Introduction and Consent

Thank you for agreeing to participate in this study!

Project ID: 41775
Project Title: Investigating the Influence of Robot Errors in Human Robot Collaborative Tasks

Chief Investigator:
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What does the research involve

During this study, you will be working alongside a KUKA robotic arm to complete the assembly and disassembly of a mock car power battery at our research facility. You will be required to perform various tasks in collaboration with the robot, as outlined in the instruction sheet provided. Throughout the session, you will be asked to fill in an online questionnaire to capture your perceptions and experiences during the task. The session will also be video and audio recorded for further analysis. After completing the task, you will be briefly interviewed to gather additional insights into your experience. The total duration of this experiment will be approximately one hour.

Withdrawal

You can withdraw at any point during this study and any data already collected on you will be removed. You can also contact the CI (Mr Finlay Callahan) up to 48 hours after your study to request having your data removed with your given Participant ID.

Confidentiality

Data recorded with this survey will be used in a de-identified form. If you provide your consent, video and survey data of your study will be included in a publicly available dataset. Your Participant ID will be used in this dataset.

Survey results

Data recorded with this survey will be used for analyzing and improving human-robot collaboration. The results will be published as research publications in de-identified form. If you provide your consent, video and survey data of your study will be included

in a publicly available dataset accessible to researchers for understanding human-robot interaction. Your Participant ID will be used in this dataset.

Complaints

For ethics concerns or complaints about the conduct of the project, please contact the Monash University Human Research Ethics Committee at muhrec@monash.edu

Please note, by continuing the survey you consent to take part in this research and agree to the information provided in the Explanatory Statement.

(Full explanatory statement: https://docs.google.com/document/d/1N5lSnXDTowaRtvsTpDmTS3JArEiu4cr usp=sharing&ouid=109627916806544886113&rtpof=true&sd=true)

Please enter your Participant ID as told by the experimenter

I consent to participating in this study

- Yes
- No

I consent to being video and audio recorded during this study for research purposes

- Yes
- No

I consent to having my data included in the publicly available dataset for research purposes

- Yes
- No

Pre-study questionnaire

Age (e.g., 25)

Gender

- [ ] Woman
- [ ] Man
- [ ] Non-binary / gender diverse
- [ ] My gender identity isn't listed. I identify as:
- [ ] Prefer not to say

How confident are you, that you can do the following with the KUKA robotic arm (KUKA) (5 = very confident):

	Sure I can't				Sure I can
	1	2	3	4	5
Operation					
Use KUKA (1="sure I can't", 5="sure I can")	○	○	○	○	○
Control KUKA	○	○	○	○	○
Learn what to do with KUKA	○	○	○	○	○
Work out what to do if KUKA isn't doing what I want it to do	○	○	○	○	○
Application					
Work with KUKA to solve a problem (1="sure I can't", 5="sure I can")	○	○	○	○	○
Get KUKA to do something for me	○	○	○	○	○
Get KUKA to help me with something	○	○	○	○	○
Make sure KUKA does the task I set it	○	○	○	○	○
	1	2	3	4	5

NARS Questionnaire

Please complete the questionnaire below.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I would feel uneasy if robots really had emotions	○	○	○	○	○
Something bad might happen if robots developed into living beings	○	○	○	○	○
I would feel relaxed talking with robots	○	○	○	○	○
I would feel uneasy if I was given a job where I had to use robots	○	○	○	○	○
If robots had emotions I would be able to make friends with them.	○	○	○	○	○
I feel comforted being with robots that have emotions.	○	○	○	○	○
The word “robot” means nothing to me.	○	○	○	○	○
I would feel nervous operating a robot in front of other people	○	○	○	○	○
I would hate the idea that robots or artificial intelligences were making judgements about things	○	○	○	○	○
I would feel very nervous just standing in front of a robot.	○	○	○	○	○
I feel that if I depend on robots too much, something bad might happen.	○	○	○	○	○
I would feel paranoid talking with a robot.	○	○	○	○	○
I am concerned that robots would be a bad influence on children.	○	○	○	○	○
I feel that int the future society will be	○	○	○	○	○

