

Project Documentation

The described system is an autopilot for the pinball machine "Mary Shelley's Frankenstein".

A Raspberry Pi with attached camera is mounted above the pinball machine and the computer is connected to the triggers of the pinball machine to allow for their actuation.

The different parts of the system interact in the following way. From the live camera footage a ball position is extracted in a series of image processing steps (see [Image Processing/Ball Detection](#)).

This pixel position is then transformed into a [World Coordinate System](#) for further processing and passed to the [SCChart Controller](#), which is the main logic component of the system.

To allow for timely reactions the [SCChart Controller](#) calls the [Ball Physics](#), which performs a ball trajectory prediction.

For a quick overview on how to build and run the system see [Dependencies and Compilation](#).

Overview

- [Components](#)
- [Image Processing/Ball Detection](#)
- [World Coordinate System](#)
- [Ball Physics](#)
- [SCChart Controller](#)
- [Dependencies and Compilation](#)
- [Links for Future Upgrades on Pinball Machine](#)

Gameplay Footage

https://mega.nz/#!EF4TIZgB!3PzVmVmV3gVvEKSXyu5i_ZB1tX02m4dEali26us9kVk

Hardware

- Sega Pinballmachine: Mary Shelley's Frankenstein
- Raspberry Pi 3 B+
 - 4 CPU-Core
 - 1 GB RAM
 - 26 GPIO-Pins
- Pi NoIR Camera V2
 - Sony IMX219 sensor
 - 3280 x 2464 resolution
 - Up to 90 frames per second (at 640x480)
- Relais box
 - Four 5V-relays (three in use)
 - To actuate the three flippers