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Funk Engineering Partners With Cleveland State University

Northeast Ohio firm to design new technology for exercise machine

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Funk Engineering, a full-service engineering consulting firm, has announced that it is partnering with Cleveland State University to be the hardware developer in adding motor control and sensing to the Nautilus F2FT exercise machine.

Funk Engineering previously worked with members of the Cleveland State University team on a contract with the Cleveland Clinic to help design and build a smart prosthetic knee for amputees.

"We're pretty excited," says Justin Funk, president of Funk Engineering. "It's somebody we've worked with before that is calling us back. It certainly feels good from that perspective, but it's also branching out. Cleveland State is a new customer for us."

As a service provider for this project, the Funk Engineering team will reconfigure the design of the commercial F2FT exercise machine to essentially make it more customizable for the user. Funk Engineering will build and test programmable motors to replace the machines arms and incorporate sensors into the commercial F2FT exercise machine.

The F2FT, or 'Freedom Trainer,' has two arms that allow an individual to experience a resistance workout through a weight stack in the back of the machine.

"In its original configuration, which we are going to change, you basically pull on these handles and they are connected to a weight stack," says Funk. "You can swing these arms through just about any motion in a 2D plane and as you stroke them down, you lift the weight up and you get a workout."

By replacing the arms with four motor assemblies, the machine has the potential to become a whole new experience for a workout. The arms already allow for a wide range of motion, and with the added motors and sensors, the machine will become customizable from a force profile perspective.

The added sensors will enable users to set tensions to increase difficulty and track their progress over time.

"You could set it to various points like you could with weights, but you could also customize it," says Funk. "Say you want to have to pull really hard at the beginning of your stroke but then taper off as you finish across your body. Maybe you want it to start off really easy and then get harder as you pull it closer to your body, kind of like an exercise band would work."

With all of the different options for programming the motors, the F2FT will make it easier to get a smarter workout, and the sensors in the handles will only boost this capability.

The sensors will be able to identify almost all of the activity going on when the machine is being used. Users will be able to see how much weight is being lifted, how much force is being put into the weight being lifted, and displacement to show the distance and path they took during motion. Sensors will also be put in other places throughout the machine to read specs like arm angles and how the body is moving.

With this information at a user's disposal, the applications for the machine suddenly expand beyond just a good workout.

"The whole idea is making a very smart device. It's more than just lifting a weight stack now," says Funk.

The expanded abilities of a smart machine allow people to use the machine to boost recovery and hone in on aspects of how their bodies are specifically performing. The information provided can help show where improvements can be made by pinpointing weak areas, or showing how the user has improved over time.

The hardware that Funk Engineering is creating will make the machine more beneficial for injury rehabilitation and physical training in the future. Funk Engineering plans to work with Cleveland State to have a functional prototype available by November of 2017.

About Funk Engineering

Funk Engineering is a full-service engineering consulting firm headquartered in Cleveland, Ohio. Funk Engineering specializes in the cradle-to-grave development and design of products and the corresponding testing required by those projects. You can visit Funk Engineering's website at funkengineering.com

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