**1. Problem Statement**

**1.1 Historical Introduction**

The game of golf can be traced back to the middle ages. It began with simple wooden clubs and leather balls in Scotland, and spread internationally through Great Britain’s colonial conquests. The game was traditionally played by royals, but was further popularized by the railroad industry in the 1800’s to allow tourists to participate in the countryside where golf courses were located. The industrial revolution further propelled the game, allowing iron molding of clubs and mass production of equipment.

Throughout the 1900’s, golf became a household sport and created several superstars wielding increasingly advanced equipment. Not only has the sport been around for almost one thousand years, but it is obvious that players will use engineering to gain an advantage in their performance.

Modern data analytics and smartphone technology has revolutionized golf. Today’s golfers can receive personalized on-course training through smartphone apps. Bluetooth sensors measure acceleration and position data during a swing, relaying the position data of a swing wirelessly to the app. The golf glove aims to increase the accuracy of recorded swing data by including additional sensors to measure hand movement, providing an even higher resolution dataset to provide feedback on.

**1.2 Market and Competitive Product Analysis**

The golf glove is marketed towards tech-savvy golfers that may not always have enough money to afford a coach and is designed to be a cost effective alternative to gathering information on one’s golf technique. On average, golfers spend $2,776 annually on golfing related expenses [2]. The golf glove is specifically marketed at enthusiasts that want to improve their swing. Comparatively, driving ranges such as Top Golf service millions of new members every year and have become of the largest driving range chains in the country. With an average customer spending rate of $35/visit the golf glove could be integrated with a system such as Top Golf’s to give visitors “on-the-fly” tips and techniques on their swing [3]. Patrons could rent the glove for a small fee and use it during their visit.

There exists on the market several other systems that can track a player’s hand and club movement, but none that track wrist movement and grip pressure. The Garmin TruSwing and Skypro both cost $150, clip onto a golfer’s club and track club movement through the use of accelerometers and gyroscopes. Other systems involve screwing in sensors to the top of a golfer’s club, and cost around 16$ per sensor [4]. The golf glove is designed to offer a wider variety of data at or below the price point of these inferior systems on the market. Rather than tracking a golfer’s swing solely on gyroscope and accelerometer data, the golf glove integrates flexible sensors that can track wrist inflection, rotation, and grip pressure. This sensor array will offer a much higher resolution of a golfer’s swing and technique.

**1.3 Concise Problem Statement**

The golf glove is designed to provide an affordable and lasting alternative to a coach. This product stands out from other products as it provides a system for measuring wrist flexion and extension, a combination of sensors that do not require recalibration by the user, and a physical package that is reusable and can last throughout many training sessions. Golf glove is a wireless system that can be paired to any smart device using a downloaded application. The system utilizes an accelerometer, a gyroscope, a pressure sensor, and resistive stretch fabric to gather real-time information of a player’s swing.

**1.4 Implications of Success**

The golf glove provides golfers with a training tool to track and analyze their swing at an affordable price. Following, the golf glove unlocks the benefits of data-driven training for a significant population. The data captured and analyzed by the device provides feedback to the user, helping them to understand the flaws in their swing. Correcting these flaws will improve the user’s golf swing and bring consistency to their overall golf game.

Additionally, the golf glove has applications in the professional market where it can assist swing coaches in their craft. Specifically, the golf glove makes benchmarking and tracking player improvement a breeze by attaching raw data to a swing. The precision of the device will also help swing coaches locate small inconsistencies in a player’s swing that otherwise might be overlooked.

The functionality that the golf glove provides has the ability to revolutionize golf swing training. If a golfer is able to consistently strike the ball with proper mechanics, they will also be able to consistently record respectable, and thus enjoyable, rounds of golf. More enjoyable golf rounds results in both more golf being played and a greater chance that the player introduces the sport or our product to a non golfer. As a result, the sport and market will grow.

**References**

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