Diana, Ray, PJ

FPGA Performative Gamer Association
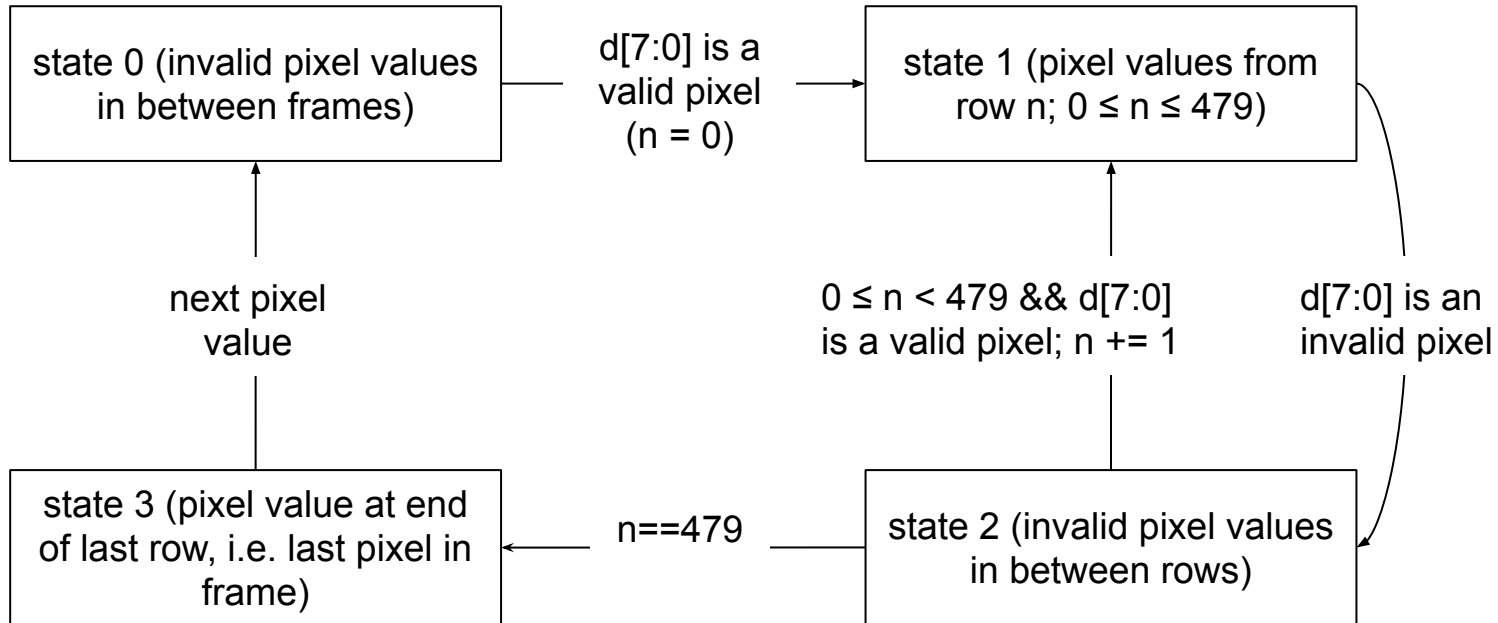
Hand Gesture Controlled Fighting Game