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
dominated by robots					

Stage 1 (Preparation) evaluative questionnaire

Please rate your agreement with the following statements based on your experience in Stage 1 Preparation (5 = strongly agree)

	strongly disagree		indifferent		strongly agree
	1	2	3	4	5
Human-Robot Fluency					
KUKA and I worked fluently together (5 = strongly agree)	○	○	○	○	○
The fluency of the human-robot team (KUKA and I) improved over time	○	○	○	○	○
KUKA contributed to the fluency of the interaction	○	○	○	○	○
Trust in Robot					
KUKA was trustworthy (5 = strongly agree)	○	○	○	○	○
I trusted KUKA to do the right thing at the right time	○	○	○	○	○
Working Alliance					
KUKA accurately perceived what my goals were (5 = strongly agree)	○	○	○	○	○
I understood what KUKA's goals were	○	○	○	○	○
KUKA and I are working towards mutually agreed upon goals	○	○	○	○	○
	1	2	3	4	5

Please rate your impression of KUKA's anthropomorphism based on your experience in Stage 1 (Preparation)

	1	2	3	4	5	
1= Fake	○	○	○	○	○	5 = Natural
1 = Machine-like	○	○	○	○	○	5 = Human-like
1 = Unconscious	○	○	○	○	○	5 = Conscious
1 = Artificial	○	○	○	○	○	5 = Lifelike
1= Moving rigidly	○	○	○	○	○	5 = Moving elegantly

Please rate your impression of KUKA's animacy based on your experience in Stage 1 (Preparation)

	1	2	3	4	5	
1 = Dead	○	○	○	○	○	5 = Alive
1 = Stagnant	○	○	○	○	○	5 = Lively
1 = Mechanical	○	○	○	○	○	5 = Organic
1 = Artificial	○	○	○	○	○	5 = Lifelike
1 = Inert	○	○	○	○	○	5 = Interactive
1 = Apathetic	○	○	○	○	○	5 = Responsive

Please rate your impression of KUKA's likeability based on your experience in Stage 1 (Preparation)

	1	2	3	4	5	
1 = Dislike	○	○	○	○	○	5 = Like
1 = Unfriendly	○	○	○	○	○	5 = Friendly
1 = Unkind	○	○	○	○	○	5 = Kind
1 = Unpleasant	○	○	○	○	○	5 = Pleasant
1 = Awful	○	○	○	○	○	5 = Nice

Please rate your impression of KUKA's intelligence based on your experience in Stage 1 (Preparation)

	1	2	3	4	5	
1 = Incompetent	○	○	○	○	○	5 = Competent
1 = Ignorant	○	○	○	○	○	5 = Knowledgeable
1 = Irresponsible	○	○	○	○	○	5 = Responsible
1 = Unintelligent	○	○	○	○	○	5 = Intelligent
1 = Foolish	○	○	○	○	○	5 = Sensible

Please rate your impression of KUKA's perceived safety based on your experience in Stage 1 (Preparation)

	1	2	3	4	5	
1 = Anxious	○	○	○	○	○	5 = Relaxed

1 = Agitated	○	○	○	○	○	5 = Calm
1 = Quiescent	○	○	○	○	○	5 = Surprised

Please rate your overall experience during Stage 1 (Preparation)

	1	2	3	4	5	
1 = Not at all enjoyable	○	○	○	○	○	5 = very enjoyable
1 = very unsatisfactory	○	○	○	○	○	5 = very satisfied

Other comments regarding Stage 1 (Preparation)

