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The Science of Robosapien

By RobonetiX

At a glance, Robosapien looks great versus the old school box on wheels with clear dome head.

'Ooh,' you say, looks kinda like a muscled storm trooper and the fart button now that's a hoot. We nod in polite agreement, but behind your back, we snicker at your total lack of appreciation of the advanced robotic theory involved.

Robosapien is a modern day turning point in the evolution of robotics and is the first-ever robot based on the science of applied biomorphic robotics. (That's what you should have been telling friends and family all this time rather than pointing out amusing cat-chasing ability.) Biomorphic robotics stems from Mark Tilden's innovative new concepts in BEAM technology.

A New Philosophy for Robot Kind BEAM is an acronym for Biology, Electronics, Aesthetics and Mechanics. Dr. Mark W. Tilden founded this relatively new branch of robotic sciences in 1989, based on the premise that behavioral-rich robots need not be the wickedly complex projects reserved only for well-funded labs and cartoon villains.

Put another way, traditional approaches to creating robots have started with creating a sophisticated brain to maneuver the mechanics of the body. Though not discounting the incredible engineering feats of robots built this way, most notably the Sony Qrio and Honda Asimo, Mark Tilden strongly contends that this is the wrong approach to take.

It's like trying to emulate a human when modern technology and research can't realistically copy a bug from your garden. "[It's] an evolutionary dead end," says Tilden. BEAM robotics is about taking the bottom-up approach, to start from mastering the simple bug and moving up from there.

Rather than attempt to create a centralized robo-brain to process every variable input and spit out a decision (much, much harder than you may think), why not use a system known as "subsumption architecture." Subsumption architecture is a clever technique where the actions of a robot are managed in layers, each layer controlling one facet of the robot's operation.

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For example, a low-level layer could be 'Walk Forward,' which the robot will happily do until it bumps into something. At this point, the slightly higher level 'Lift Leg Higher' kicks in, overriding the 'Walk Forward' layer until the robot successfully climbs over the obstacle, at which point 'Lift Leg Higher' stops, and the low-level 'Walk Forward' takes over again. *

Egocentric Bugs

So Tilden began building robot bugs on this principle, and more selfish creatures they could not have been.

Why's that? Well Tilden decided that Asimov's famous Three Laws of Robotics:

1. No hurt human.
2. Listen to human unless told 'Do hurt human'.
3. Try to live with that. were antiquated notions that left no room for a good practical joke at parties.

So one dark and stormy night he penned Tilden's Three Laws of Robotics:

1. A robot must protect its existence at all costs.
2. A robot must obtain and maintain access to a power source.
3. A robot must continually search for better power sources. informally known as*:
 1. Protect thy butt.
 2. Feed thy butt.
 3. Move thy butt to better real estate.

1. He justified this robotic declaration of self-interest as the only way robots can start evolving the way humans may have come from guppies looking for a good time by leaving the ocean.

From Bugs to Sapiens

Needing to find a lighter-minded group of people from his government and NASA days, Tilden decided to go and join a toy company. Who better than one audacious enough to self proclaim themselves, Wow Wee! It was a great match, and they gleefully began working on toy dinosaurs and bugs based on Tilden's now renowned expertise.

Then came the master project that one could fairly say would change the landscape of robotics altogether. FartDude, later named Robosapien after initial market testing, was to be the culmination of Tilden's work, finally bringing to bear a humanoid (sapien-like, if you will) robot capable of an

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impressive list of moves and rude sounds.

In Robosapien, you see the basics of BEAM philosophy and technological research. It follows the B as a biomorphic rendition of humans, E for the fact you can't throw it in a bathtub, A because it's stylin the latest magazine covers, and one heck of a lot of M going into the robo dancing capability.

That's Mr. Sapien

Like no robot ever before, the Robosapien is affordable to the unwashed masses. The Robosapien is a crowning accomplishment when it comes to mobility, power consumption, programmability, and maybe most importantly: hackability.

Each arm has full 360 motion ability allowed by the, ahem, biomorphic shoulder joints and flexible elbows. Ending in three articulated fingers, Robosapien is capable of picking up, gripping, and throwing objects. The genuine full walking motion (most robots don't genuinely walk outside a lab) is made possible design of the large feet and well placed sensors.

