Wearable Computing for Physical Rehabilitation
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According to the United States Bone and Joint Initiative, the second most prevalent cause in which patients seek care in primary care clinics is due to musculoskeletal disorders (MSD); which accounts for 18% of all clinical visits. The majority of these patients require rehabilitation services as part of their treatment plan. Usually, the patients have to practice the exercises assigned to them on their own time with no professional supervision. The problem is that when the patients perform these exercises, they have no way of identifying potential mistakes that might hinder their overall health progress. Additionally, the physician or the professional is not able to track the patient is performance of the exercises. The challenge that the proposed research is trying to address is ensuring that the patients who leave rehab are able to perform the exercises correctly without having to be monitored directly by a professional. This is very important because it impacts a lot of people who have different types of MSD disorders such as osteoporosis, arthritis, spine related disorders, injuries, etc.

The proposed research works on incorporating wearable computers in order to develop a system that can measure the range of motion. The main goal is not only trying to measure the range of motion, but aim for a feasible and cost effective system for the patients and professionals. The intended system should be able to measure the range of motion using angle measurements, identify if the range of motion fits the criteria of the exercise given by the professional, and give immediate feedback to the patient.

In this research, information was gathered regarding the standard motion ranges, types of movements correlated with joints, and the importance of understanding the anatomy of the human body for the objective of this research. From literature reviews and interviews with professionals, information regarding the protocol for evaluating a patient and different tests that can be performed for validity and reliability purposes was obtained.

In future research, the team will specify different exercises in which data could be gathered for. Moving forward, data will be collected for the different exercises selected, and the team will classify the data obtained to be analyzed. Next, the data will be categorized in a useful way to identifying the range of motion for varying exercises. If the measurement for the range of motion is identified in a useful form for the professional staff, then it will help ensure a swift recovery for the patient.