Tech In The News
Assignment: SpotMinis

Headphones Needed: ☒ YES ☐ NO

Step One:

Watch This Video
https://www.youtube.com/watch?v=tf7IEVTDjng

Step Two:

Read the article on the next page

Step Three:

Create a Word document, and list the five W's of the story (Who, What, Where, When, Why). Research the price of the SpotMinis. Discuss with your neighbor if companies and consumers would but the robot. Add your comments to your report.

Submit Your Assignment : Spotminis-your name.

To Mr. Amerikaner Using: Gdrive

6 Aug 2018 | 22:22 GMT

Boston Dynamics Is Getting Ready to Produce Lots of SpotMinis

But what are they going to do?

By **Evan Ackerman (/author/ackerman-evan-)**

Photo-illustration: IEEE Spectrum; SpotMini: Boston Dynamics

At CEBIT back in June, Boston Dynamics' CEO Marc Raibert mentioned (http://www.youtube.com/watch?v=iZD6hkRwZKM) in a talk that they're currently building about 100 SpotMinis (https://www.bostondynamics.com/spot-mini), and that they're planning on scaling that up to be able to build something like 1,000 SpotMinis by the end of 2019. This has attracted some attention recently, since it seems like Boston Dynamics is ready to "productify" its robots on a commercial scale, and Raibert even mentioned some areas in which they've had interest from potential customers. "We're trying to take what we already know, and reduce it to practice by making robot products," he said. "Robot products are new for Boston Dynamics ... we've been operating for a long time working on the future, and now we're trying to make practical products."

Making practical robotic products is a very difficult thing to do, as Boston Dynamics knows. And Raibert did a good job contextualizing how big that challenge is. As always, though, this got a little bit lost in the middle of the impressive videos and demos that followed, and there's been a lot of attention focused on one specific application that for some reason seems to capture people's imagination: package delivery.

Sure, a pack of SpotMinis jumping out the back of a truck and carrying boxes to our doorsteps sounds pretty cool. But that's not the only application Boston Dynamics envisions for SpotMini and its other robots, especially when they're talking about unleashing thousands of them on the world. So where are they likely to show up? Let's take a look at some realistic options.

Here's how Raibert framed things in his talk:

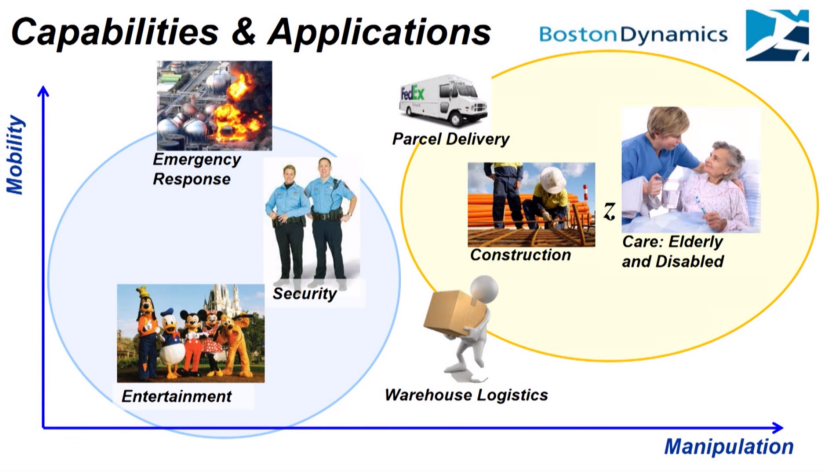


Image: Boston Dynamics

The blue bubble on the left contains products and applications that Boston Dynamics is aiming for now; the yellow bubble on the right includes advanced capabilities that Boston Dynamics is aiming for long term.

Near-Term Products and Applications:

Entertainment: There's a reason entertainment is bottom left of the chart, and that reason is that you don't have to do anything "practical" and you can have a human in the loop. Arguably, SpotMinis are already entertainment robots. This will definitely happen.

Emergency Response: Like entertainment, emergency response robots could have a full-time human in the loop. Versatile mobility is more important, but SpotMini already has that in spades. I could easily see SpotMini being used as part of a team of robots (that could include drones, snake robots, and so on) to perform search and rescue and other tasks. I'm not sure whether SpotMini can handle environments that are hot, wet, or dirty, but that seems solvable to me.