Stage 2 (Assembly) evaluative questionnaire

Please rate your agreement with the following statements based on your experience in Stage 2 Assembly (5 = strongly agree)

	strongly disagree		indifferent		strongly agree
	1	2	3	4	5
Human-Robot Fluency					
KUKA and I worked fluently together (5 = strongly agree)	○	○	○	○	○
The fluency of the human-robot team (KUKA and I) improved over time	○	○	○	○	○
KUKA contributed to the fluency of the interaction	○	○	○	○	○
Trust in Robot					
KUKA was trustworthy (5 = strongly agree)	○	○	○	○	○
I trusted KUKA to do the right thing at the right time	○	○	○	○	○
Working Alliance					
KUKA accurately perceived what my goals were (5 = strongly agree)	○	○	○	○	○
I understood what KUKA's goals were	○	○	○	○	○
KUKA and I are working towards mutually agreed upon goals	○	○	○	○	○
	1	2	3	4	5

Please rate your impression of KUKA's anthropomorphism based on your experience in Stage 2 (Assembly)

	1	2	3	4	5	
1= Fake	○	○	○	○	○	5 = Natural
1 = Machine-like	○	○	○	○	○	5 = Human-like
1 = Unconscious	○	○	○	○	○	5 = Conscious
1 = Artificial	○	○	○	○	○	5 = Lifelike
1= Moving rigidly	○	○	○	○	○	5 = Moving elegantly

Please rate your impression of KUKA's animacy based on your experience in Stage 2 (Assembly)

	1	2	3	4	5	
1 = Dead	○	○	○	○	○	5 = Alive
1 = Stagnant	○	○	○	○	○	5 = Lively
1 = Mechanical	○	○	○	○	○	5 = Organic
1 = Artificial	○	○	○	○	○	5 = Lifelike
1 = Inert	○	○	○	○	○	5 = Interactive
1 = Apathetic	○	○	○	○	○	5 = Responsive

Please rate your impression of KUKA's likeability based on your experience in Stage 2 (Assembly)

	1	2	3	4	5	
1 = Dislike	○	○	○	○	○	5 = Like
1 = Unfriendly	○	○	○	○	○	5 = Friendly
1 = Unkind	○	○	○	○	○	5 = Kind
1 = Unpleasant	○	○	○	○	○	5 = Pleasant
1 = Awful	○	○	○	○	○	5 = Nice

Please rate your impression of KUKA's intelligence based on your experience in Stage 2 (Assembly)

	1	2	3	4	5	
1 = Incompetent	○	○	○	○	○	5 = Competent

1 = Ignorant	○	○	○	○	○	5 = Knowledgeable
1 = Irresponsible	○	○	○	○	○	5 = Responsible
1 = Unintelligent	○	○	○	○	○	5 = Intelligent
1 = Foolish	○	○	○	○	○	5 = Sensible

Please rate your impression of KUKA's perceived safety based on your experience in Stage 2 (Assembly)

	1	2	3	4	5	
1 = Anxious	○	○	○	○	○	5 = Relaxed
1 = Agitated	○	○	○	○	○	5 = Calm
1 = Quiescent	○	○	○	○	○	5 = Surprised

Please rate your overall experience during Stage 2 (Assembly)

	1	2	3	4	5	
1 = Not at all enjoyable	○	○	○	○	○	5 = very enjoyable
1 = very unsatisfactory	○	○	○	○	○	5 = very satisfied

Other comments regarding Stage 2 (Assembly)

Stage 3 (Painting) evaluative questionnaire

Please rate your agreement with the following statements based on your experience in Stage 3 Disassembly (5 = strongly agree)

	strongly disagree		indifferent		strongly agree
	1	2	3	4	5
Human-Robot Fluency					
KUKA and I worked fluently together (5 = strongly agree)	○	○	○	○	○
The fluency of the human-robot team (KUKA and I) improved over time	○	○	○	○	○
KUKA contributed to the fluency of the interaction	○	○	○	○	○
Trust in Robot					

	strongly disagree		indifferent		strongly agree
	1	2	3	4	5
KUKA was trustworthy (5 = strongly agree)	○	○	○	○	○
I trusted KUKA to do the right thing at the right time	○	○	○	○	○
Working Alliance					
KUKA accurately perceived what my goals were (5 = strongly agree)	○	○	○	○	○
I understood what KUKA's goals were	○	○	○	○	○
KUKA and I are working towards mutually agreed upon goals	○	○	○	○	○
	1	2	3	4	5

