# Real-Time Ball Tracking and Trajectory Prediction for Catching Robot


Student

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Introduction: This thesis presents the design and implementation of a computer vision demonstrator for real-time trajectory prediction and catching of hand-thrown table tennis balls.

Approach: A vision system consisting of three RGB cameras and an embedded computer is used to estimate the balls 3D position. The use of a robust color based threshold algorithm enables the precise detection of the ball on the captured images.

Using a gated Kalman filter and an aerodynamic physical model the balls impact position gets predicted. A two-axis robot capable of rapidly moving a cup has been built to catch the ball.

Conclusion: With the vision system operating at a frame rate of over 50 frames per second, the ball can be successfully tracked and caught in 9 of 10 cases.

**Render showing the CAD model of the demonstrator.**
Own presentment

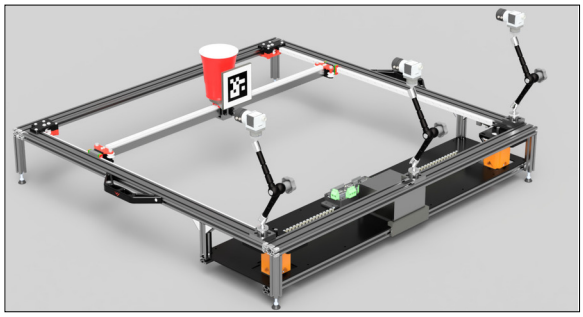
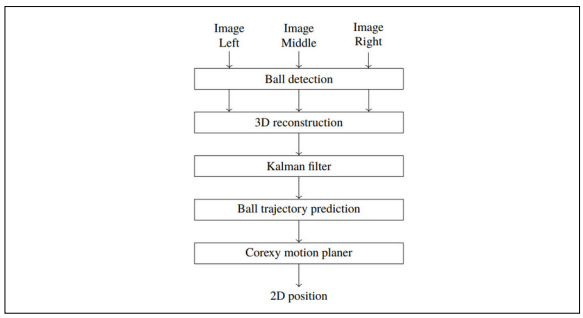
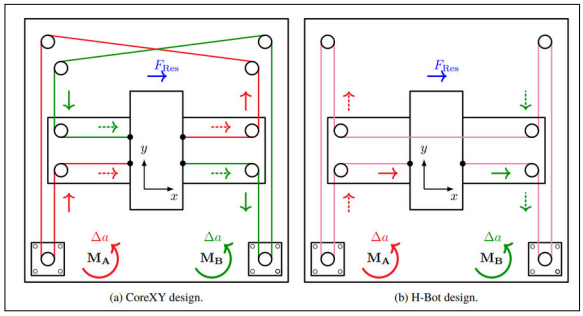


**Diagram illustrating the process pipeline.**
Own presentment




**Visualization of the working principle of the CoreXY and the H-Bot design.**
Own presentment





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Subject Area
**Data Science**