**Leveraging Machine Learning in Central Venous Catheterization Training**

Training for Central Venous Catheterization (CVC), a common procedure typically involves the use of a manikin and expert oversight. However, coordinating training sessions with medical experts can be challenging and costly. Automating training feedback for surgical tool tracking in CVC not only addresses these challenges, but also provides feedback on both precision and accuracy.

The primary component of the experiment is computer vision, which uses a machine learning (ML) algorithm to predict the location of surgical tools and hand movements using the mediapipe algorithm. This information can be interpreted to determine the sequence in which the tools are being used.

The system successfully tracked tool usage to accuracy of 96% or higher for 3 out of 5 tools. The other 2 tools had low accuracies of 54% and 45% respectively, however, both tools have alternate sensors to track their usage which mitigates for these inaccuracies. The use of a multi-sensor system to increase the accuracy of the ML has yet to be analyzed; however, has the potential to make a more robust system.