AutoTKT: A Novel Method for Intuitive and Accessible Hemorrhage Control in Extremities

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Uncontrolled bleeding is a leading cause of preventable death in both civilian and combat trauma cases. My project, Smart Tourniquets, explores the development of an automatic tourniquet designed to reduce blood loss with minimal user training. I hypothesized that while my automatic tourniquet would be less effective than the CAT 7 manual tourniquet, it would still provide significant blood loss prevention. To test this, I designed a motorized tourniquet utilizing a high-torque servo motor and a zip-tie-based ratcheting system, powered by an ESP32 microcontroller. Using a pressure gauge on an artificial limb, I found that my device performed 29.70% worse than the CAT 7 but still increased pressure by 70%, supporting my hypothesis. While not as effective as manual tourniquets, my design offers a simple, low-cost alternative for emergency situations. In the future, I plan on adding a higher torque motor as well as changing my design to faciliate cheaper mass-production of my tourniquet.

Awards Won: