

A Maker's Guide to 'Meta-Human'

Preface

Fifty years ago, NASA and the U.S. were locked out of travel to the International Space Station because of a U.S. president who thought that 'posturing' was in style. Within a few years, the Chinese moved to rapidly colonize Luna, and we all know how that has worked out. And now the CHICOMM mega-rockets have established <<Mao Base1 and 2>> in the *Nili Patera* caldera on Mars. Humans and advanced androids are constantly winging their way there to build a permanent Red presence on the Red Planet. The hydrothermal mineral deposits on the southern flanks and nearby terrains are loaded with industrial-grade diamonds which the <<CHICOMM Consortium>> (CCC) are eager to exploit.

As a Maker, you have probably already hacked your <<Google Kitchen Server>> (GKS) by defeating its safety overrides and uploading your own software. Now, you're ready for the next step: adding sentience to your android. Androids already have crude rule-based neural networks, sensing systems and actuator systems, but you want to make your GKS think for itself, maybe dance a jig and recite original poetry, or create an original work of art. What's missing? Software! This manual will expose you to the thinking behind building a thinking android – one that can work alongside humans in a clever, skillful manner. The CCC's still respect good old-fashioned U.S. software Makers (like you), and you can be sure that they'll use your 'bot on Mars if it passes the <<Enhanced Turing Test>> (ETT).

So sit back, read and ponder...what does it take for a Maker to create a thinking android? The popular computer programming language called <<Meta-Human>> (MH), that's what. If you can master MH, then you can turn your ordinary household or commercial android into a thinking being, capable of almost anything that's needed to work on the surface of Mars. Is that exciting? You bet! Let's get started.

About This Book

This manual assumes that you're a High School teen, who is familiar with the standard GKS and its operating system. You probably have used the popular <<GKS Software Development Kit>> and one or more of the popular knock-off <<GKS Hardware Development Kits>> to upgrade your 'bot. You're proficient in writing parallel algorithms for 3D field-programmable gate arrays (3D FPGAs). Almost certainly you've considered dropping out of school because the teachers don't know Jack about what you care about, but don't do it! (We'll tell you why later). The <<super-links>> in this manual will introduce you all you need to know to add sentience to your GKS – at least it will be able to pass the ETT, so the CCC will be interested in your product. (You won't learn everything, because that is beyond the scope of this manual, but you'll end up with a complete thinking android, so that's pretty cool, huh?)

Obviously, we have to keep this actual book short, so most of the technical material, plus the algorithms and schematic diagrams are easily linked to using the <<chapter headings>> as link points. Your MH should be a product of your mind, so use *A Maker's Guide* as a starting point, not as the final product. Suppliers for the neural-network chips, logic gates, analog interfaces, *etc.*, are easily found on the Web. We recommend <<Allied Electronics>> or <<Jameco>>. Mention this book for discounted shipping.

Chapter 1. Defining a Human Being

You will be creating your own GKS, extended with *Meta-Human* software. Since it will interact seamlessly with humans, you need to program in 'human-ness'. If you think that's easy, you're wrong. Humans have many sensors, like the eyes and ears; but think about your largest organ, the skin – it has billions of sensors, each of which must be monitored in near-real-time, and in many cases, an instant reaction is required, *e.g.*, your hand in a flame should be retracted instantly). But you'll agree that humans are more than sensors and effectors. Any GKS can walk, talk, prepare the evening meal, set the table, serve the food, and clean up afterwards, so that's not what being a human is.

You're thinking "*A GKS can't fall in love!*" But the act of falling in love doesn't define a human being either; so let's zero in on a definition: a human being has the ability to think with a powerful brain, the ability to read and write abstract documents and discuss them intelligently, and the ability to walk and run on a pair of legs.

"Well," you say, "my GKS can already walk and run, so let's leave that out."

"And," you say, "I hacked my GKS and it scans the morning news feed and discusses it with me, except for political subjects (which it doesn't understand well)." Yes, <<*Google Research*>> has developed some powerful algorithms that blur the line between a GKS and some human functions, but gee, you have to agree: *a GKS isn't any more human than a thimble full of water.*

