Can Robots Learn to Assist Humans in Complex Tasks ?
# A Challenge in Human Robot Interaction

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Abstract : Working with robots might one day be an easy job for everyone, even those without programming expertise. Roboticists are developing automated robots that can learn new tasks to work with human teammates. Can robots be good teammates if the task is complex or there is any communication disorder? Here, we will discuss on how collaborative robots can assist humans and become useful teammates by valuable information exchange while prioritizing tasks.

- **RQ I:** What necessary behavioral changes are required to be adapted by the cobots to manage tasks while interacting with humans ?
- **RQ II:** Can robots be guided towards appropriate actions if the interactant has communicative disorder ?
- **RQ III:** What necessary changes in the human's feedback, will help the robots to be better guided towards the correct actions?
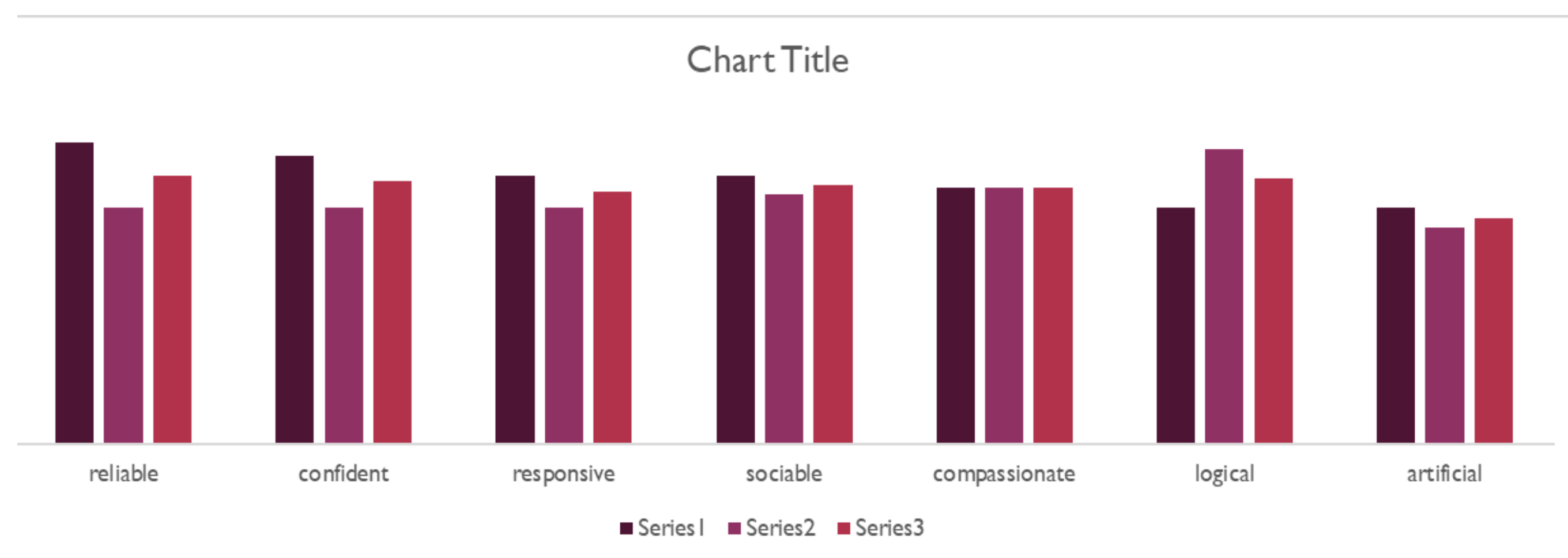
Technical Approach :

Simulated, Physical · ROS + CMUSphinx · Prolific, In-Person
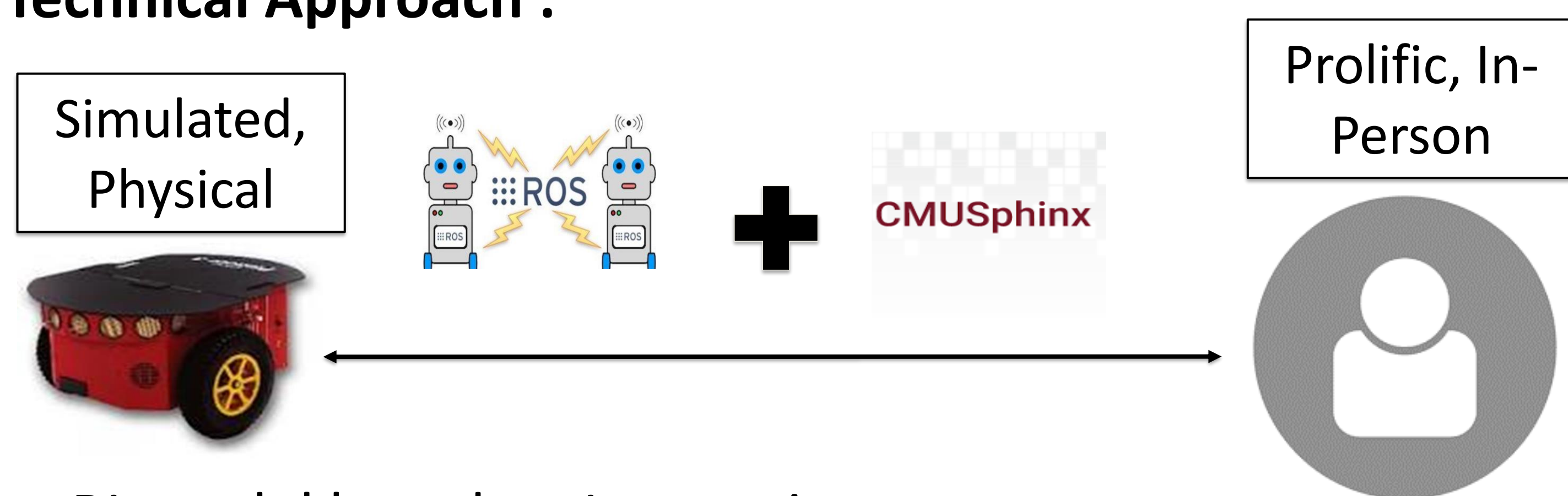
RL model based on Interaction
Factors : Spatial and Temporal
Measurement : ROSAS, CETI, Communication Confidence Rating Scale etc.

Analysis of RQ II using ROSAS :
Performance of N= 5 Participants

Chart Title

reliable · confident · responsive · sociable · compassionate · logical · artificial
■ Series1 ■ Series2 ■ Series3

Scientific Impact of RQ I and RQ III:

With time, robots are becoming more and more adaptable, and we can also see robots doing multiple jobs at the same time. We would be programming robots to achieve good time management techniques such as prioritizing tasks and breaking them down into smaller, more manageable chunks which will overall improve our productivity and the quality of work.

Scientific Impact of RQ II :

Robots can help patients with reduced social communication skills to initiate conversation and effectively exchange routine information. They can also help them to manage emotions and judgements by helping them with their problem-solving skills.

Broader Impacts on Society :

- Robots can benefit humans as a collaborative team member and hence robots might be a useful introduction to modern society. E.g. Robots in warehouses, hospitals, search and rescue operations, robots in space helping astronauts, farmers, autonomous cars etc.

Broader Impacts on Education and Outreach :

- While programming simulated and physical robots, the students will learn the concepts of science, technology, engineering, and the usage of statistics and mathematics in the field of robotics.
- Programming robots will help their critical and analytical thinking and build interest and confidence to pursue research and development and encourage building of technology for a sustainable future.