Camera Vision Implementation
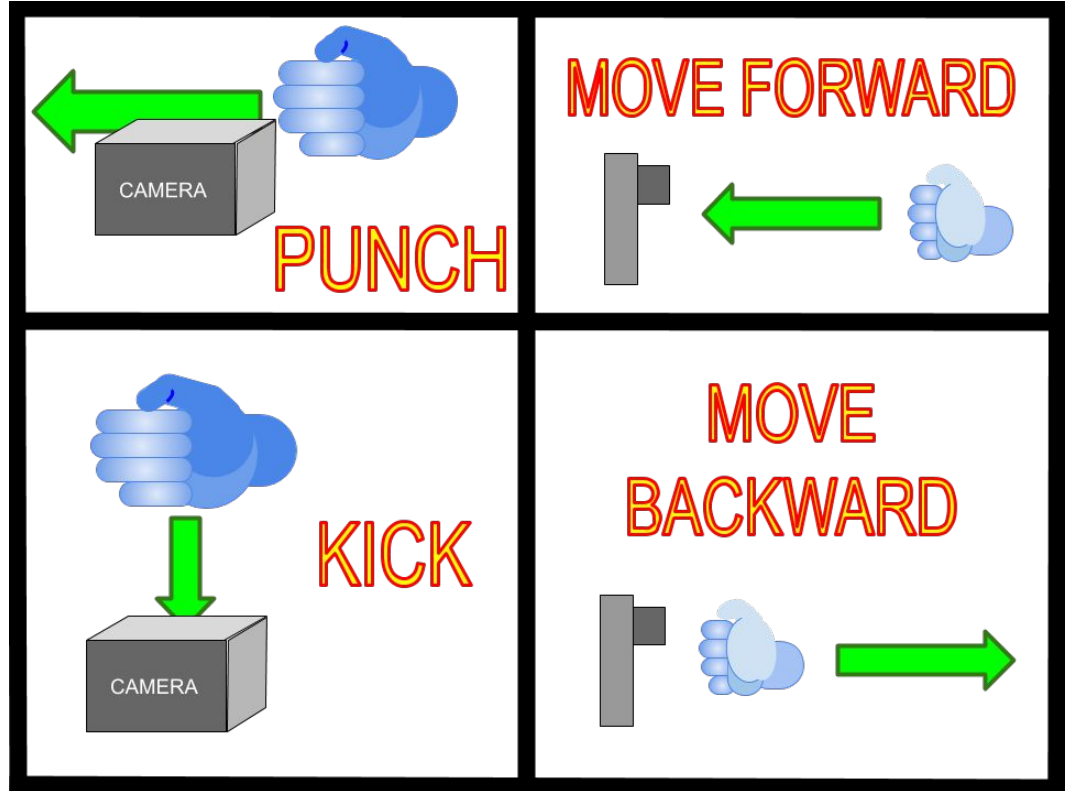
Ray

Gesture Recognition

- Using OV7670/OV7171 CameraChip^{TM}

Gesture Recognition

- Player 1 will wear a bright blue glove
- Player 2 will wear a bright red glove

Gesture Recognition

- To get the (x, y) location of each glove in each frame, average the locations of the pixels that, based on some color threshold, are from the glove

- To get the approximate distance of each glove from the camera (z), calculate the number of pixels that, based on some color threshold, are from the glove
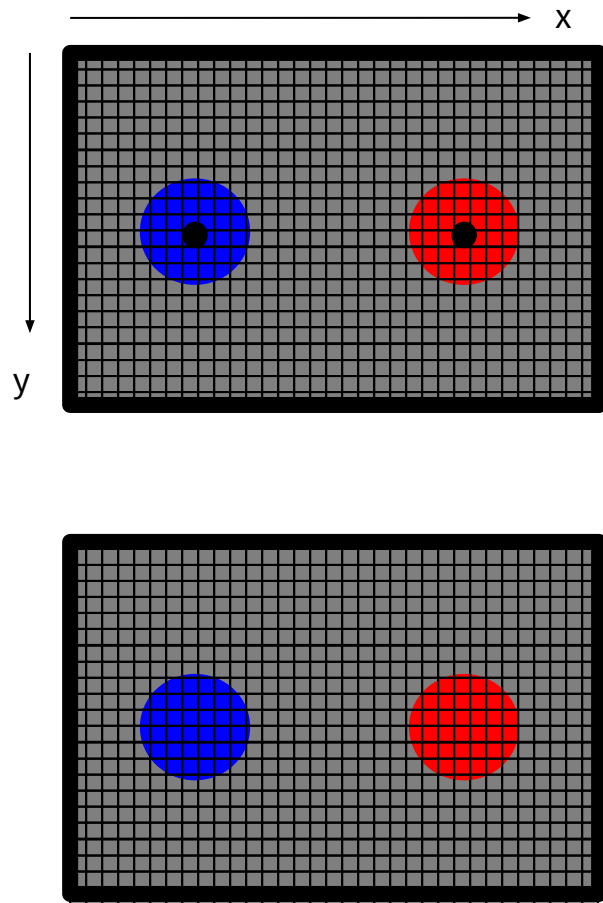
Gesture Recognition