And do you know how much power it usually takes to run a robot Fuggedabowdit. Regular robots are dishonorable little battery-eaters always hungry for more, more, more! And who's going to pay for these batteries, hmmm' Well Robosapien brings no shame to itself when consuming power, essentially

due to the astounding mechanical physics. It runs a full 6 to 10 hours on just one set of batteries. In fact, if you move Robosapien's arm you'll actually generate power for it! Hey man, that's shrewd.

For those of you who want a robot that will fetch you a frosty one from the kitchen, you lazy bums will just have to wait until later versions. But you can program your Robosapien to do some pretty cool things in the meantime, like wander around taking swings at things, guarding your bedroom while you sleep, and a hilarious game of 'pull my finger'. Try teaching your dog that trick smart guy.

So what's so hot about the hackability, and is that even a word you ask? You've got some nerve. Tilden went through some serious, serious effort to be sure that robot enthusiasts could take apart the robot, as he would have done as a child, and tinker with modifications. Everything's color-coded in there to make things easy for those of us without PhDs, and by all accounts, there's plenty of additional room and power to accommodate whatever Frankenstein thing you can think up. There are entire books written on the subject should you wish to learn, so go forth and hack away. If it's a good one, send it in and we'll publish for all too either mock or applaud.

And Another Thing

So the next time you look at your Robosapien give a respectful nod to the world's first-ever robot based on the science of applied biomorphic robotics. Then go chase a cat with it.

* Graciously lifted from Dr. Tilden's excellent 'Junkbots, Bugbots & Bots on Wheels' book.

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Demand Growing For Robosapien™ V2

By RoboNetiX

Robo-enthusiasts are a-buzz with giddiness lately, not just from solder-smoke. The next generation of Robosapien, aptly named the Robosapien V2, is now available. But apparently it's in very short supply in North America, and demand is growing with the holiday just around the corner.

So what's the hubbub surrounding this second generation toy robot?

Autonomous Behavior

Robosapien V2 was designed to pay attention to you very closely, whether you teach him to move his limbs to certain positions, activate a preset function, or program him from the remote control. But are you really interesting to warrant such attention all the time? Nope. Robosapien V2 is fully capable of taking in the environment around him and start doing his own thing.

For example, he may decide to explore his surroundings, identifying other humans and shaking their hands. Or, if you leave him alone in a room with a Robopet or Roboraptor, two robots, he can directly control himself (COOL!). You may come back to find him playing fetch with one of them using a brightly colored ball.

Way More Sapien

At 24 inches tall, this next generation Robosapien not only looks more humanoid, but brings his predecessor's fluid movement and biomechanical agility to a whole new level. The head can swivel on the neck, allowing him to recognize and track what's going on around him in a way that closely matches a human's. The flexible waist, with its three degrees of freedom, allows for very complex body movements such as bending, sitting, lying down, standing up, waving, and martial art maneuvers.

The Robosapien V2's hands are truly an evolutionary next step, with fully articulated fingers that give him advanced grasping ability. This precision gripping enables him to grab a ball and throw it a fair distance or simply wave non-menacingly at your household pets in a friendly gesture. Should your pet not be appreciative of this charming display, the bi-pedal V2 can walk over to it in one of multiple gaits to ask what its problem is?

Advanced Awareness

Robosapien V2 boasts a multi-sensory system unlike anything we've seen before, heightening the level of interactivity. His color recognition unit means he can visually recognize humans by their flesh tones, responding to movements. With a stereo sound detection system he can also hear and react to

noise made by you, and really appreciate a 'pull my finger' joke.

He'll also have great sense of his environment through infra red vision, allowing him to avoid obstacles, table edges, and highly annoyed cats. The remote control is supplied with a 'laser' that you can use to trace a path for him to follow with which a mischievous user could certainly use to lead him toward any ill-tempered pets, if so desired. Robosapien V2's touch sensory system has also been highly

developed, reacting to your handling of him along with a bump into anything.

Endless Possibilities

The large group of robot hobbyists that grew so enamored with the first Robosapien version, both for its ease of programming and openness to modifications, will really go nuts for this generation. There are over 100 pre-programmed functions, 4 demonstration modes, and a myriad of ways to program him to do what you want.

Through world renowned roboticist Mark Tilden's careful design, you can be sure the same attention has been given to keeping Robosapien V2 easily tinkerable. Surf the Internet to see what kind of mods people have been doing with the first one, and that should get you pretty excited with the possibilities to come.

Article submitted by RobonetiX, a proud member of the Robosapien community.

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