Please rate your impression of KUKA's anthropomorphism based on your experience in Stage 3 (Disassembly)

	1	2	3	4	5	
1= Fake	○	○	○	○	○	5 = Natural
1 = Machine-like	○	○	○	○	○	5 = Human-like
1 = Unconscious	○	○	○	○	○	5 = Conscious
1 = Artificial	○	○	○	○	○	5 = Lifelike
1= Moving rigidly	○	○	○	○	○	5 = Moving elegantly

Please rate your impression of KUKA's animacy based on your experience in Stage 3 (Disassembly)

	1	2	3	4	5	
1 = Dead	○	○	○	○	○	5 = Alive
1 = Stagnant	○	○	○	○	○	5 = Lively
1 = Mechanical	○	○	○	○	○	5 = Organic
1 = Artificial	○	○	○	○	○	5 = Lifelike
1 = Inert	○	○	○	○	○	5 = Interactive
1 = Apathetic	○	○	○	○	○	5 = Responsive

Please rate your impression of KUKA's likeability based on your experience in Stage 3 (Disassembly)

1	2	3	4	5

1 = Dislike	○	○	○	○	○	5 = Like
1 = Unfriendly	○	○	○	○	○	5 = Friendly
1 = Unkind	○	○	○	○	○	5 = Kind
1 = Unpleasant	○	○	○	○	○	5 = Pleasant
1 = Awful	○	○	○	○	○	5 = Nice

Please rate your impression of KUKA's intelligence based on your experience in Stage 3 (Disassembly)

	1	2	3	4	5	
1 = Incompetent	○	○	○	○	○	5 = Competent
1 = Ignorant	○	○	○	○	○	5 = Knowledgeable
1 = Irresponsible	○	○	○	○	○	5 = Responsible
1 = Unintelligent	○	○	○	○	○	5 = Intelligent
1 = Foolish	○	○	○	○	○	5 = Sensible

Please rate your impression of KUKA's perceived safety based on your experience in Stage 3 (Disassembly)

	1	2	3	4	5	
1 = Anxious	○	○	○	○	○	5 = Relaxed
1 = Agitated	○	○	○	○	○	5 = Calm
1 = Quiescent	○	○	○	○	○	5 = Surprised

Please rate your overall experience during Stage 3 (Disassembly)

	1	2	3	4	5	
1 = Not at all enjoyable	○	○	○	○	○	5 = very enjoyable
1 = very unsatisfactory	○	○	○	○	○	5 = very satisfied

Other comments regarding Stage 3 (Disassembly)

Post study questionnaire and conclusion

Please complete the questionnaire below.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I would feel uneasy if robots really had emotions.	○	○	○	○	○
Something bad might happen if robots developed into living beings.	○	○	○	○	○
I would feel relaxed talking with robots.	○	○	○	○	○
I would feel uneasy if I was given a job where I had to use robots.	○	○	○	○	○
If robots had emotions I would be able to make friends with them.	○	○	○	○	○
I feel comforted being with robots that have emotions.	○	○	○	○	○
The word “robot” means nothing to me.	○	○	○	○	○
I would feel nervous operating a robot in front of other people.	○	○	○	○	○
I would hate the idea that robots or artificial intelligences were making judgements about things.	○	○	○	○	○
I would feel very nervous just standing in front of a robot.	○	○	○	○	○
I feel that if I depend on robots too much, something bad might happen.	○	○	○	○	○
I would feel paranoid talking with a robot.	○	○	○	○	○
I am concerned that robots would be a bad influence on children.	○	○	○	○	○
I feel that int the future society will be	○	○	○	○	○

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
dominated by robots.					

Please leave any additional comments below:

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