

Building Brains for Manually-Driven Machines

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Abstract

Brain Corporation builds brains for robots. BrainOS Navigation is a commercial grade navigation solution, with built-in safety, that empowers autonomy to existing machines. The system has been designed to work in many indoor environments such as warehouses, grocery stores, big box retailers, airports or universities. It has a modular architecture adaptable to a majority of wheeled platforms. It can be used to automate existing human operated machines. This approach helps by leveraging the product expertise and market positions of the top OEMs in each industry.

We chose a paradigm of learning by demonstration to adapt the robots behavior to new environments. With our technology, there is virtually no environment setup required during the deployment of a new machine. Our mapping technology allows the robot to build large maps of the environment after a single non-expert demonstration. Robust 3d perception with multiple types of sensors detect obstacles for safe and efficient navigation. Our motion planning algorithms are able to control heavy non-convex tricycle drive robots in tight spaces with 1 inch clearance. We developed a cloud infrastructure that ties all the pieces together and provides many services that are fundamental for a scalable operation. This gives us a constantly growing database of edge cases in order to keep improving the system and researching the state-of-the-art self-driving methods.

Bio

Dr. Oleg Sinyavskiy graduated from the robotics department of Moscow Power Engineering Institute with a PhD in Computational Neuroscience. His research and effort aim at bridging the technology gap from neural science research to commercialized robotic products. Oleg joined Brain Corporation in 2011, an R&D and product company with a focus in robotics and artificial intelligence and is leading research of a next generation mobile robotic navigation system.

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