GOOD SYSTEMS
Ethical AI at UT Austin

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Designing Ethical AI with Skilled Trade Workers: An Interdisciplinary, Co-Creative Approach

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Introduction

An interdisciplinary team of engineering and social science researchers are collaborating with three stakeholder groups to explore the conceptualization, design, and implementation of ethical AI:

(1) ACC welding students and instructors
(2) City of Austin skilled trade workers and supervisors
(3) Texas AFL-CIO labor union members and leaders

Our efforts seek to represent the voice of workers, students, and instructors and to co-design solutions that reflect their values including AI-enabled smart tools with embedded sensing, assured edge intelligence, and Internet of Things.

Research Goal

The team seeks to support workers by putting AI in their hands to increase access to training, enhance safety, and support effective tool use. By co-creating ethical AI applications, we seek to increase equitable access to skilled trade jobs to address worker shortages.

Methods

The social science team gathers insights from participants through qualitative methods including semi-structured interviews, validation studies, and workshops that inform the engineering team's designs. Participants then interact with tool prototypes and provide insight via demonstrations and participatory design workshops.

Austin Community College District

- 28 Semi-structured Interviews
- 2 Validation Studies
- Demo with 5 ACC instructors
- 5 Prototype Tests with ACC students

City of Austin — Founded 1839

- 22 Semi-structured Interviews
- 2 Validation Studies
- Participatory Design Workshop

TEXAS AFL-CIO

- Semi-structured Interviews with labor union leaders
- Survey of union members

Project Overview

AR WELDING SIMULATOR

Co-designed with welding students and instructors at Austin Community College (ACC) to supplement real-world training and expedite learning and skills development

Figure 1: 3D Printed VR headset with markers for simulation

Figure 2: Simulated Welding Tool provides real-time feedback

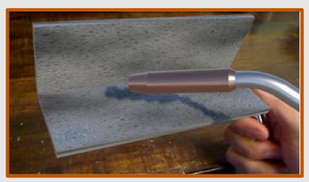

Figure 3: Simulated Welding Tool - user's view

AI-ENABLED ROTARY TOOL

Designed to offer workers personalized feedback and adapt to real-time activity based on insights from City of Austin skilled trade workers and supervisors.

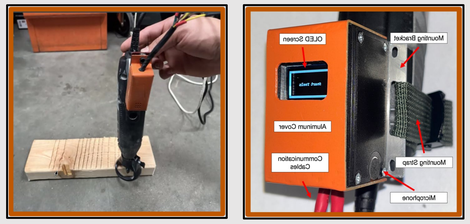

Figure 4a, 4b: Augmented rotary tool with data visualization attachment

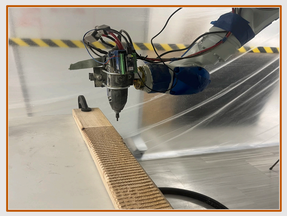

Figure 5: Collecting AI training data via robot

Figure 6: Collecting AI training data via human

Collaboration between an interdisciplinary team of engineering and social science researchers with skilled trade workers and welders informs the co-design of two smart hand tool prototypes: an AR welding simulator and a smart rotary power tool. Smart hand tools collect information on user activity and provide feedback to the user based on their performance to support worker training, knowledge, and skills building.

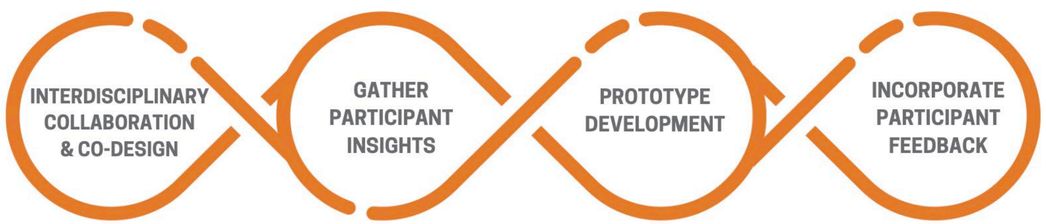

Figure 7: Co-creative process

Expected Outputs

Our contribution supports the need for research with skilled trade workers related to the impact, development, and implementation of emerging technologies (AI, AR, VR, smart hand tools). Our research supports skilled trade training by providing workers with tool-based feedback so they may advance their skills and their careers. We also support workforce development and expansion which can help employers recruit and retain skilled workers who can enjoy a safe and fulfilling workplace environment.

Acknowledgments

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