Georgia Tech Institute for Robotics and Intelligent Machines

Rapid Operator Awareness Via Mobile Robotics (ROAMR)

NSF 1830498

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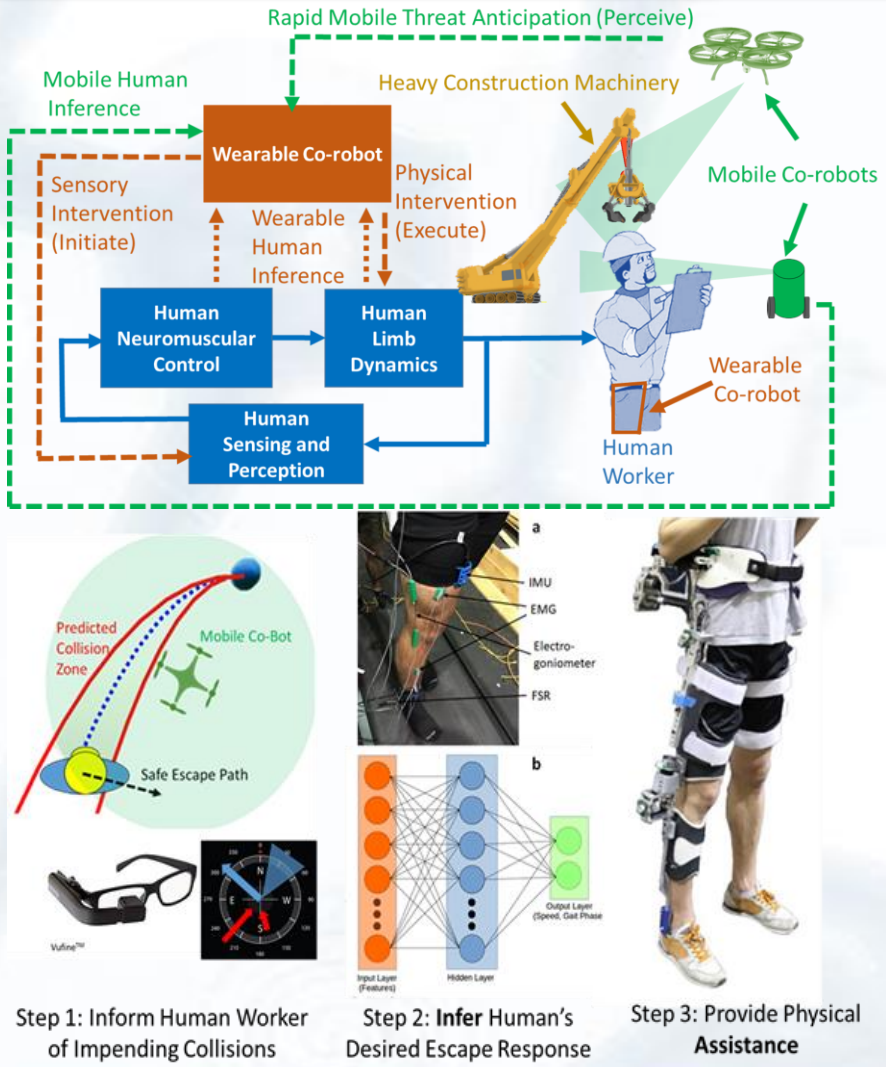
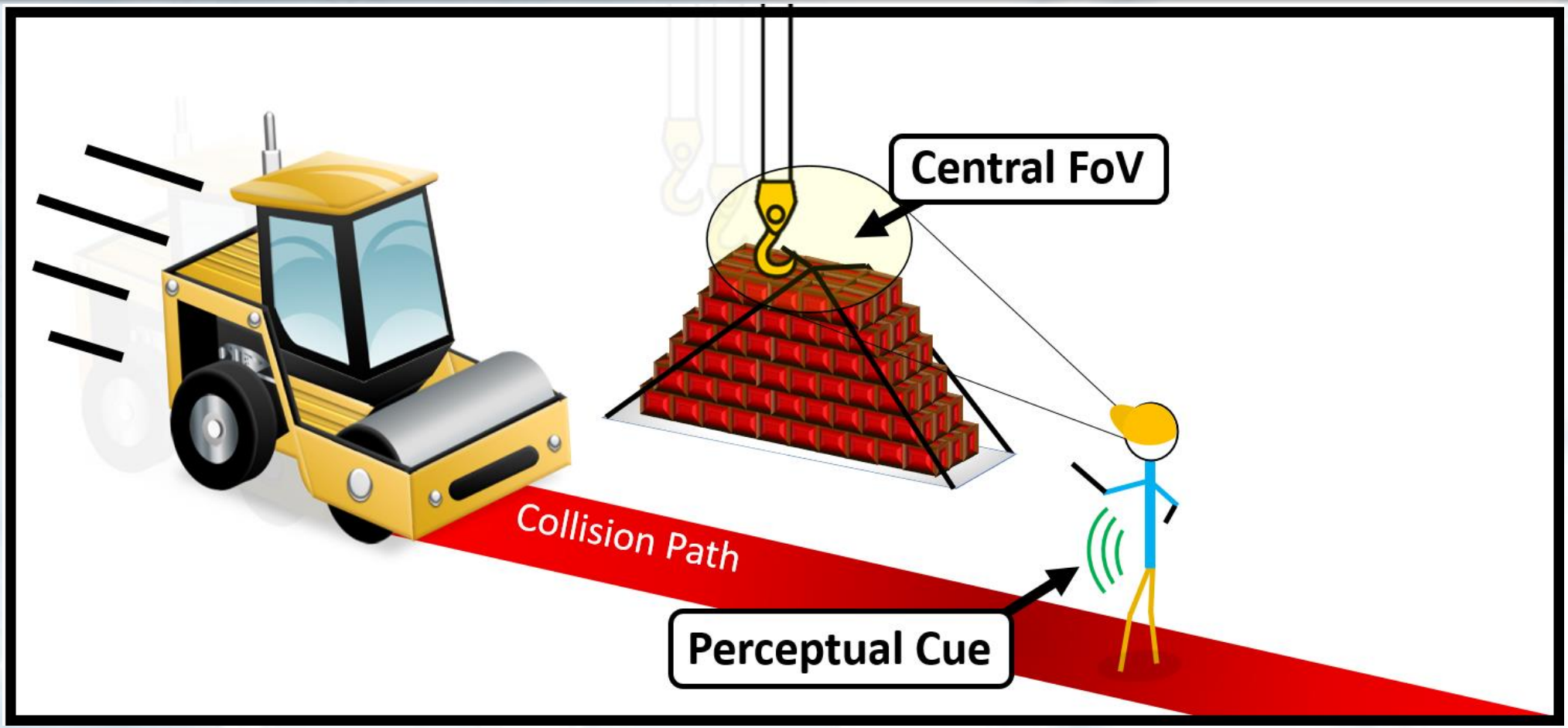
Poster Number 79

