Thomas the Pinball Engine

A small device that houses a camera to watch live play on a pinball machine, then actuate solenoids to hit flippers and play the game. Screenshots and statistics can be published to web. Proof-of-concept demos will illustrate alternate play options, e.g. “no vision” ball detection and interactive play.

Target markets:

* **Home players** who own tables. Comfortable with electronics tinkering, and enjoy it. Looking for excuses to show off their game rooms and have done enough table maintenance to be okay modifying their buttons.
* **Sensor shops** wanting to show off electronics with flashy lobby pieces. E.g. an ultrasonic sensor business who want something interesting for their waiting room. “Oh, Cindy tossed a couple of our US5307 sensors to track the ball’s position and play. Let me take you back and show you what she’s working on now.” True “Tommy” implementation would require no “lights and flashes,” and no “buzzers and bells.” Would require collaboration with subject matter experts on sensors of interest.
* **Art installation**, e.g. Meow Wolf. They have talent on-hand to manage integration, possibly facing minor hurdles. UL certification and such should be simplified by connecting only low-voltage flipper actuators inside the table, and it could be interactive by allowing manual flipper control and a laser pointer to act as a target for the flippers.

Components for demo:

* Thomas: A packaged ESP32CAM (or similar) to watch the game using its camera and control the flippers.
* Flipper plungers: Push-pull solenoids controlled by Thomas to hit flippers.

Components for proof-of-concepts:

* Alternate sensor control – Plinko with piezos. Color display on ESP32 chip will triangulate position of falling Plinko puck on pegboard, display peg locations, and forecast result. Also a chance to talk about other sensors, e.g. vibration and sound.
* Triangulation based on sound cues – Nearly a side-bar, but useful for city stuff, and a chance for briefly talking about open libraries that do that. Machine control based on triangulated events, and “was that breaking glass” identification using open ibraries. A chance to bring up the split-second timing required for live play, as opposed to 1-2 second delay after real-time for some environments.
* Alternate flipper design. More intrusive wiring to parallel button pushes eliminate the solenoid stuff. Faster, cleaner, lower power, and can be disabled when Thomas isn’t close by. Requires intimate access to a table.
* Interactive play, e.g. trying to hit a laser pointer with the ball. Can be demoed with software pinball game, and processing and control handled in python while taking advantage of pyautogui and possibly opencv2.