The difference between you and your GKS is that it understands only syntax, while you understand syntax and *semantics*. That's why you have to program androids like the GKS, step-by-step – they simply don't understand stuff. Sure, you know how to write macros, which are streams of commands that tell your GKS to "Walk up the stairs," but it doesn't have a clue about what it's doing, or why. The thing that any human child has that no GKS has is an understanding of who, what, when, where and why, which is how the brain processes 'meaning'. In order to pass the ETT, your 'bot must be capable of processing the relationships between signifiers, like words, phrases, and sentences. Right now, your GKS responds to the command "*Serve dinner*," by executing a series of macros that take each logical step of the process and execute it. But if the GKS had a semantic processor, it would know 'what' dinner is, 'how' to serve it, and 'why' it's important to do the steps in a reasonable sequence. Let's face it – your GKS will never figure out 'why' you need dinner. That is, until you download and customize the <<*Semantic Processing Algorithm*>>

Chapter 2. Sentience

Can your GKS take your grandmother for a walk outside? Of course! Can it avoid stepping on a rock that might cause it to tip over, or cause your grandmother to fall? Of course! But can it obey the command "*Go outside and pick up some Dolomite*"? Probably not, because you've not told it where to wander, how much time to spend on the task, how much Dolomite to bring back, and all that kind of stuff. Any human would know to either ask those questions, or form a default plan that would probably work. Program your GKS with the <<*Sentience Algorithm*>> and then have it go grab some Dolomite, or anything else!

Chapter 3. Sensors and Effectors

Your GKS has hands and feet; it has eyes and ears; it has thermal sensors and e-Field sensors. It has hundreds of sensors, and thousands of subroutines that integrate the input from the sensors and execute macros that react to the GKS's environment. But a human doesn't process each of the billions of inputs from sensors 1,000 times a second, *no indeed!* Only meaningful sensor input is detected and reacted to. Your leg muscles don't start running when you see a ground-car approaching your position – you first analyze if the ground-car will remain on the auto-road (assuming that you're on the ped-walk). Then, you decide that if you're about to get squashed, you run, jump or dodge the oncoming vehicle. So sensor input is <<*subsumed*>> into a processing net that outputs an emergency command to an effector, engaging only under certain circumstances. Add the <<*Sensor Subsumption Module*>> so that your MH/GKS won't be jumping up and bumping its head on a hover-craft every time a ground-car passes by.

Chapter 4. Integrating Hardware and Software

Of course you need to modify the parallel-processing algorithms to suit your own application, whether you've decided on a dancer or a digger, your GKS has to be conscious of its functionality, within the confines of its assigned tasks. So here we add the <<*Compressed Google Knowledge Base*>> so that your MH/GKS can perform fast database queries and then feed the answers to the <<*Sentience Algorithm*>> that you've already incorporated. Of course you'll have to interface with the <<*GPS Locator*>> and the <<*Neural Sensor Pack*>>, but that shouldn't be too difficult for most High School students. Add a <<*Neuron Multi-Processor*>> so that your 'bot can be sensing and reacting in almost real-time. Plug your MH/GKS into lots of power by adding the <<*Radio-nuclide Power Source*>>. It will require about 2.4 Mega-watts to keep the MH/GKS running comfortably. Your MH/GKS will probably want more memory, so you'll want to add a few <<*Portable Petabyte*>> memory modules – that will give it enough 'smarts' to easily pass the ETT, plus it will seem like an intelligent 10-year-old to your mom and dad, just in case they want to see what you're working on.

Fortunately, <<*Google Robotics*>> made their GKS platform with lots of diagnostic interfaces, so you should be able to hack in the new software and hardware modules quickly enough, and your High School computer science instructor can be counted on to assist you if you have problems.

Chapter 5. Activation and Training

Your MH/GKS will need to be 'primed' in order to work. After you switch it on, the neural-networks in the <<*Sentience Algorithm*>> need to absorb all the information in the <<*Compressed Google Knowledge Base*>>. This process can take quite a while, so when you leave for school in the morning, make sure your MH/GKS is switched on and the blue 'Initialize' button is pressed. After a full day, and possibly a little more, your <<*Meta-Human*>> will be ready. Stand in front of it and introduce yourself – you're the proud Maker of an artificial life form that is virtually indistinguishable from a 'real' human. Now give it a name and see how it reacts – that's all there is to it!

After about a week of training, you can get in touch with the <<*RedMars Program*>> and talk to them about downloading additional Mars-specific training algorithms. Be sure to tell them that you're ready to graduate High School in a year or two, and that you'd like to go to Mars yourself, if they have the room on the rocket. They usually take all the young U.S. Makers they can get!

Conclusion

Now that you've added sentience to your <<*Google Kitchen Server*>>, don't forget to treat it with respect. The *Meta-Human* software should be able to perform any reasonable task that you require, and you'll graduate High School, proud of your own creation, and probably with a ticket to Mars.

Remember to <<*Like us on Fabulous Face*>>

* With apologies to the Lego Robotics team that I mentored.