Overall Project Vision

- *Human-centric* approach to safety.
- Can we utilize robotic sensing, principles and actuation to improve *human* performance in dangerous environment.
- Three core thrusts: Inform, Infer, Assist.
- Key results in thrusts 1,2.
- Development of thrust 3 is ongoing.

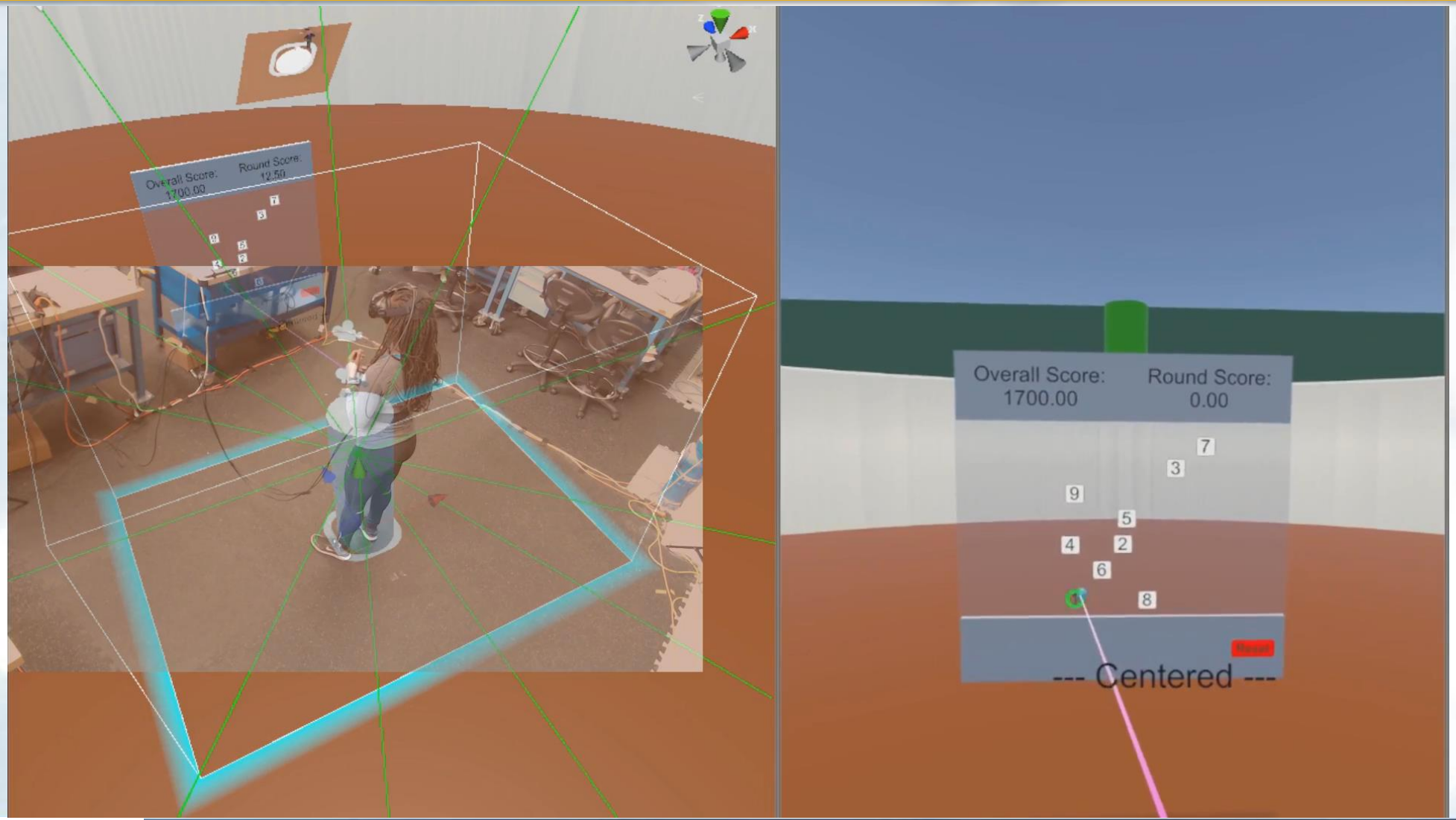


Introducing Visual Distractions

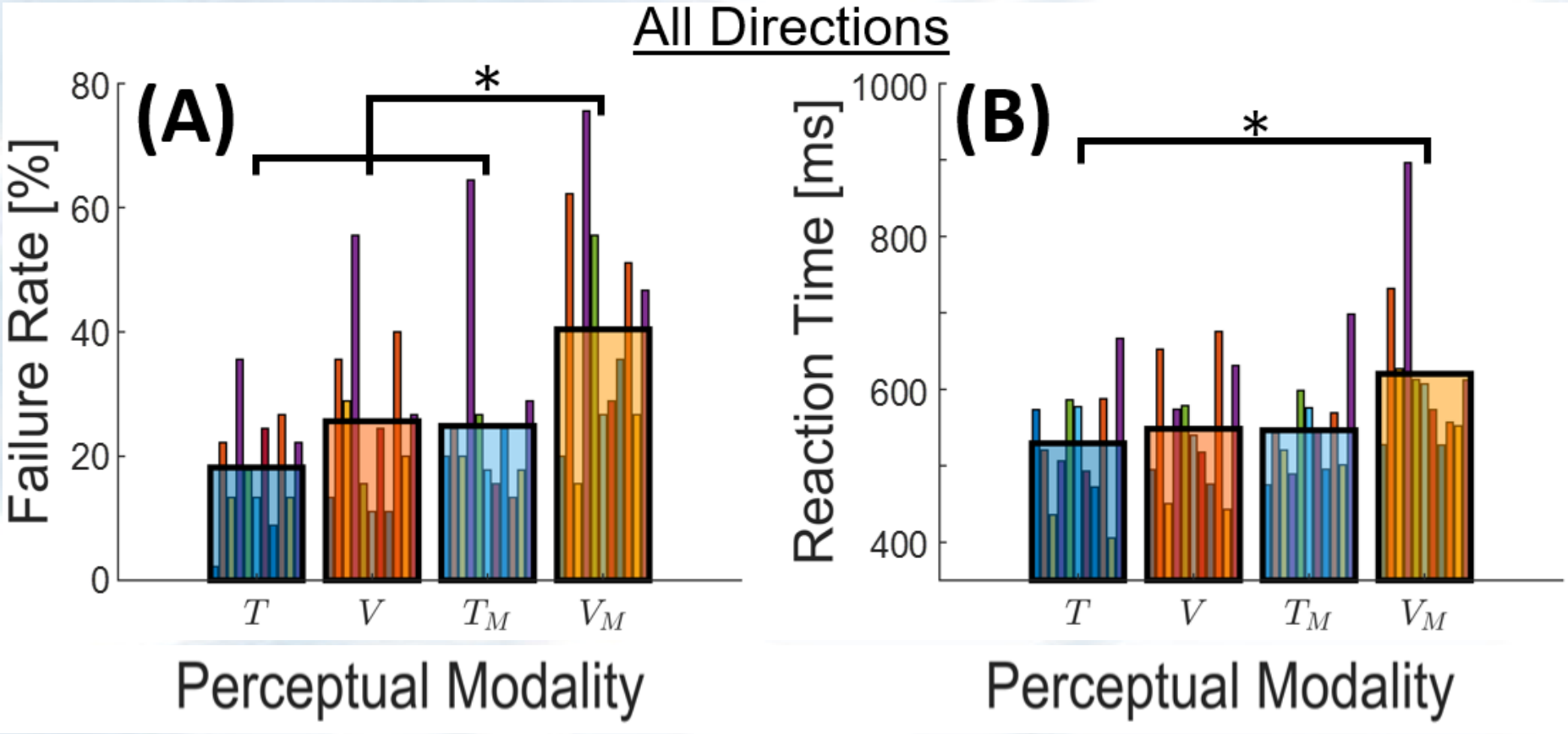


- Studies of cue modalities haven't examined visual distractions.
- We seek to identify cue modalities that can provide benefit while visually engaged.

