APECGR

Artificial Personality for Cognitive Guidance Studies on Welder Interaction and Emotion

Pro²Future

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MOTIVATION & GOALS

This project researches **user experience design** based on emotive triggers in the industrial domain, to **increase tool life** by **decreasing instances of negligent handling** of industrial tools. The goal of this project is to **investigate ways to trigger emotional responses** in welders, ultimately to **reduce device damage** induced by inappropriate handling of welding torches. This goal will be achieved by development of an assistance system for welders, that detects whenever a welding device is being treated roughly, thereby reducing its life expectancy, and prompts the user in an emotive way to not do so in the future.

APPROACH

The project implemented the given goals using a data driven approach. A purpose-built data collection system was created, consisting of
i.   the **welding torch** itself as a data source,
ii.   an **eye tracker** as indicator for affect, intent and interface quality,
iii.   body-**physiological**, wrist-worn **sensors**,
iv.   as well as in-ear **microphones**.

Using this system, multiple user studies were conducted, aiming to find
i.   indicators for **affect and skill** in the welding domain, and further
ii.   to investigate the impact of **user experience design choices** on the **utility of the welding device**, as well as **emotional state** of welders.

Project FactBox

Project Name APECGR
Project ID MFP II 1.2
Duration 36 Months

Area 1
Perception and Aware Systems

Project Lead
Dr. Michael Haslgrübler

CONTRIBUTION

Scientific contribution
Prototypes for- and studies on affect recognition in the industrial domain.

Economic contribution
Method of increasing life-time of industrial tools, reducing frequency of maintenance. User experience analysis of industrial tools and recommendations for improvements

EXEMPLARY OUTCOMES

Quantitative Results

experiment	classifier accuracy			
	DT	XGB	Ada	ET
(1) default	0.8358	0.9270	0.8632	0.9710
(2) default (label run)	0.7778	0.9005	0.4312	0.9751
(3) leave seam out	0.6617	0.7529	0.7181	0.8192
(4) leave person out	0.5141	0.5713	0.5489	0.5398
(5) leave seam out (4 vs. baseline)	0.7298	0.7980	0.7803	0.8106
(6) leave person out (4 vs. baseline)	0.5505	0.5707	0.5556	0.5025

Affect recognition based on supervised classification

Qualitative Results

User experience analysis based on skill level