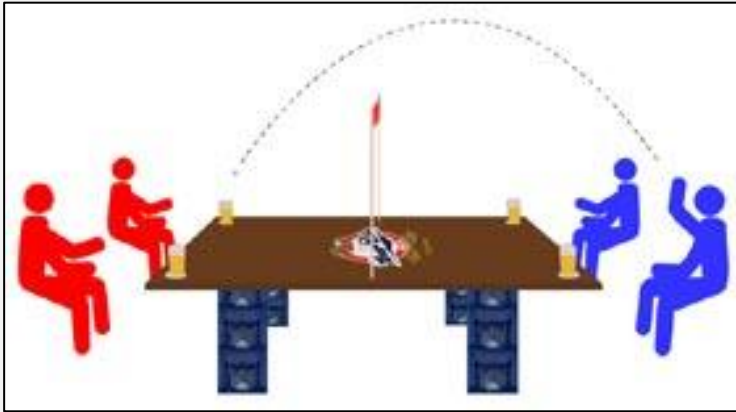# Snappa Referee

Enjoy what's great, without any debate

De Jesus, Juan
Orton, Matthew

Demo

- Hard to judge height validity

- Difficult to reach a consensus
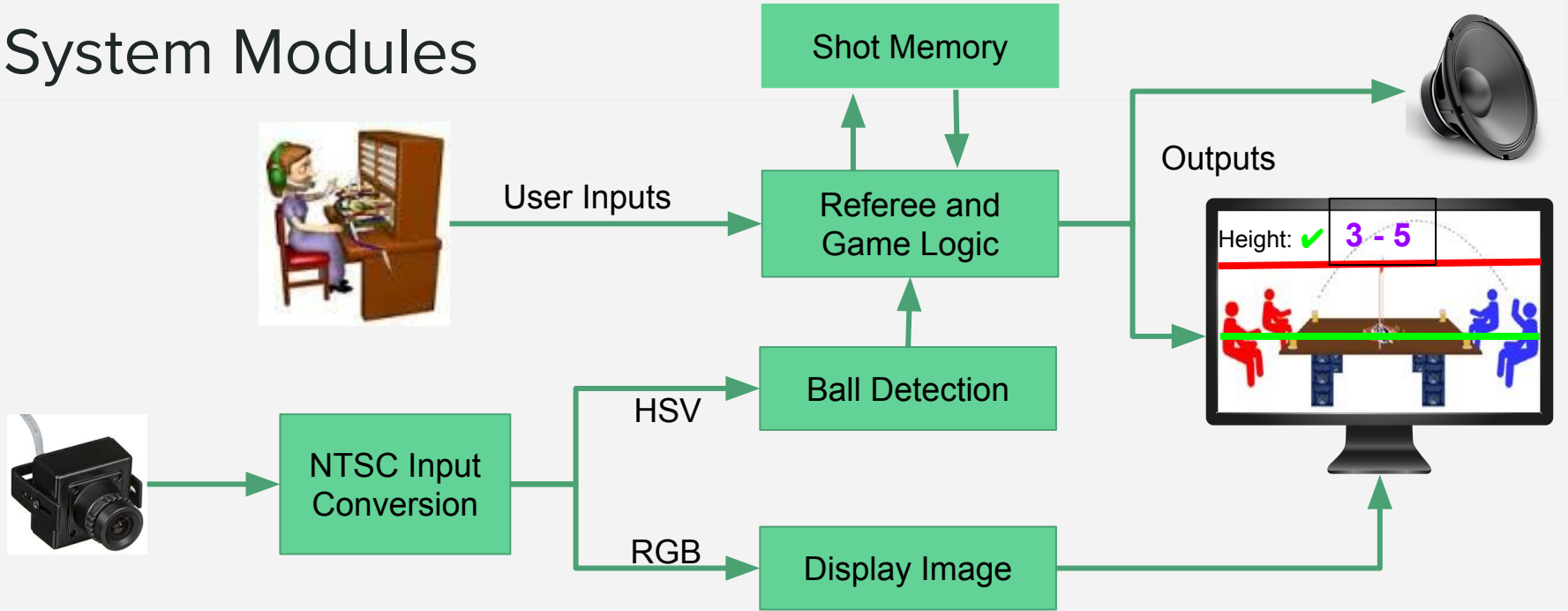
- No gaming atmosphere