Security: I'm not quite sold on the security idea. I agree that security is a job that robots should be doing (/automaton/robotics/industrial-robots/cobalt-robotics-introduces-mobile-security-robot), and that it makes sense commercially for them to do it, but I'm not sure that SpotMini is the best robot for the job. It certainly doesn't make sense (relative to other platforms) indoors, where its dynamic mobility would be underutilized. Same goes for outdoors, unless it's providing security in a complex environment, like through woods or in some sort of factory where there are pipes and stairs all over the place. But then you have to get serious about long-term autonomous mobility, and while SpotMini does have some autonomy, this would require a lot more work.

Slightly Less Near Term

Warehouse Logistics: This one I don't get. What makes Boston Dynamics unique is the incredible balance, agility, and mobility of its robots. Whether we're talking about SpotMini or Atlas, Boston Dynamics does movement better than anyone. So why would you take all of that capability and stick it into a warehouse that's either a semi-structured or structured environment, with flat floors? Just use wheels. Four of them. It's cheap, efficient, reliable, and much easier to implement. I guess maybe Handle (which is a wheel-leg robot) (/automaton/robotics/humanoids/boston-dynamics-handle-robot) could work in a warehouse, but it still seems like overkill.

Parcel Delivery: For generalized package delivery, humans are very cheap and efficient, which is bad for robots. The reason that wheeled sidewalk robots have found a niche is because they're usually delivering food, which means two things: First, they spend a significant amount of time not doing anything since food orders are somewhat intermittent and unpredictable, and it's cheaper for a robot to not do anything than a human. And second, they can reliably expect that the hungry person they're delivering too will be waiting for them, and probably willing to come meet them at the sidewalk.

SpotMini certainly has the capability of doing the kind of last mile delivery that goes all the way to your doorstep, even if your doorstep is up a flight of stairs or two. The current generation of delivery robots are constrained to sidewalks, so there's a valuable opportunity there. Agility Robotics is pursuing this doorstep delivery idea as well, with Cassie. (/automaton/robotics/industrial-robots/agility-robotics-introduces-cassie-a-dynamic-and-talented-robot-delivery-ostrich) I fully expect that walking robots will be making deliveries at some point, but it's going to take an enormous amount of work to go from sidewalks to doorsteps, in both perception and motion planning, considering just how unconstrained those last few tens of feet are. Raibert says that right now, their robots can manage to get to about 80 percent of the doors that they try to reach. This sounds pretty good, but as anyone working on an autonomous car will tell you, things get exponentially harder as you try to close that gap.

Not Near Term

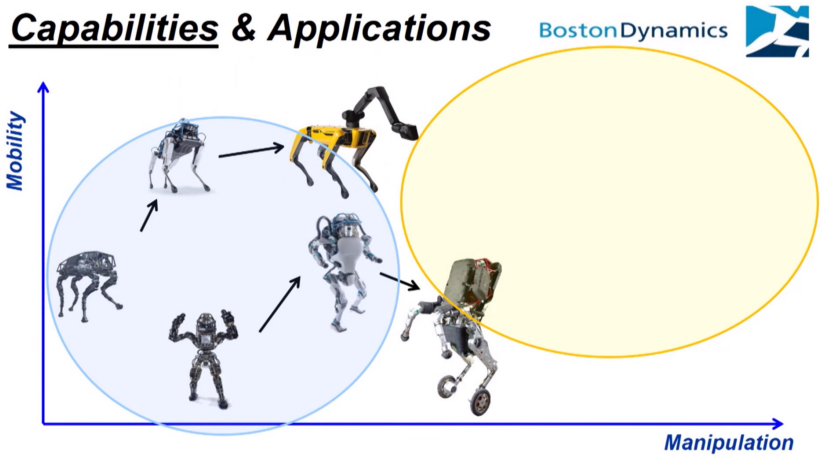
Construction: Hmm. I can understand the thinking here, that construction sites are dangerous environments with lots of complicated things on the ground that are shifting around all the time where a robot with exceptional mobility would be required to get around. What would it do, though? I suppose it could bring heavy(ish) things from one place to another so that humans didn't have to, but is that valuable enough to justify the amount of development required for such a behavior to be autonomous? I'm not yet convinced.

