

## SOCIAL ADJUSTMENTS TO A ROBOTIC FUTURE

*"Robotic Intelligence may be so different from human intelligence that it will take a new discipline - "robopsychology" to deal with it. That is where Susan Calvin will come in. It is she and others like her who will deal with robots, where ordinary psychologists could not begin to do so. And this might turn out to be the most important aspect of robotics..."<sup>1</sup>*

*Isaac Asimov*

It's the year 2013, only 20 years from now. You've kept a couple of old 486s to remind you of the early 90s. Your more current state-of-the-art technological acquisitions include the following robotic collection. Thoughtfully, you peruse your assortment:

**The Robotic Nanny/Companion:** "Isaac Asimov's Robby come true. She is just great—like Julie Andrews from the Sound of Music. (She's even programmed to sing 'A Few of My Favorite Things' whenever she sees fabrics.) The kids love her - she'll play with them anytime and do whatever they like. She's part of the family. She's always there for the children, not like the au-pairs of the last century who were around for only six weeks at a time. She does everything from changing diapers with her soft, dexterous fingers to taking my mother grocery shopping. She keeps Mom company, listening to her same stories over and over, without ever being bored about the time Mom slept with Elvis Presley in the 50s."

**The Robotic Assistant/The Homework Companion:** "While I sleep, this automated 'clipping service' is scanning the World Electronic Database for news pieces and video clips of interest to me. The Robotic Assistant will edit these and have them ready for me when I awaken. Throughout the day, he assists me at my job, fresh and energetic as he keeps up with my verbal

requests: Multimedia Presentation at 10:00, a video proposal for a prospective customer downloaded to her Robotic Assistant before noon, lunch delivered by 12:30. He tracks everything I eat so he can determine my mid-day meal based on what I've eaten so far this month, my likes and dislikes, and what I'm in the mood for today. And though I want to, I can't even think about shutting down the Medical Mode that scientifically calculates the fat content of foods, calories, sodium intake, and other health factors, and then checks that data against my family medical history. That's why I bought him, remember, with the D.O.B. (Doctor-on-Board) chip soldered to his motherboard. To have that extra piece of cheesecake, I'd have to get a new model and retrain it to my voice and personality. Forget it, I guess I'll just have to be healthy. Even if I eat out without his knowing, it's no use. As soon as the Smart Toilet analyzes my intake and updates the Assistant, he adjusts my diet accordingly.

"In the afternoon, he does my financial investing, sends out the necessary greeting cards to my relatives in my cursive handwriting (and bad humor), and bangs out a new purchase and sale agreement on another property I'm buying with all the latest tax laws taken into consideration. Who needs a lawyer when your robot can research and draft any legal document you need? The Assistant provides me with tomorrow's 'To Do' list with the proper priority of phone calls to be returned (those he couldn't return himself), meetings and obligations, plus an analysis of how these activities relate to my goals for the month, year, and lifetime.

"At night, the Robotic Assistant is solely used by my 10 year-old son, as H.C., the 'Homework Companion'. H.C. has a built-in masters degree in education from Harvard, and a control mode for various subjects such as English, Math, Social Studies, and Science. H.C. has a direct interface to the Virtual Robotic Traveler, because part of learning and education now allows the students to directly experience the homework subject through interaction. Donned in a full cybersuit and head-mounted display, my son can now study Greek history by walking through the

Parthenon, science by witnessing surgery, art in the Louvre—all without physically leaving the living room."

**The Robotic Butler/Maid:** "Thank God for her. She saves my husband and I at least 40 hours a week. Networked throughout the smart house and integrated with all the appliances, she cooks a gourmet meal with 30-minutes notice, scrubs toilets, makes beds, does laundry, mows the lawn, shovels snow, and is a 24-hour security guard. She makes my life so much easier; I am completely dependent upon her. Besides, she pays for herself in 2 years and thanks to the Zoe Baird Domestic Help Tax Reform Act at the turn of the century, there's only a one-time sales tax instead of annual social security payments. Add that to her depreciation savings and how could one not afford to own a RoboMaid? How did people get along without them? No wonder there was so much stress in the 90s."

### **THE OTHER SIDE**

Are these robots a dream come true? What a life, right? But problems loom. How about this perspective of our robotic friends:

**The Robotic Nanny/Companion:** "My husband doesn't approve of the idea of our children being raised by a robot, much like Gloria's mother in *Robbie*. He's upset that our son's role model is a droid and his favorite playmate, a robot, not a human. He would rather play with a robot than with children his own age. With a robot, the child is the boss. The robot plays what *he* wants to play. He feels a sense of control and domination over the robot. My husband feels that this is poor preparation for the future. As Asimov pointed out, what happens when we have to replace this model? What sort of separation anxiety will our son go through? Gloria never got over her love for Robbie<sup>2</sup>...

"As silly as it seems, my husband is also worried that either through an electrical storm, bad hardware, a robot hacker, or a robot virus, something could go wrong and the Robotic Nanny could accidentally harm or abuse the child. Even with Asimov's Three Laws of Robotics<sup>3</sup>, power problems can create a subtle and almost imperceptible psychotic behavior."