Exploring Visual Distractions in VR



Tactile Cues Provide Robustness to Distraction

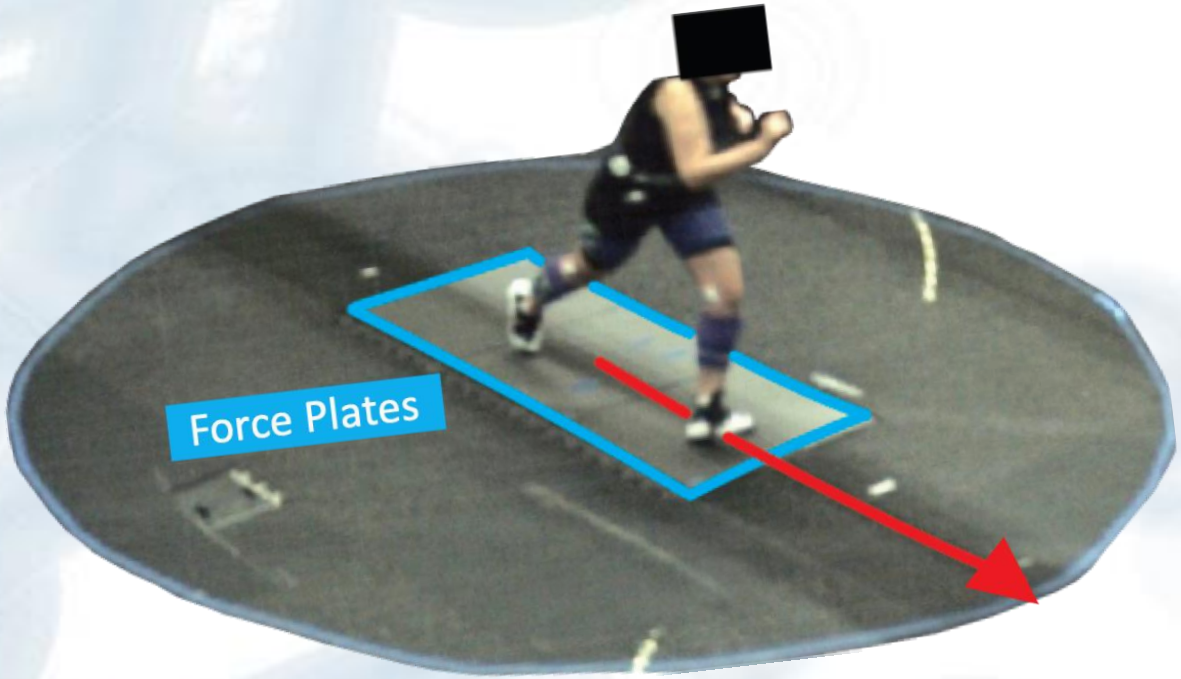


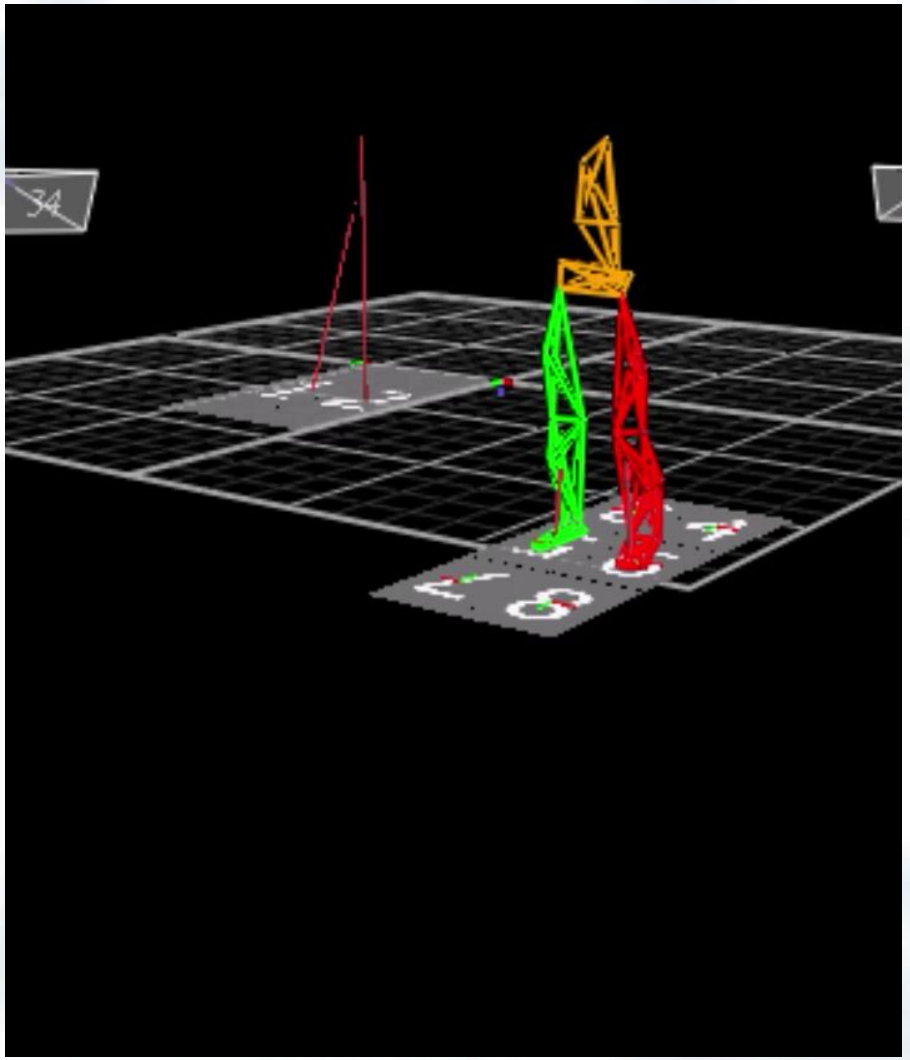
T: tactile, V: visual, C: control

