

## System Implementation project - HRI Application: Sphero guidance system for lowlight conditions

- A list of group members

Phi Bui, Joey Grossman, Ju-Hung Chen, Saurya Koka

- Your project topic area and a preliminary idea for what your project might be about (especially what the robot might need to do)

Our team's proposed project topic is HRI Application in the form of a System Implementation project. We plan to utilize multiple Sphero robots to map out obstacles in lowlight conditions in order to guide a human safely through a room.

- Two existing skills or knowledge areas that you will leverage for this project

Two existing skills or knowledge areas that I would need to leverage for this project is my knowledge of system architecture for the code behind the Sphero, and my cursory knowledge of human-computer-interaction to build an interaction schema for the Sphero.

- Two skills or knowledge areas you would like to develop during this project

I would like to expand my knowledge in artificial intelligence and human-robot-interaction during this project.

- A description of the part(s) of the project that you will be responsible for (as a starting point). This should be something relatively specific (not "the robot needs to interact with people") and reasonably ambitious/complex (not "the robot's motors will move").

I would like to determine and build a basic artificial intelligence model for the Sphero, either for the Sphero's movement/mapping or the Sphero's interaction/reaction to humans.

- Describe one HRI topic you will need to learn more about to complete your part of the project [preferably different from what your other group members are doing]

I would definitely need to consider the ethics of the application of this robot. For example: This idea came from a simple question of "What if we had a robot help someone find their way in a scary basement?" However, it could be expanded to be used for basic directions in a safe environment (like a museum tour) or for search and rescue of individuals in a dangerous environment (like disaster zones). Both examples would require us to consider the ways we program the robot behavior: Should Sphero only consider accessible routes? Should Sphero display messages in multiple languages? Should Sphero prioritize quick routes or safer routes?

- Describe one technical skill or tool you will need to complete your part of the project [preferably different from what your other group members are doing]

One technical skill that I will use to complete my part of the project is my experience in systems architecture. One of our ideas is to utilize multiple Spheros in a hivemind-esque formation in order to cover more ground and better direct humans. Designing the communication schema and memory management of the Spheros' code will be challenging, fun, and necessary for the success of this project.

- Explain how your part of the project would fit together with your other group members' parts

While the specifics of what we work on as a group will definitely morph and change throughout the project timeline, it is necessary to consider the ethics portion of robot-human-interaction in any robot project, especially for one in a HRI course. I believe my part will both strengthen our study as well as make a better and more sound robot overall as it will force me to consider a variety of edge cases that someone with a purely programming perspective wouldn't consider.