Recently we took a look at the Wilfa “RVC-17 Robot Vacuum Cleaner.” This is an affordable vacuum cleaner, but it also claims to do the vacuuming itself, considering that this is at about the same price as the other non-robotic vacuum cleaners it can have quite an appeal. While there are many flaws with the machine\(^1\), we’ll try to narrow our focus to what can be done with the remote control interface and perhaps some of the other things that may be very simple to check out.

First, identify the users of the machine. While we could go on and cast a wide net for stakeholders, it boils down to the person wanting to do the vacuum cleaning and those that would be directly affected (people who live in the same house), we could also consider pets and the people that visit.

If we are only going to focus on the main user, who is it? I see three people that are most interested in a device like this. One seems to stick out off the top of my head, I see the person to be someone who is young, most likely male and possibly single, and doesn’t necessarily like vacuuming. It would seem to me that the person is a bit of a “gadget person” and willing to forgive some problems with a machine, especially if it doesn’t cost too much and it promises to make life easier. He probably doesn’t care too much how long it takes, he will just turn it on when he leaves for work or for during an errand. Let’s give the person a name; let’s call him “Chester.”\(^2\)

There is another group that might be interested in a robot vacuum cleaner, and that’s someone who is disabled or in a wheelchair. The robot can move by itself, if it has a remote control, it can be used without bending down. Let’s create a persona who is a paraplegic and her name is “Addy.”

I assume that a lot of people did grow up with their mothers doing a fair share of vacuuming.\(^3\) I can certainly see some families being interested in the device (perhaps a teenage son or daughter) or a stay-at-home mom who would like to spend more time with her children instead of spending some time vacuuming. We can create another persona, a mother with two young kids, “Vivian.” Vivian would probably be given this as a gift.

Now that we’ve found our people who we want to design for and we have an idea of their needs. In general, it would seem that Chester and Vivian are

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\(^1\)The machine seems to be a remarketing of the “Zoombot”, a machine with poor reviews.

\(^2\)This is based on Alan Cooper’s idea of creating personas to help guide design.

\(^3\)Of course, when we were old enough it was our job to vacuum.
into saving time, they want to use time to do something else, so the interface should be very simple to use. The simplicity should also be advantageous for Addy, but she needs to be able to access this from the remote control. Chester wouldn’t mind using the remote control, since it helps reach it to the “gadget level.” Vivian would probably not use the remote control at all, she would probably just bring the robot to the place where the mess is and turn it on.

When I look at the remote, there are a couple of things that I can think of to improve its design. First of all, instead of it being based on infrared, I would instead use a radio controlled remote. The advantage with this is that you don’t need to have a line of sight to control the robot. This can be somewhat of an advantage if the vacuum is under something and you know how to get it out, but can’t send it an infrared beam. It also makes it function as a nice radio controlled car for the kids to play with. As for a control method, the buttons are OK, but I think something like a joystick would be better. It would allow you to have some greater control over where the robot is going and you could move it and turn it in a fluid motion. I think it would require some work on the servos, but it would make the whole navigation experience more enjoyable.

In general, if we have an adequate AI for vacuuming the room, it is sufficient to use the remote to move the robot the place of the mess and press the “clean” button (or perhaps the “quick clean” button, both of which are also on the main device). Not running the vacuum motor by default saves battery. Still, it may be useful to do some vacuuming “by remote”, if nothing else to show off. The current remote has an “on/off” button for the vacuum, but this introduces a mode, which will lead to mode errors where Chester can forget which mode he had it in, probably not a big problem, when he just want to move the robot, but problematic if he actually wants to control the vacuuming. While we could introduce a toggle switch, mode errors will still happen because Chester will not be looking at the remote when he using the joystick. Instead, we could offer a “quasi-mode” where he pushes a second button and holds it run the vacuum motor and releases it to stop it. The button could be under the remote (reachable by the index finger) or even integrated into the joystick, pushing down on the joystick will cause a click, you can still move the joystick around, and relaxing pressure will bring the joystick up and stop the motor.

The biggest challenge with the current robot is the price. From checking other models on websites, I can see that this model at least half the price. Machines that have quite a bit of functionality to “see” the room are ten times the price. The only way to compensate for the cheap price is to skimp on things like the motor, AI, and construction (making it not handicap accessible). I think a good random walk algorithm could work OK for cleaning the room, (though it takes more time), and keep the price down. To make the effect of using a joystick really shine, one could install servos such that it no matter which direction you move the joystick, it will move in that direction, but I’m sure it’s too expensive.