Redefining Robots - A manifesto!

What is the purpose of a hobby robot? In its simplest form it is a gateway to technical exploration. When viewed from this framework, then what would optimize its function as a gateway? A gateway needs to be inviting, intriguing. The most successful gateways are the ones that grab some attention. At the same time, it needs to be accessible. The more accessible it is the more powerful it can be.

I would further argue that the way a robot becomes intriguing is by giving it anthropomorphic behaviors, to make it act like humans or animals. Roboticists have worked hard to bring the five main senses to robots and this is good work. However, I have recently been made aware that we do not just have five senses but rather 16 or 18! They have fancy names like proprioception and equilibrioception but they are really definitions of what we feel every day like knowing where your body parts are and whether you are standing up or upside down. What I am getting at is that it is remarkably easy to provide a robot with some of these humanizing traits and this makes them come alive. The more alive they seem, the more intriguing they are. Going even further, I would argue that demonstration of intelligence takes that even further and combining the internet connection with a situation awareness can make a robot tell you things you would never expect it could!

Now let's explore accessibility. Robots are thought of as extremely expensive devices. Dogs that cost more than cars amaze us with their dance moves but are million dollar development projects. Sure some progress has been made to these for thousands of dollars. I was inspired by the open source project named Chop where a Mexican team made one for $500. I make a good salary and love robotics, but even to me, this was still more than I wanted to spend to make this exploration. I 3D printed the frame but never pulled the trigger on the $400 dollars of servo motors and processors. But what if it was $50, or $25? Now it is less expensive than the textbook and a hundred times more inspiring! This project archives this clever design eliminating the need for hundreds of dollars of servo motors. It also is making the most of $5 240MHz processors by using expanders to control it all. What's more is that technology itself has gotten amazingly accessible. In the 80’s and 90’s I used to dream of a day when the power of a computer could be put in a matchbox and cost less than $100. Now it can be had in a potato chip and Amazon will deliver 20 of them to me tomorrow for that same $100! This project archives this clever design eliminating the need for hundreds of dollars of servo motors. It also is making the most of $5 240MHz processors by using expanders to control it all. My next impediment was the inability to own a machine shop and have the workers to make what I could imagine. Now I have a 3D printer in my basement that costs $250 and makes the most detailed parts I can imagine in hours. The costs of making populated circuit boards used to be prohibitively expensive but this year JLCPCB started a service where I made 120 boards for $80 with components populated on it. I used to travel to Tokyo to get my robot parts, then it was Aliexpress and 2 months in shipping. Now most everything I want can be delivered tomorrow by Amazon. Technological exploration has never been more accessible and it is time to make a robot platform that demonstrates this amazing new reality.

Now that we have demonstrated that robot parts are accessible in ways they never have been, what about the Cad programs to make them. Just five years ago only companies could afford the programs to make intricate mechanical parts, design PCBs and program these amazing processors that bring them alive. Surprisingly, free and open source tools have been developing to the point they rival their commercial equivalents. Not only are the tools good, they have huge libraries of ready made content. There are also tutorials and youtube videos describing everything you might want to do with it. We are at a point that with enough curiosity, you are a google search away from knowing anything needed to make a hobby robot. However, since it can be daunting and there is incredible technical breadth people do not know where to start. To help make the tools more accessible and intriguing, we are defining ways to make it more structured and fun.

Robotics is basically mechanical skills, electrical skills and programming which provide structure, control and awareness. By creating tutorials that help people learn the free or pro level tools for these three areas, and giving them an intriguing and accessible robot to build one piece at a time, there is endless possibility for this amazing technological exploration.