

Abstract

As long time fitness enthusiasts, the CIWRFC team discovered that nearly all the machines used for resistance training are based around physical weights and machines. It was there they came up with idea of the Computer Integrated Weight Resistance with Feedback Control machine. Our main goal was to design a weight resistance system that allows the user to safely and effectively exercise without the need for physical weights and bulky machines. The CIWRFC system will allow the user to exert a force upon the resistance module and have the user see the exact force that is being exerted upon it. As there are not moving parts or heavy weights, the user need not worry about straining himself by resisting against a weight that he can't handle or accidentally hurting himself. Unlike conventional weight resistance training systems, the CIWRFC utilizes a solenoid that performs the same role as heavy weights in regular weight machines and a force gauge that measures the amount of force being put upon it. Our other goals were to design a software component that works along with the hardware (the solenoid, Arduino-micro controller, force gauge) to measure the forces and provide a live graph for the user on the GUI. The software component will also feature a website and a database which will allow the user to login to check his past workouts data. So far, the group has been able to accomplish nearly all of our goals, we have a working resistance system and the software component that will simulate the amount of pounds that the user is exerting against. We have also been able to finish configuring the website as well as the database and have

Computer Integrated Weight Resistance with Feedback Control Group

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had the file transfer working properly. If our group would attempt this again, we would use our experience from this project to better plan out our approach and better outline the project. We would also choose a different programming language that would allow for better communication with the database and also since our system is scalable, we would like to choose bigger components to build a large scale model of our experiment. The last upgrade of our system would expand upon our web platform and offer suggestions to the user regarding their posture or provide better exercise methods.