- Calculate the average change in position and size of the gloves over 15 frames to get the dx/dt, dy/dt and dz/dt of the gloves

Gesture Recognition

- Use these to determine the state (at rest, punching, punching fast, kicking, moving forward, moving backward)

at rest/moving forward/moving backward
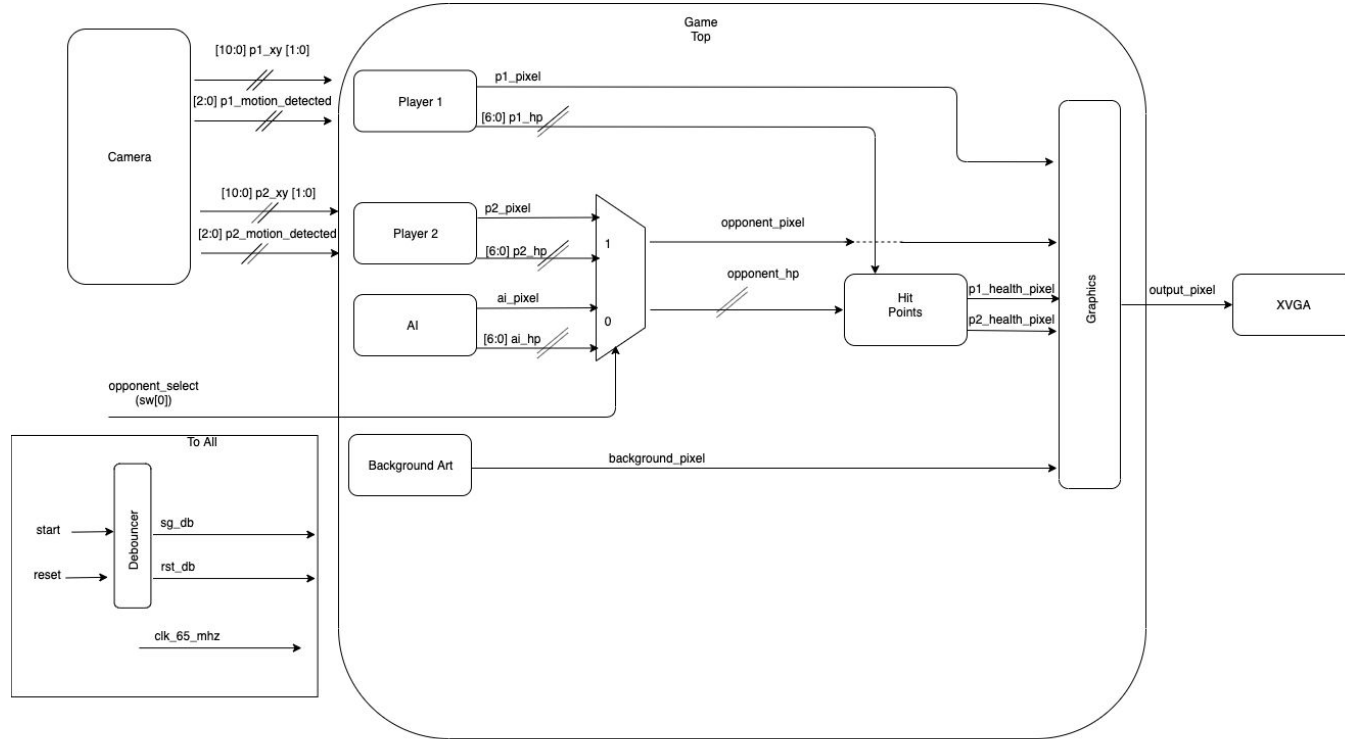
punching

