Imagine your perfect robot helper. Maybe it does the dishes for you, walks your dog, or makes repairs around your house. Well, there’s no need to imagine, as the technology already exists today for you to have the perfect robot helper, capable of doing any of these things and many more. There is, however, a catch.

First, you will need to rearrange your house and change the way you do things in your daily life. Modern robots need a well-defined, static environment in which to work. While fast and accurate, robots may fail at their tasks if there are minor perturbations in the environment, often times catastrophically.

Additionally, the robot will need to be programmed for the task you wish it to perform. This, of course, involves a long, painstaking effort to program the specifics of the task at hand. But the good news is that this programming only has to happen once, assuming you only ever want the robot to perform the single task for which it has been programmed and that its environment has not changed.

Also, while watching your new robot companion may bring you some measure of joy, it should be stressed that you absolutely must not be in the area in which the robot is working. In addition to the fact that your existence may sufficiently alter the environment to cause the robot to fail at its given task, you may also be severely injured by the robot as it continues on, oblivious to your presence.

If these restrictions have yet to sway you, then you can have your very own futuristic helper. This, of course, assumes that you can afford the enormous cost of a custom robot, designed to work on a single task, in a very specific environment.

Perhaps, then, current robotic technology is not for you. There have been a lot of advances in robotics over the last several decades, but these have mainly been mechanical in nature. In order for robots to truly arrive they need to be robust, safe, easy to use, general purpose, and affordable.

Can these various attributes be brought about by further advances in mechanical design? Perhaps, but it seems unlikely.

Would, instead, a higher level of intelligence be necessary? Does a robot need to be smarter in order to seamlessly integrate into our daily lives? Perhaps not. Humans can be easily fooled into believing a system is intelligent. Many have felt that they have had meaningful conversations with Weizenbaum’s ELIZA or Colby’s PERRY. While contentious, some would say that these program’s are some of the first to pass Turing’s famous test without being truly intelligent.

The issue with the Turing Test as a measure of intelligence is that, rather than rigorously defining what it means for a system to be intelligent, humans are the final arbiter of the decision. Even worse, this decision is not made directly by the human, with full intent and understanding of what is being decided but, instead, it is couched in the context of social interaction. One could argue that there are many people who follow social cues and interact well with others in society without ever doing any serious thinking.

Even in a more abstractly strategic environment it seems that the appearance of intelligence is all that’s necessary. After all, it seems that Deep Blue’s famous victory may have been the result of a bug in its code and a little over-estimation by Garry Kasparov. According to Silver (2012), a glitch prevented Deep Blue from properly selecting its 44th move. Stymied by this, the computer simply selected a move at random. It has been suggested that, in attempting to figure out this random move, Kasparov came to the conclusion that the computer must be more intelligent than he, as he could find no logical purpose for the move. Further more, this "realization" may have inspired him to forfeit the second game, handing Deep Blue the victory.
Thus, it seems that we can be easily fooled into believing a system is intelligent. We can have meaningful
conversations and can be convinced to change our behavior by merely the illusion of intelligence. Perhaps,
then, these interactions are more a reflection of ourselves than anything else.

Regardless, for robots to integrate into human society it will take much more than the ability to converse
or play games. What is really needed, is some base level of self sufficiency. Enter Baxter.

Baxter is an anthropomorphic robot designed to complete simple, repetitive tasks. While this sounds no
different from other industrial robots, Rodney Brooks and his team believe they are heralding in the future
with Baxter.

Brooks left a professorship at MIT’s Computer Science and Artificial Intelligence Laboratory to start
Rethink Robotics, the company behind Baxter. What makes Baxter different is that it’s designed to be a
platform rather than a machine for the completion of tasks. That is, Baxter is designed to be extensible,
cheap, and generalizable.

First, there is no integration necessary. Baxter does not need to be welded into a specific location on a
factory work floor with millimeter precision. Instead, one simply needs to plug the robot into a wall socket
and turn it on.

Second, rather than having to carefully program Baxter to perform very specific tasks, one simply needs
to teach the robot by example. By directly manipulating its arms, Baxter can be shown where items need
to be picked up or dropped. Baxter will then repeat the task on its own, regardless of small changes in its
environment. Even if the conveyor belt off of which it is picking up widgets speeds up or if the box it is
packing them into gets bumped out of alignment, Baxter can compensate.

This is due, in part, to the fact that Baxter uses “common sense” to determine how best to accomplish
the tasks it has been given. For example, the robot understands that if needs to place a widget in a box, it
must be holding a widget first

One stark difference between Baxter and its industrial brethren is that it is both aware of nearby humans
and compliant. In factories, humans must stay away from the industrial robots that work at a lightning
quick pace with no regard for their surroundings. But, given a suite of sensors and compliant mechanics, it
is perfectly safe to be around Baxter when it is working. In fact, Brooks often demonstrates this by placing
his head in the path of Baxter’s arm with no effect greater than a slight nudge.

Finally, every piece of Baxter was designed with cost savings in mind. Priced at $22,000, Brooks likens
the creation of Baxter to that of the home PC. It may not be quite as fast as other robots, but it’s relatively
inexpensive, generalizable, and easy to train for new tasks.

So, is this the future of robotics, here, today? Not quite, but its pretty close. Currently, while Baxter is
not limited to a single task, it does seem to be limited to a general category of tasks for the moment: that of
picking up and moving items around a work area. To be fair, Rethinking Robotics’s philosophy is that Baxter
is meant to be a platform for expansion, not just a static product. This means that they will be releasing
further software updates to further expand the platforms capabilities as well as an SDK in the hopes that,
much like the home PC, hobbyists and professionals can generate many more capabilities for the system.

While the robots of tomorrow may not quite be here yet, it seems that Baxter is certainly a step in the
right direction.

References


made-the-robot-do-it.html

robot-with-a-delicate-touch.html

1Unfortunately, the inner workings of this common sense system seem to be a closely held secret of the company, so further
explanation is impossible.
