SmartNet, Kicking into the Future

Joseph Durocher, Noah Litzinger, Aidan Lynn, Noah Skinner,
Michael Sposato
Advisor: Alireza Ebadi

Overview

- In the NFL, field goals count for 17% of all total points scored. In this 18-billion-dollar business, a field goal can win or lose a game.
- The NFL currently uses technology such as TrackMan to track the trajectory of a football. TrackMan and others like it use sonar technology to map the path of a ball in flight, yet it cannot predict the path of a ball.
- Our team's project aimed to develop a "smart" kicking net by using MATLAB and physics, capable of relaying a message back to the kicker and informing them of how far away their kick would be good from.

Modified Footballs

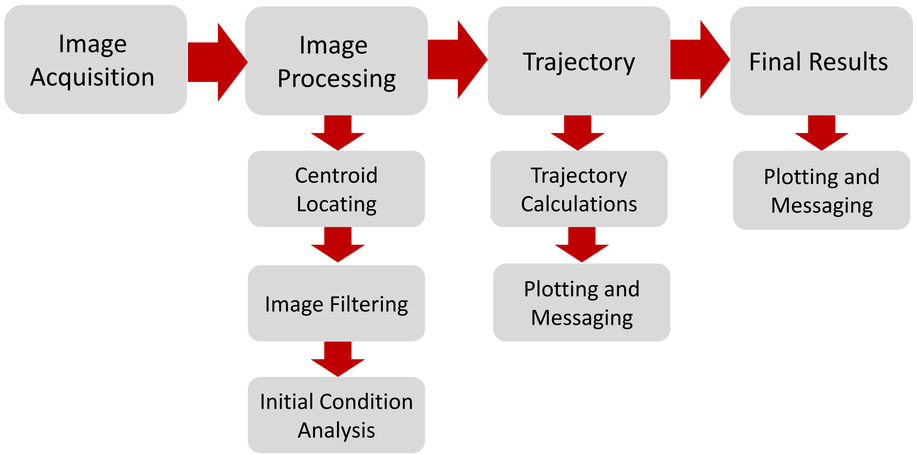
Yellow tape was added to improve image processing

Objectives

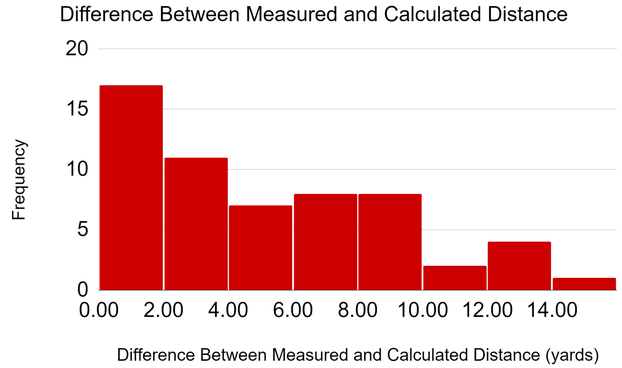
1. Formulate an equation that calculates the trajectory of an American football.
2. Use MATLAB image processing features to find the initial angle, velocity, and spin rate of the video recording of a kick.
3. Combine recorded angle, velocity, and spin rate with trajectory calculations to create the final trajectory plot.
4. Relay a message back to the kicker stating how good the kick would be good from.

Experimental Set Up

Methods



Results



30%	Within 0-2 yards of the measured distance
50%	Within 0-4 yards of the measured distance
60%	Within 0-6 yards of the measured distance

Future Work

- Add an additional camera behind the kicker and a wind sensor to increase the accuracy of image processing and trajectory results.
- Conduct further field tests to increase the sample size for data collection.
- Obtain a high-speed camera capable of tracking a fast-moving object with no motion blur, rather than using MATLAB color thresholds.
- Automate image and data collection to minimize processing time.