CAREER READINESS

Boston Dynamics

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Our Selected STEM Career and why we chose it

Leading robotics business, Boston Dynamics, is renowned for creating cutting-edge robots with unique designs. To ensure that its robots are well-structured devices, the company producing these robots must have an appropriate design process in place. This is similar to the design process we employ at VEX, as well as the design process used by other engineers in different industries. The use of the design process in the real world can help us learn how to connect the design process used in companies like Boston Dynamics, with the design process we use. This can lead us to improve the approach we take to build our robots. Plus, who wouldn't want to research a cool company like this? We might build robots for games in VEX, but to see the useful applications of these robots, led us to specifically choose Boston Dynamics.

Boston Dynamics

How these professionals apply the design process

Engineers in Boston Dynamics use the design process to solve problems, create something new, and improve their ideas. The design process is a fundamental part of their job as it is used to solve problems and create solutions. This process includes brainstorming, prototyping, testing, and refining. One of the most important steps in this process is brainstorming. Designers need to come up with ideas for their product before they start working on it and then test them out with their team members or clients. Once they're satisfied with their idea, they can start coming up with prototypes of that idea and testing it out with people who are experts in the field and people who aren't experts at all so that they can get feedback from both sides. Afterwards, designers will refine the prototype based on feedback from those trials and make changes accordingly until they are satisfied with the prototype. The design process is a systematic way of solving problems and creating products. Designers use their creativity, knowledge of the field they are working in, and the design process to create and innovate.

How the professionals approach of the design process matches/differs from ours (1)

Our design process is identical to this, as we put in the same amount of effort, and followed the same steps that the Boston Dynamics used in the making of their bot the *Atlas*. We used a design cycle which contained 6 steps in total, the first step being identifying the problem at hand. We would find a problem that is needing to be solved, just as Boston Dynamics would by working closely with customers and partners to get feedback to fix a problem that they might have found to make an efficient and reliable robot.

After, we'd begin the second step of Researching and Brainstorming. Boston Dynamics put forth a lot of time and effort into Researching the best options that would suit their bot the best. They work together to sketch out potential solutions and prototypes. We used the same method, by researching all of the varieties of options and gathering all these ideas in our notebook, so we could begin the third step in our design cycle, analyze the best plan of attack.

The fourth step is to build and program the solution. As we have found the best solution to our problem in step one, we would start to construct and program the bot using all the research we had done to guide and instruct us. Boston Dynamics says, "Atlas uses depth sensors to generate point clouds of the environment and detect its surroundings." We can connect to this as we also use sensors in VEX for many things, which include getting more accurate data for the robot to process and to eliminate the highest percentage of error when writing autonomous code.

Testing the solution is the fifth step in the design process. Just as Boston Dynamics had done, they tested their robots after programming and building their bot to identify any flaws that may exist, ensuring that the design meets the necessary specifications and requirements when running these simulations.

How the professionals approach of the design process matches/differs from ours (2)

Once the robot is constructed and programmed accordingly, we would test the bot to examine for anything that may be nonfunctional in the design that needs to be improved or fixed as well. After we'd completed the fifth step of the design process, we would continue on to the 6th: improving and repeating the design cycle. This is also one of the biggest parts of the Boston Dynamics' design process. No matter what, there is always something you can do to improve the bot. It could be either changing the program or fixing/rebuilding the design of the robot. Boston Dynamics had done the same thing: rebuilding and improving their last design even to this day, since there is always going to be a way to make a better design from the last.

As agreed upon by our team and Boston Dynamics, probably the most important step in the design process is research. Research is the first and most crucial step as with good research and information, you can make a good build and program.

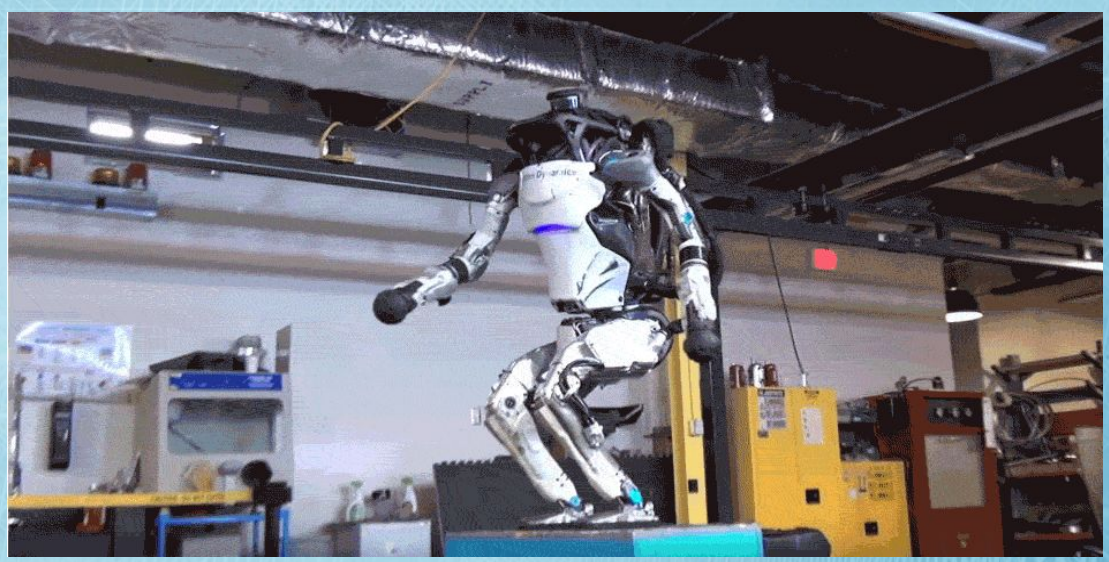
Boston Dynamics says that, "One of the things that makes Boston Dynamics unique is the ambition to build dynamically stable, legged machines. Marc Raibert began tackling this problem before anyone else in the world. And we've been at it since, almost 35 years. We've been inspired by and worked towards this goal for so long that we have invented techniques to make robots work that you can't find in any textbook or technical article. The result is that we now know how to build walking machines of any size, shape, actuator style or powerplant."

This proves that this company has been researching for the past 35 years, which connects back to the point made earlier on just how important the research step is. We both put a lot of work in our research, which includes gathering information into our notebook, in order to CAD a great design of a bot with the best options and ideas. Not just this, but many of our other steps that we took into action matched the process that Boston Dynamics had also used.

How VEX Robotics has prepared us for a future career

VEX Robotics is a stepping stone for a future in various fields. VEX Robotics has prepared us for the future in several ways. Many may think that VEX has just prepared us for opportunities in the field of computer science, but this has also increased our knowledge in problem solving. VEX Robotics has encouraged us to use our minds and utilize critical thinking to obtain solutions. The same holds true for the brilliant engineers at Boston Dynamics. They have to use the same skills we use in terms of problem solving and using critical thinking, just on a more widespread path.

VEX ROBOTICS COMPETITION



Works Cited

Boston Dynamics Video:

https://www.youtube.com/watch?v=eNAjWDhYR0U

Our Design Process:

https://docs.google.com/document/d/160WOZLT9Cx4soou3oQwea901XOlPPQAyxv3eXqbhCa0/edit

Boston Dynamics Website:

https://www.bostondynamics.com

Boston Dynamics Newsletter:

https://newatlas.com/boston-dynamics-new-atlas/42007/