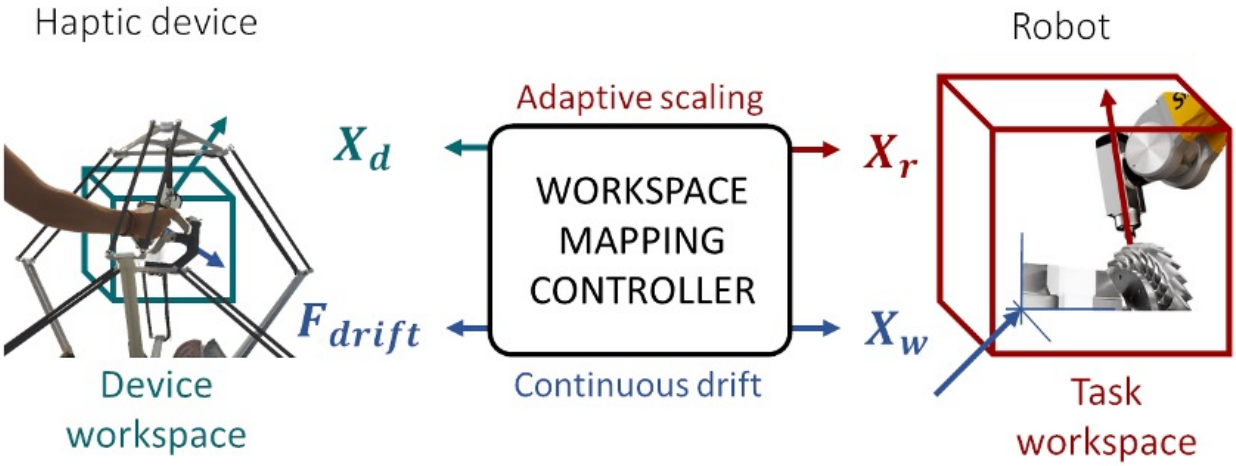
Docket #: S19-192

Drift-based Adaptive Workspace Mapping Controller for Haptic Interaction

Researchers in the Stanford Robotics Lab have developed a dynamically adaptive workspace mapping control method that adjusts remote task resolution to keep haptic-robot (in real-world applications) or haptic-avatar (in virtual environment) interactions within the device workspace boundaries; and maintains precise movements. The controller combines a drift-based technique , which continuously moves the haptic device back to its workspace center and the robot to the task area of interest; and a smart adaptive scaling of the exchanged motions and forces to ensure both large exploratory and small accurate tasks. . The balanced progressive and imperceptible drift with the resolution scaling ensure that teleoperation activities in any environment feel free of haptic interface hinderance.



Workspace Mapping Controller
Image courtesy of The Stanford Robotics Lab

Stage of Development – Prototype

The Stanford Robotics Lab researchers are using the workspace mapping controller with a new compact haptic device prototype (see Stanford docket S19-193). Research is ongoing.

Applications

- Haptic interfaces, especially for:
  - Medical & surgical robotics
  - Telerobotics for hazardous environments (aerospace, underwater, nuclear, polluted, industrial operations)
  - Cobots, and Industry 4.0 (I4.0) technologies for the smart factory
  - Virtual / Augmented Reality and interactive simulations

Advantages

- Automatic drift and scaling adjustments are **imperceptible to the user**.
- Maintains **excellent accuracy** for fine tasks, allows for large workspace exploration without reaching limits.
- **Intuitive, easy to use**. Versatile and suitable for different user preferences.

Innovators

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