punching fast

kicking

Game Logic
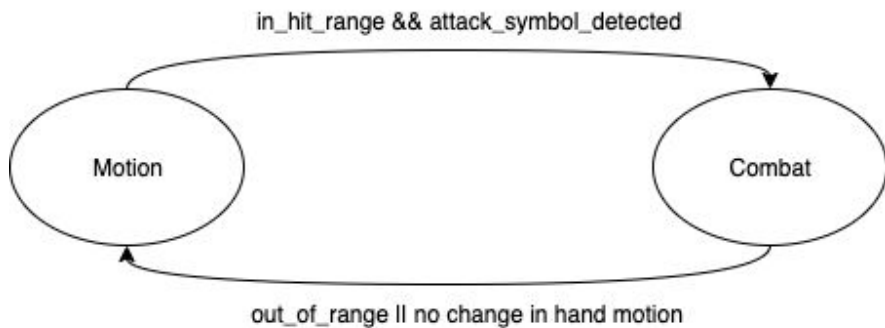
Diana

Game Logic Overview
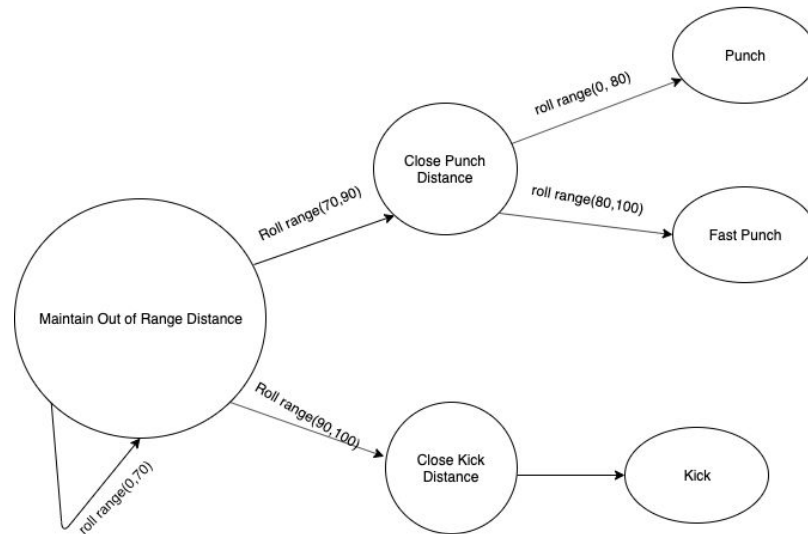
Game Logic Overview

- Players in motion or combat
  - Hits: kick, punch, fast punch
- Requirements for Successful Combat
  - Must be in range
  - Right of Way
- AI
  - Tries to maintain constant distance between players, striking based on random numbers
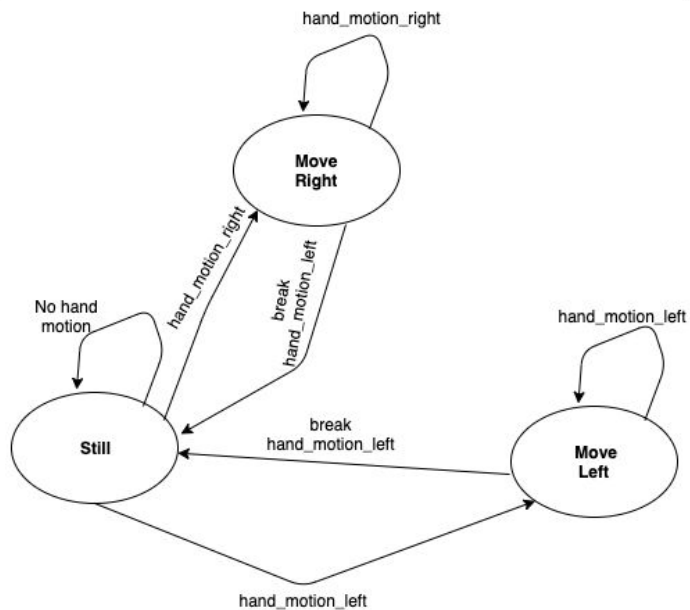
Game Logic Overview

Player State

in_hit_range && attack_symbol_detected

Motion

Combat

out_of_range || no change in hand motion

AI Logic

Maintain Out of Range Distance

Roll range(70,90)

Close Punch Distance

roll range(0, 80)

Punch

roll range(80,100)