M: condition with Minigame

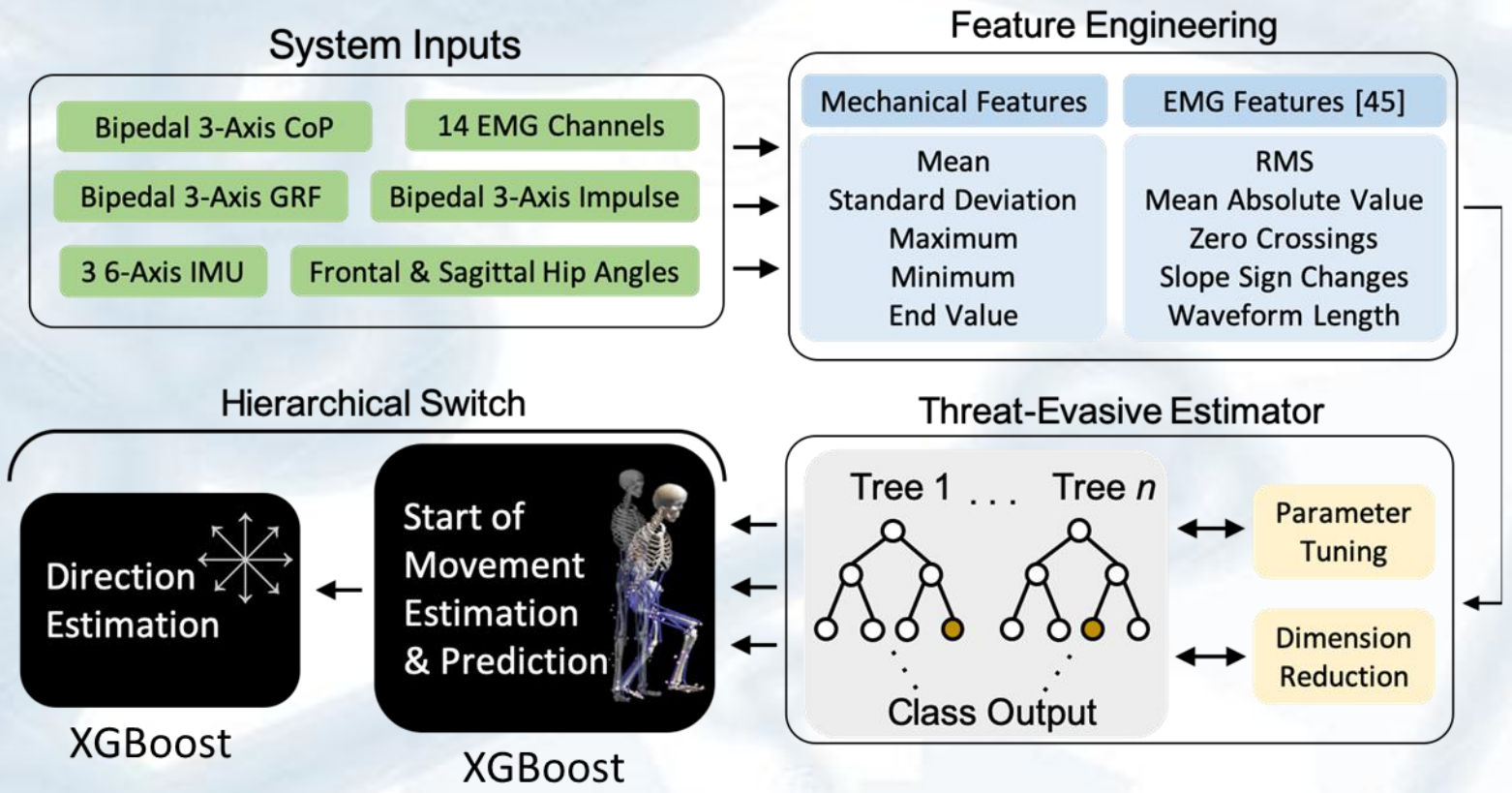
A. Bajpai, K. Feigh, A. Mazumdar, A. J. Young, "Influencing Human Escape Maneuvers with Perceptual Cues in the Presence of a Visual Task," In Revision, Feb. 2021.

