

Intelligent Clipper and Manikin System

Elizabeth Ortgiesen¹, Austin Rose¹, Tyler Tichler²

Advisor: Abul Azad Ph. D.¹

Client: David Todd and Matt Bowers of Wahl Clipper Corporation

¹Electrical Engineering and ²Mechanical Engineering



NORTHERN ILLINOIS UNIVERSITY

College of Engineering and
Engineering Technology

Abstract

The project proposed by Wahl Clipper entailed creating an educational tool that will assist an untrained user in performing a haircut. The system needed to utilize one of their most popular clippers, the Cordless Magic Clip, and a manikin head. Through the use of various electronics housed in the clipper and manikin, the system will provide the user with visual feedback based on their performance.



Figure 1: Photorealistic representation of completed project

Introduction

Objectives:

1. Create system to detect clipper position
2. Using clipper guard combs and the taper lever, instruct user to perform specifically indicated hair cut
 - Communicate between systems within the clipper and the manikin head using Bluetooth technology



Figure 2: Modified Wahl Clipper Cordless Magic Clip

Methods and Materials

Clipper Position: Using an array of Hall Effect proximity sensors and a fixed magnet on the hair clipper, the position of the clipper can be detected.



Figures 3 & 4: The Hall Effect Proximity Sensing Arrays

User Instruction: The RFID-equipped guard combs, combined with an LED collar, will tell the system the desired hair length. LEDs within the manikin head light up to visualize the zone that comb is used in. A switch built into the taper lever refines this zone. If the user starts to stray from the desired zone, the LEDs will flash, indicating an error.

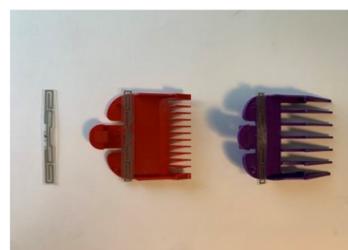


Figure 5: Comb guards with RFID tags



Figure 6: Manikin scalp with light-up zone

Communication and Housing: A Bluetooth compatible Arduino Nano 33 IoT is housed within the Cordless Magic Clip. Its counterpart is mounted within a reusable manikin head, along with an Arduino Uno, an RFID reader, the Hall Effect arrays, LED array, and LED collar.

Discussion/Results

Due to extenuating circumstances related to the COVID-19 pandemic, the team was not able to completely integrate the individual parts of this project. The RFID technology, Hall Effect proximity sensing arrays, and Bluetooth technology have all been tested individually and have been shown to work.

Conclusions

The system that was designed should be able to walk an untrained user through the process of performing a Bald Fade haircut. Due to extenuating circumstances, the physical integration of the individual parts could not be completed. The result was a system where each part was shown to work individually, which implies that the design would theoretically be able to function when fully integrated.

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