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FW-HTP-P: Firefighter Exoskeleton for Navigation In eXtreme Environments (FENIXE)

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Goal: To investigate the challenges faced by career and volunteer firefighters and mitigate challenges by providing FENIXE, a low-cost, automated, adaptive, and integrated intelligent exoskeleton suit

Tasks

- Use markerless motion capture and sEMG to study joint motion and muscle activation for firefighters from various groups completing functional tasks
- Create an integrated exoskeleton design that combines ergonomic and biomechanical considerations with structure, dynamics, and control
- Conduct stress testing of multiple multimodal sensors under high-stress conditions, such as heat and smoke
- Plan meetings and conduct surveys with stakeholders to better understand technological perceptions, safety considerations, injury mitigation, concerns of underrepresented groups, and barriers for adoption

Automated, Adaptive, & Integrated Intelligent Exoskeleton

Robot Dynamics, Controls & Exoskeletons (M. Bazzocchi)

Multi-Modal Sensing & Human-Computer Interaction (S. Banerjee)

Computer Vision & Machine Learning (N. Banerjee)

Materials & Structural Optimization (M. Martinez)

Biomechanics & Ergonomics (K. Fite)