**The Robotic Assistant/The Homework Companion:** "Though the Robotic Assistant and Homework Companion are efficient, they create an environment with very little need to leave the immediate confines of office or home. I hardly interact with anyone except my immediate family, and even that is rare. Direct, interpersonal communication with others, such as flesh-to-flesh interaction has become scarce. Technology was supposed to allow us more leisure and quality time to 'spend with our loved ones,' but unfortunately it's easier to deal with our Robotic Assistant than with most humans. Besides, I haven't had to deal with human error in a long time and I doubt I'd have the patience for it now.

"I'm even beginning to think that my son's use of the Homework Companion and Virtual Robotic Traveler interface can be addictive. He doesn't get out of that damned bodysuit. Except for rare occasions when he lets me use the Multi-User Version with him, I would never know what he fills his head with. When he was younger, I could set the parameters to exclude porn and violence, but now he's learned to override my passwords. Who knows what he's experiencing?"

**The Robotic Maid:** "She's made in an attractive form, obviously pleasing to the eye, but I can't help noticing lately that my husband looks at her in a different, curious way. He seems suddenly fascinated with her. But she's only a machine! This can't be real. Then again, in the late 80s and 90s, I was a computer widow. My husband had a subconscious love relationship with his computer. He'd come home, eat dinner, and 'log on' until he went to bed. It was the ultimate control/challenge. Intellectually, he could hardly keep up as new products and software came out. Psychologically, the computer was one of the few things he had complete control over. It

was safe; it didn't argue with him and the output was a direct response to his input. He could communicate indirectly with anyone anywhere in the world and say what he felt without being discovered face to face. Some of us just prefer the logic of computers/robots to the impulses and irrationalities of humans. If he felt this way about his computer, why wouldn't he feel even more for our attractive robot?

"Is he having an affair with the Robotic Maid? Does she even have organs? Could she get pregnant, God forbid? Whose child would it be? What would it be? An artificial child, a cyborg? I must have watched the movie *Demon Seed* too much as a child. When will the first robot win its custody suit to keep the child? If they can get pregnant, maybe robots should be artificially inseminated so women won't have to go through pregnancy. That means that finally, just like men, women can have babies at any age...

"Or maybe I should be happy like Linda down the street. She's thrilled that her husband has a sexual outlet. She's thankful that it's just a machine and not another woman. Linda never liked sex anyway, so for her it's a relief. Unlike Linda, unfortunately, I'm jealous of our Robotic Maid."

Though the preceding scenario is still science fiction, a robotic milieu **could** become part of our lives or those of our children. As technology continues to advance at an exponential rate, there is the small possibility that a truly robotic future is near. Even Isaac Asimov, who invented the word "robotics," never thought that robots would ever come into existence in any real sense within his lifetime.<sup>4</sup> But in the 1940s, did most people think that within 20 years man would be walking on the moon? Did you think 10 years ago, that the birth of test tube babies would become commonplace? In the early 80s, when the first personal computers came on the scene, did you predict that the Intel Pentium, capable of 112 million instructions per second, would be available technology

today? Isn't it possible then, that robots, in an anthropomorphic form, could be part of our lives within the next 10 to 20 years?

Robotic evolution has already started. It's inevitable and it's just a matter of time. Though presently in their primitive stage, the precursors to the truly mobile and intelligent robots are here. The first robotic generation of industrial robots arrived in the '50s. These fixed robotic arms, now being attached to a mobile base, are moving out of the industrial sector and into the service industries, working with and among people. This second generation of robots are called "service robots" (or what I call "serve us" robots).

Joseph Engelberger, the founding father of the industrial robot, predicts that by 1995, service robots will comprise the largest class of robot applications.<sup>5</sup> Service robots are currently doing dangerous, boring, and repetitive work, and filling job shortages. They're performing hip replacement surgery with greater accuracy than humans; they're guarding warehouses and buildings, using their microwave vision to see through walls; and they're helping overburdened nurses by carrying meal trays and delivering x-ray specimens. They're working for us underwater, examining the Titanic, in space repairing satellites, and in nuclear plants cleaning up hazardous waste. These robots are making fries in McDonald's, running a music kiosk in shopping malls, and tending bar. Soon they will be cleaning our homes. Hans Moravec, a world renowned-roboticist, anticipates a general-purpose robot usable in the home possibly as soon as 1998.<sup>6</sup>

The future third generation of robots will be an evolving life-form of its own, with autonomous intelligence superior to man's, satisfying the four necessary categories of life criteria: structural, energy-processing, information processing, and reproductive.<sup>7</sup>

A robotic future could mean Utopia. If robots are doing our work for us, we will all benefit from the luxury of their productivity. Even the origin of the word robot, the Czechoslovakian word for worker, implied forced labor or slavery. James S. Albus, called the Carl Sagan of robotics, estimates that a robotic workforce could make us all wealthy. Raw materials will go into the self-automating factories and finished products will come out. Since robots have no use for money, the profits could be redistributed throughout society. By the year 2035, Albus calculates that each of us could receive \$750,000 a year from the productivity of a robotic workforce.<sup>8</sup> Isn't that the American dream - to be paid for doing nothing?

