# Proposal

1. Scientific and/or technical quality, relevant to the topics addressed by the call

## 1.1 . Concept and objectives

The main idea of this proposal is to combine the following fields: robotics ( mechanical engineering, electrical engineering, computer science ), computer vision, intelligent sensors, internet technology, wireless; all that for the success of the next generation of robot house helpers.

The main idea that led us to propose this work was that people would have a lot more time to spend on activities that they like, instead of wasting time on doing monotonous chores like: vacuuming, wiping, cleaning windows, etc.

Objectives:

1. Cleaning: SRHC has to actually do it's job well, and not just be a gimmick. We will be measuring how much it has cleaned vs. how much there is to be cleaned.

Success criteria:

- Done the cleaning as well as an average person would.
- Didn't miss important surfaces in need of cleaning.

1. Safety: SRHC should go through all the places in the house without breaking or damaging things that are not considered dirt. It should also be safe to use around pets like cats and dogs.

Success criteria:

- Finishing its cleaning route without breaking or damaging anything.
- Not hurt anything that is in its way.

1. Self management: To lessen the amount of work a person has to do, SRHC should go back to the charging station when it's low on battery. Also, it should go back to the charging station when it finishes its job. When the garbage bag is full, it should dump its content into the designated trash can. When battery power is under 20%, SRHC should calculate distance to charging station, and check how much time it needs to come back, so it doesn't turn off before coming back. It also should do that when battery percentage is under 15 and 10 percent. If battery level is 5% or less SRHC doesn't clean anymore, but goes into safe mode and goes back to the charging station.

Success criteria:

- Coming back to charging station.
- Calculating distance to charging station correctly.
- Having time to come back to charging station before the battery runs out.
- Finding out that garbage bag is full.
- Going to the right place to empty its garbage bag, finding the trash can.

1. Initialization: The first time SRHC is activated in the room/house it should go through the place (going next to the walls, following right edges), and scan the position of all the objects in the room. After scanning the positions, it should be able to reconstruct the room, so it can go through it and clean it without breaking anything. For this purpose SRHC will use intelligent sensors, and also computer vision. Going through the room can be set manually, but also will be performed daily. Before the first cleaning of a day it will automatically start room scanning.

Success criteria:

- Being able to go through the room that should be cleaned.
- Being aware of the surroundings.
- Starting room scanning every day before first cleaning.

1. Programmability: SRHC should be programmable in some ways. User will be able to program it to start automatic cleaning every day at the same time. Before that initial cleaning, room scanning will be performed as described before. Also, user will be able to pick a day for emptying the garbage bag.

Success criteria:

- Recognized first cleaning of the day (after date change).
- Recognizing day of the week for emptying the garbage bag, and successfully emptying it.

1. Resistance: In order to last longer, SRHC will be made of steel. It will have some kind of armor so it cannot break if something falls on it.

Success criteria:

- Not broken if some house furniture, such as chair falls on it.

1. Cleaning hard to reach places: Our robot will be able to access hard to reach places such as corners of the walls and high shelves.

Success criteria:

- Cleared corners of the walls and other hard to reach spots.