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**A Novel Approach for Real-time Workout Helper System  
(RealGym) using Graph Convolution Neural Networks**

A dissertation by

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## ABSTRACT

There are thousands of video tutorials and mobile applications that are created for physical workouts available on the internet today. Even people who go to the gym on regular basis find it very difficult to follow these applications and tutorials to complete their workout routines. Continuously doing these exercises incorrectly may cause severe injuries in the long run. Since 2019 limited studies introduced a smart workout approach. These are in the very basic stage. All these have been approached with the help of traditional convolutional neural network (CNN) models. Images and videos have a graph-like structure rather than a grid-like structure. CNN transforms these image frames to a grid-like structure to extract useful information using computer vision (CV). The downside of this is, CNN the image is considered as a regular grid. But in reality, it has irregularity to a considerable extent. When analyzing a workout there are lots of important factors to be considered which as well the available lack. In this proposal, we are proposing a novel way of building a real-time workout helping system using graph convolutional neural networks (GCNN) which addresses the specific problems in analyzing a workout.

**Key Words** – Computer Vision, Graph Convolutional Neural Network, Human Pose Estimation, Machine Learning