A Referee. A Solution

- Video system with ball tracking determines whether ball is high enough or not
- User-friendly interface to set line threshold points
- Replay available for ball's movement
- Gaming sounds and scoreboard to enhance playtime

System Modules

Shot Memory

User Inputs

Referee and Game Logic

HSV → Ball Detection

NTSC Input Conversion

RGB → Display Image

Outputs

Height: ✔ 3 - 5

Inputs

User Inputs

- Start, Reset, Points
- Threshold set-up
- Replay

Camera Input

- Image data received as YC_BC_R
- Transformed to RGB for display and to HSV for ball-detection
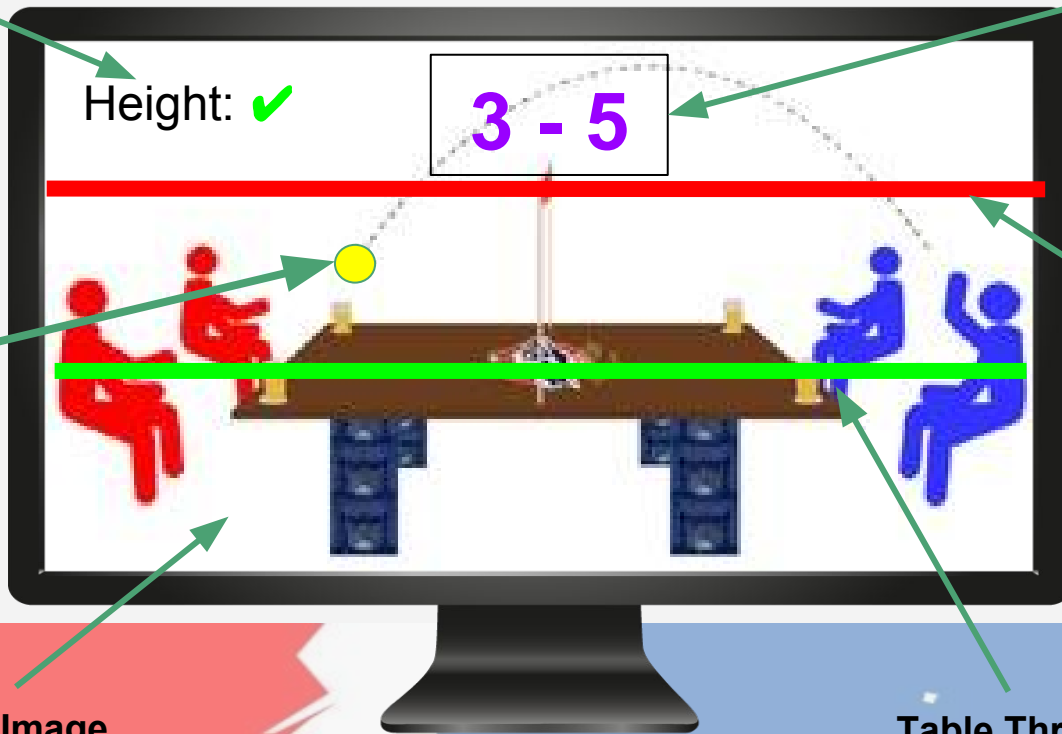
VGA Output

