# FW-HTF-P: Inspector Assistant Robot for Future Construction Progress Monitoring (Award ID 2128948)

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Problem Statement:

Construction progress monitoring incorporates a set of regular inspections of construction work to prevent schedule delays and unpredicted costs or rework. But currently, construction progress monitoring is a manual process with repetitive in-person visual inspections of construction work that has caused inconsistent, time-consuming, labor-intensive, and error-prone inspection. This has resulted in cost overruns in 66% of construction projects and schedule delays in 53% of the projects affecting almost $1.3 trillion worth of structures being constructed each year in the U.S.
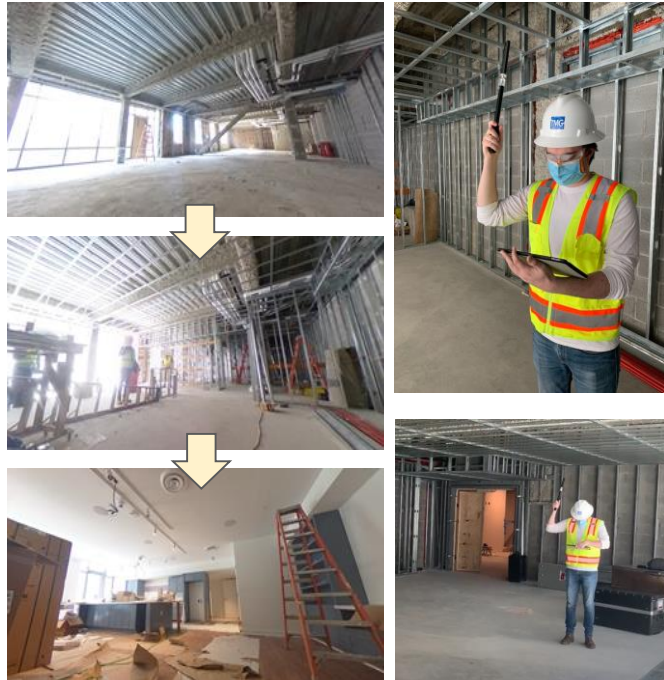
Goal:

To provide a deeper basic understanding of the human-technology partnership in future progress monitoring work by enabling human inspectors to use their assistant legged robots with high mobility and agility capabilities to help them with performing progress monitoring tasks in dynamically changing job sites.
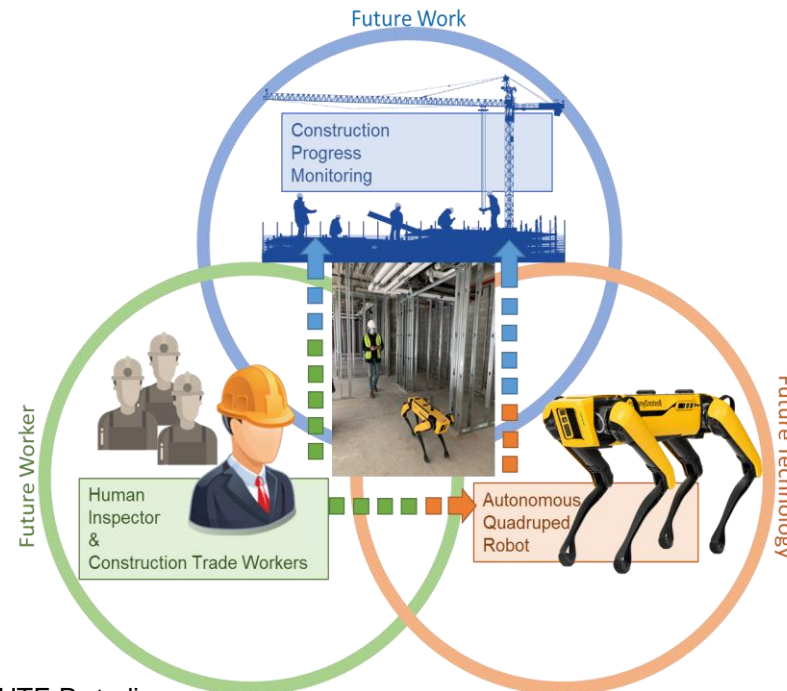

This FW-HTF-P studies:
- Future Technology: The legged robot technology for the enhanced human-robot shared autonomy.
- Future Worker: Human-robot inspector teaming for a human-in-the-loop procedure.
- Future Work: The future of construction progress monitoring work within the proposed human-robot teaming.

Intellectual Merit:

This research creates new knowledge in (a) Future Technology: designing intelligent control and motion planning algorithms that enable safe and agile cooperative tasks of quadrupedal robots and human inspectors in unstructured environments of construction sites, (b) Future Worker: identifying human-centered design strategies in construction progress monitoring utilizing methodologies of human factors psychology for effective human-robot inspector teaming, and (c) Future Work: understanding the fundamental transformation that the future of construction progress monitoring will encounter in transitioning from manual processes to human-robot inspector teaming.
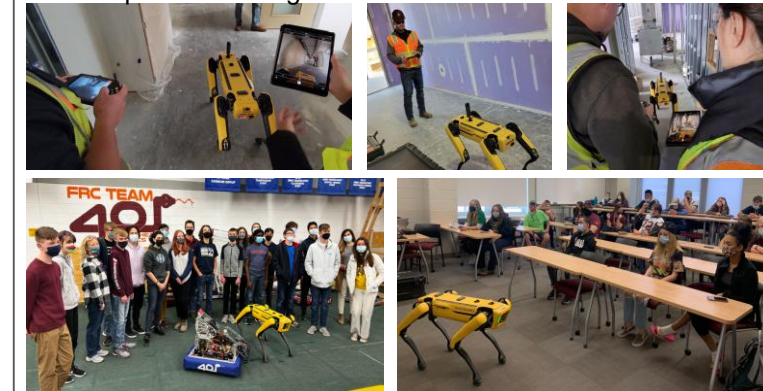
Broader Impacts:

This project has provided opportunities for education and outreach plans for middle-school and high school students. Partnerships with industry stakeholders has specifically guided discovering potential social and economic consequences of the human-robot inspector teams in future construction work. This research also creates new career opportunities that will be inclusive of individuals with ambulatory disabilities.