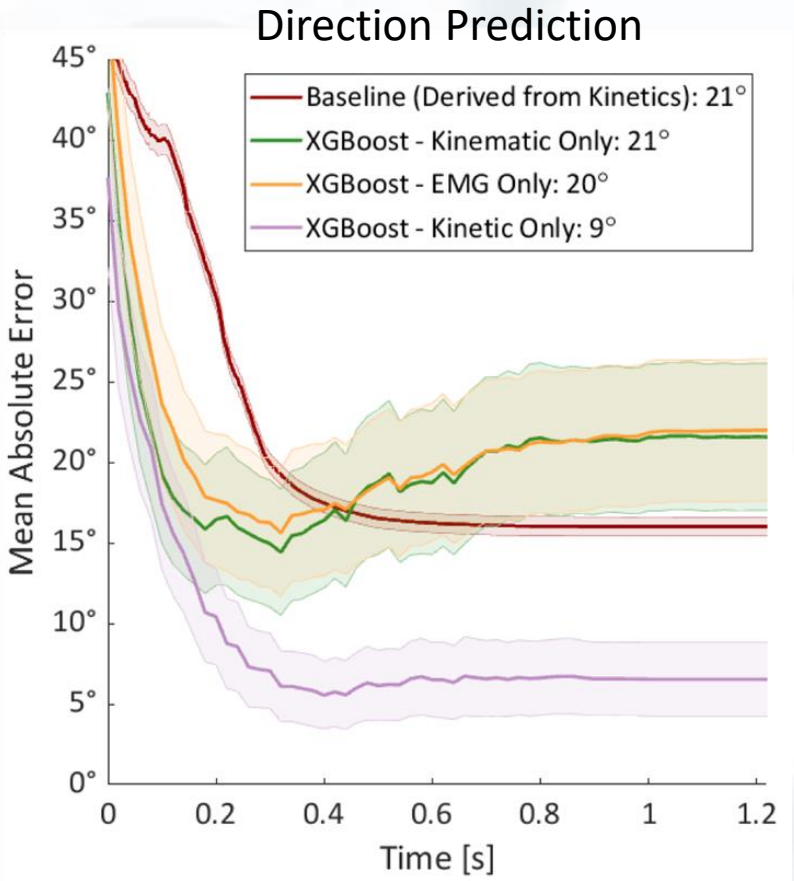
2) Understanding Human Intention





Machine Learning for Predicting Human Intent

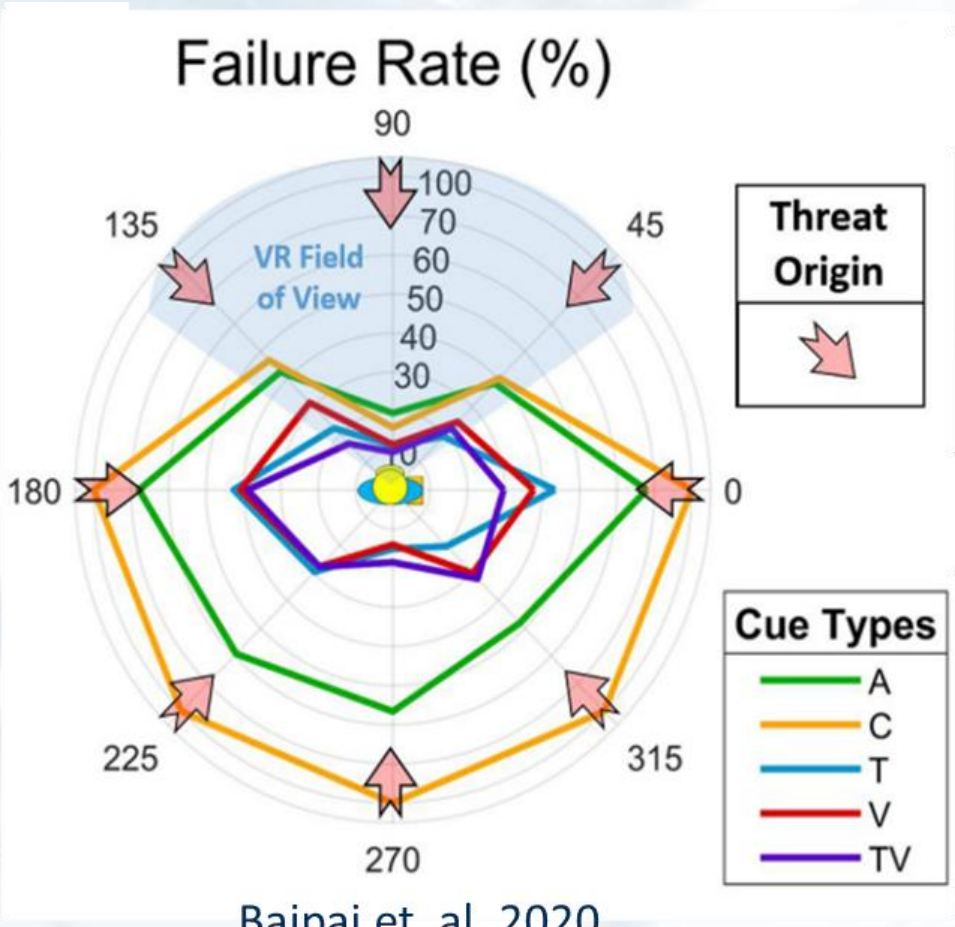




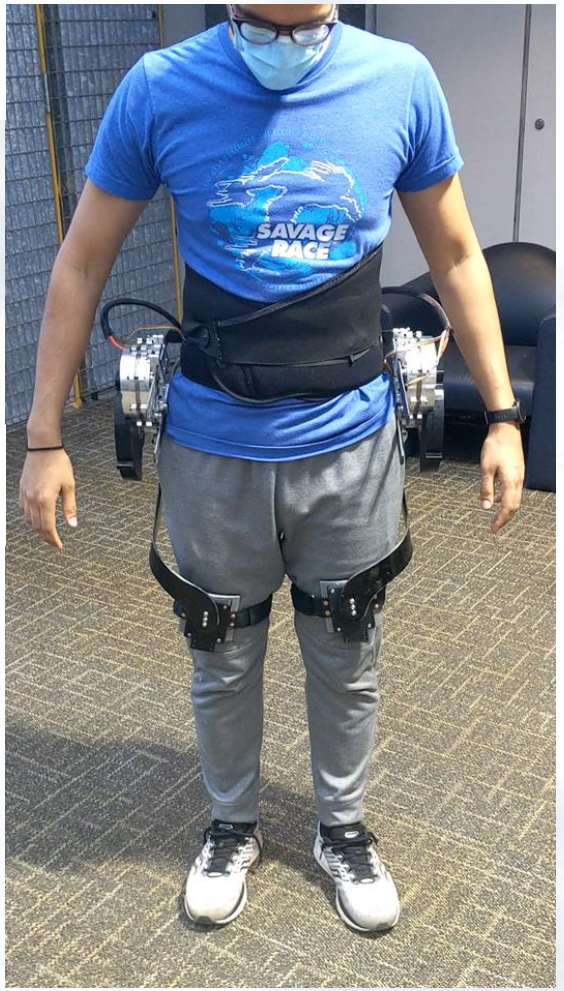
P. Moolchandani, A. Mazumdar, A. Young, "Design of an Intent Recognition System for Dynamic, Rapid Motions in Unstructured Environments," *Under Review*, Dec. 2020.

3) Providing Physical Assistance

- Insight: Human dodge threats more poorly when they have to move in the sagittal plane.
- Developed a hip exoskeleton design for this axis.
- Exoskeleton is designed for high-force-bandwidth actuation (~17Hz)
- Human-subject testing will begin soon.



Bajpai et. al. 2020



Acknowledgements