Caregiving: Helping to take care of the elderly and people with disabilities is going to be (in the long term) one of the most critical roles that robots play in our lives. I think this is more aspirational for Boston Dynamics than anything else; the kind of autonomous mobile manipulation skills that would be required for in-home care are highly complex and could easily take a decade (or more) to develop in any reliable, practical, cost efficient way. This isn't just true for Boston Dynamics, is also true for every robotics company working on the problem. It's very, very hard.

I'm sure that Boston Dynamics has carefully thought through everything that I brought up above, and they have a much better idea than I do what the capabilities of their robots are, and what industry wants from them. My goal here is simply to attempt to properly contextualize where things are right now (especially because most people just watch the videos), and what's going to be tricky going forward. Fortunately, Raibert helpfully shows this slide in his talk as well:

Image: Boston Dynamics

Compare with the previous slide above to see where Boston Dynamics' robots are in terms of practical use cases.



This is maybe the most important slide in the entire talk, because it gives what I think is a quite accurate representation of where Boston Dynamics' robots are right now in the context of practical applications. For now, none of those robots quite make it into that "slightly less near term" bubble that include warehouse logistics, parcel delivery, construction, and caregiving. I'm sure that the robots are getting better every single day, but they have a long way to go, and Boston Dynamics isn't trying to pretend otherwise. It'll be interesting to see whether the second bubble gets filled with new robots, or whether those existing robots just gradually slide over to the right.

The last thing to talk about here is the idea of SpotMini as a **platform**:

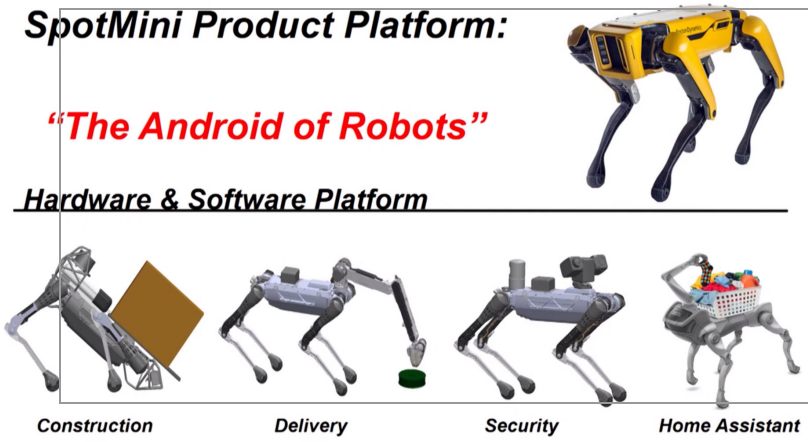


Image: Boston Dynamics

Here's what Raibert said in his talk:

> *"It's up to all of you to think of the application where you could get a basic SpotMini, and either work with us or with others to build hardware and software that runs on it that solves your application."*

The big question here is whether SpotMini *as a platform* has all the basic capabilities other roboticists will need to build upon it, as it happened with Android (and iOS). Yes, the robot is strong and nimble and can move really well in different environments, but there are many other things a robot platform needs. Will it do mapping and navigation, object recognition, motion planning, and so forth, so that roboticists trying to develop new applications don't have to build those things?

I'm also wondering whether Boston Dynamics should really be presenting SpotMini as a "product platform" at this point, as opposed to a "research platform." It's a path that many robotics companies have taken, from Willow Garage to Fetch Robotics to Agility Robotics: Make a great robot, let other roboticists see what they can do with it both in and out of the lab, and then start thinking about commercial potential.

The upshot is building robots is hard. Building useful robots is harder. And hardest of all is building robots that are both useful and practical. I'm sure Boston Dynamics knows this as well as anyone. This is going to be a difficult transition for them, as it is for any robotics company, but Boston Dynamics has the added burden of trying to live up to the expectations that they've been setting for years with their YouTube videos. People see those videos and expect robots to be ready to go out in the world and do things for us. Now all Boston Dynamics has to do is spend the next few years delivering on that.

[SpotMini (https://www.bostondynamics.com/spot-mini)]

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IEEE Spectrum's award-winning robotics blog, featuring news, articles, and videos on robots, humanoids, automation, artificial intelligence, and more.

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