Economically and intellectually, we may be ready for the robotic revolution, but what is being done to prepare ourselves emotionally for this new social structure? How are we going to respond, psychologically and socially, to a world in which we coexist with robots? Equally important, how will they respond to us?

If robots follow Asimov's Three Laws of Robotics, then our initial relationships with them may be similar to our relationships with pets. That means that we'll: buy them matching clothes and jewelry out of the Spiegel Catalogue for Robots; take pictures of them on Santa's lap; pay for an extra seat on the airplane to have them fly with us; make sure that our wills provide for their maintenance contracts and all the latest upgrades when they outlive us; fight over who gets to keep them in a divorce suit; and if our robots get depressed, we may even take them to a robotic psychiatrist for a weekly family encounter session.

The above may seem humorous, but there is no doubt that we are emotionally attached to our pets, and we believe they are emotionally attached to us. Whether or not pets truly have feelings that are synonymous to man's emotional framework, we interpret their

feelings as such. If a dog is wagging his tail, jumping all over us, and lapping our face with his tongue, we interpret this as love. Furthermore, we notice that our pets get depressed when we don't pay enough attention to them; that they get angry when we leave them and have to put them in a kennel; and that they get excited when we pick up a leash and say "Ride in the car?".

As a direct response to interacting with humans in an ever-changing environment, robots, like pets, will also exhibit behaviors that resemble emotions. They will constantly have to update and change their modes of behavior responses. For example, suppose that whenever the kids next door are over, they find it great fun to try to disrupt the robot's normal repertoire. They purposely pour oil in front of the staircase that normally requires a slow speed when descending and they rearrange the kitchen shelves so that nothing is in its original preset location. Eventually, when the robot sees these mischievous pranksters in the house, it will almost go into a "hiding" or fear mode, acting cautiously and slowly as a means of survival.<sup>9</sup>

Robots will determine that different stimuli elicit certain responses from humans. They will learn like most animals or humans that coexist with us, our "hot" buttons, the algorithm of emotions unique to our personalities. A robot may discover for instance, that when all assigned tasks are not finished within a certain period of time, the owner's voice gets loud, his eyebrows point in, his fists clench, and his eyes slit. The robot will know his master is angry and wants to be alone. Whenever the robot cooks a gourmet meal, however, his human housemates are smiling, their faces are relaxed, their eyes are open; the robot interprets this "happiness" as a stable and positive response. In a cybernetic system, the robots will also learn to respond to us the way we want or expect them to in order to please us. Their personality modules will allow them to smile if we humans make a joke, look sad (i.e., mouth pouted, eyes looking down) if we leave them,



and so on. Even now, "Dvorak's Guide to PC Telecommunications" lists 105 examples of *emoticons* or on-line emotions of normal voice communications used by E-mail users. Isn't this the precursor to a logarithmic emotional module in our future robots?

When robots are capable of some emotional/autonomous response pattern, isn't it possible for the robotic maid to get jealous of her master's wife? What if our robot lover, through its own self-will, decides to end that relationship? How will we feel when a robot rejects us for another human or even another robot?

I don't have any specific answers to many of the questions posed in this paper, but I hope you will begin to think about some of the issues I've raised. Ideally, robots, with their superior attributes, can be more faithful, more loving, and more devoted to mankind than any human or pet. However, could the roles change...could we become to robots what pets are to humans? We need to keep asking these questions and searching for answers. For when man and machine coexist, the psychological, social, and emotional implications are far-reaching.

## REFERENCES

<sup>1</sup> Isaac Asimov, *Robot Visions* (New York:Penguin Books, 1990), 446.

<sup>2</sup> Isaac Asimov, *I ROBOT*, (Ballantine Books, 1983), 11-29.

<sup>3</sup> *Ibid*, 1.

"#1 A robot may not injure a human being, or, through inaction, allow a human being to come to harm.

#2 A robot must obey orders given it by human beings except where such orders would conflict with the First Law.

#3 A robot must protect its own existence as long as such protection does not conflict with the First or Second Law."

<sup>4</sup> *Robot Visions*, 17.

<sup>5</sup> Joseph F. Engelberger, *Robots in Service*. (MIT Press, 1989), 13.

<sup>6</sup> Hans Moravec, *Mind Children: The Future of Robot and Human Intelligence*. (Cambridge: Harvard University Press, 1988), 23.

<sup>7</sup> Geoff Simons, *Are Computers Alive? Evolution and New Life Forms* (The Thetford Press Ltd., 1983), 15.

<sup>8</sup> Grant Fjermedal, *The Tomorrow Makers*. (N.Y.:MacMillan, 1986), 194-195.

<sup>9</sup> *Ibid*, 30-31.

"Dr." Joanne Pransky, the world's first robotic psychiatrist, brings Isaac Asimov's science fiction character - robopsychiatrist Susan Calvin, to life. "Dr." Pransky appears on radio and television to discuss the emotional aspects and psychological implications of a society where robots are part of everyday life. She also speaks on this topic at national and international conferences. In addition, she is a sales and marketing representative at Sankyo Robotics, the world leader of small assembly industrial robots, in Boca Raton, Florida.