Referee Judgement

Scoreboard

Height: ✔

3 - 5

Low Threshold

Ball Tracking

Camera Image

Table Threshold

Visual Modules

Ball Detection

- Uses HSV for tracking
- Midpoint of Ball fed to Referee Module
- Tracked movement stored for Replay memory
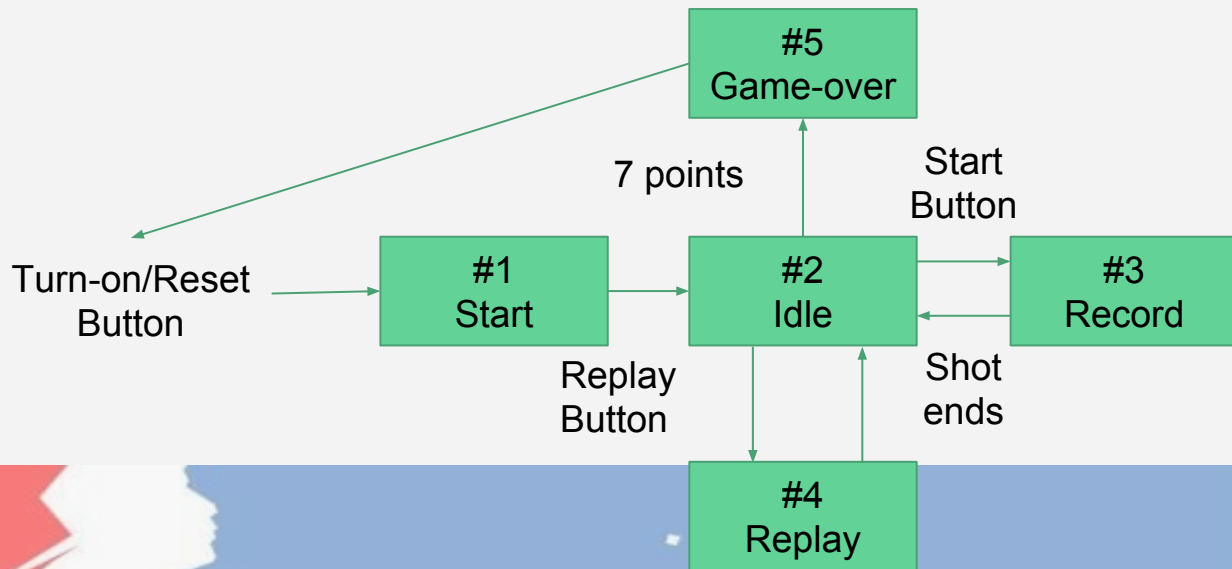
Display Image

- Displays onto monitor the visual input of the camera
- Module transforms YC_BC_R to RGB

Referee Finite State Machine

Referee Module

- FSM decides validity of throw based on threshold lines and ball position
- Defines the end of a throw for memory-allocation purposes
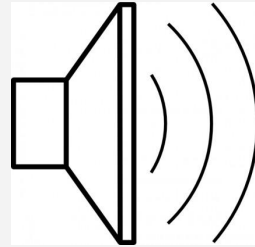
Gaming Atmosphere

Scoreboard Module

- Displays a scoreboard for easy point-tracking
- Player input

3 - 5

Achievement Sounds

- Game start, game finished, shot validity

LOW!!!

Timetable

Week	Implementation	Testing	Writing
11/1 - 11/7	**Finish off Design decisions (utilize Lakit, NTSC camera, and manageable replay"**	**None**	**Project Proposal Draft Revision, Prepare for Project Presentation, Block Diagram Meeting**
11/8 - 11/14	**Ball and Background tracking, start Referee Logic Module**	**Debugging of video tracking modules (edge cases, different colors)**	**Project Proposal Due, Project Presentations, Revise Block Diagram**
11/15 - 11/21	**Referee Logic Module, Scoreboard Block**	**Debugging of Referee Logic (state switching)**	**Project Checkoff Checklist Meeting**

Week	Implementation	Testing	Writing
11/22 - 11/28	**Memory Replay, Basic Sound Effects**	**Memory Replay test benches**	**None**
11/29 - 12/05	**Stretch Goals (motion sensors)**	**Debugging**	**Project Status Update with Mentor**
11/6 - 11/11	**None**	**Debugging for Check-off**	**Check-off due, Project Report due, Video of Projects**

Complications

Encountered

- Memory constraints for video replay
- Limitations due to single point of reference
  - Side detection and stretch goals
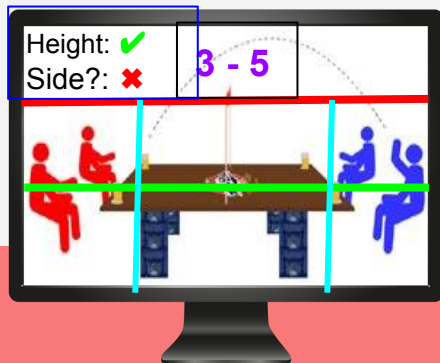
Anticipated

- Not constricting original gameplay
  - Quick object detection
- Determining the end of a shot

Snapp'on your camera and enjoy!