Fast Punch
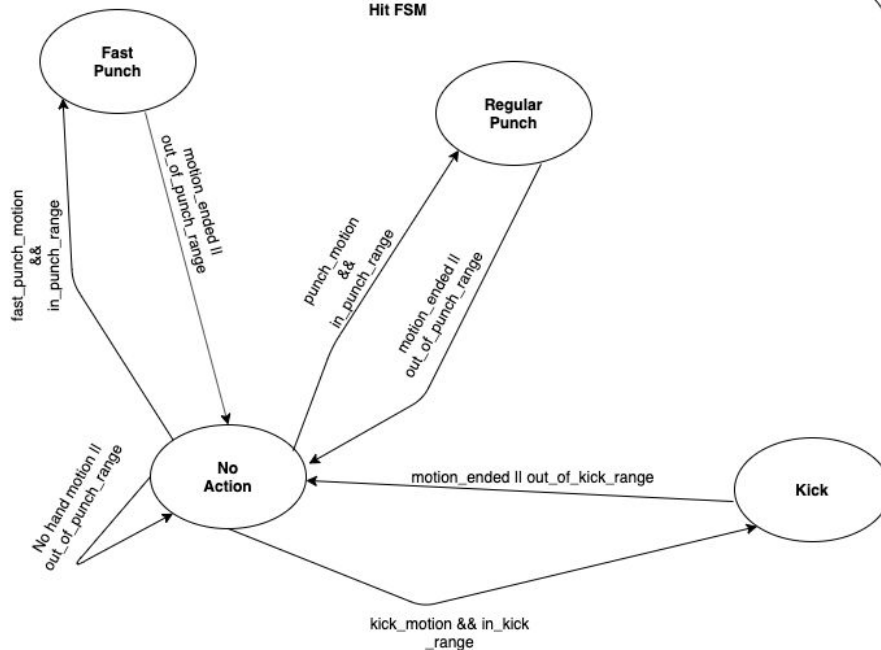
Roll range(90,100)

Close Kick Distance

Kick

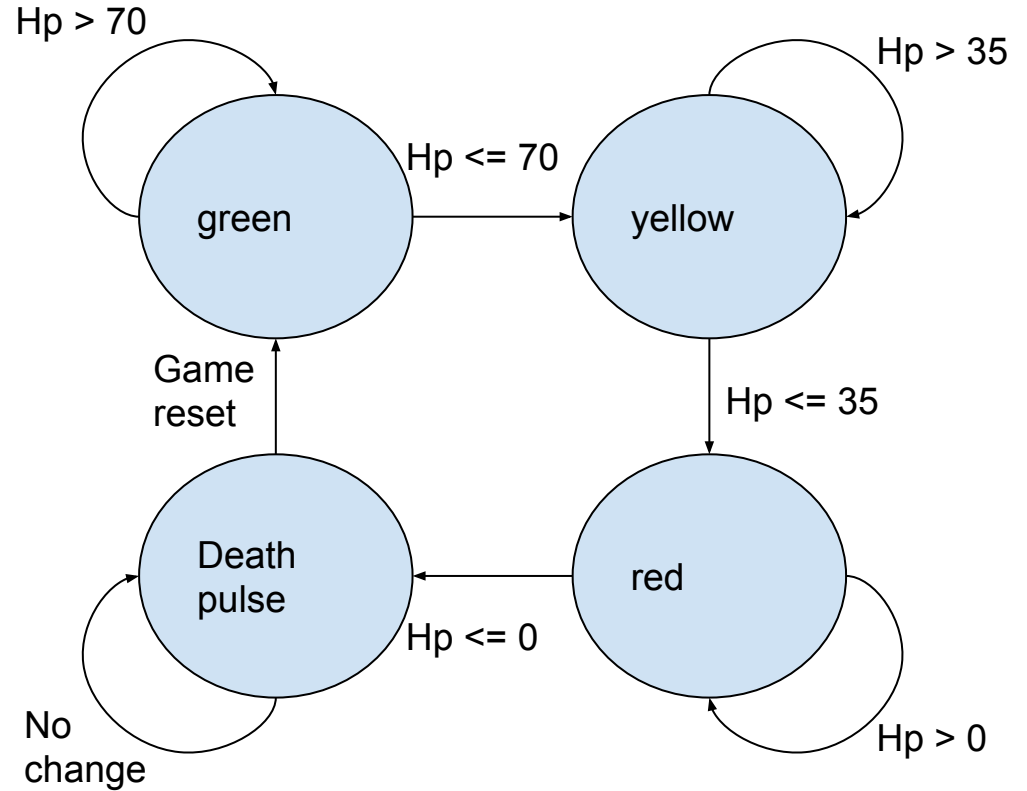roll range(0,70)

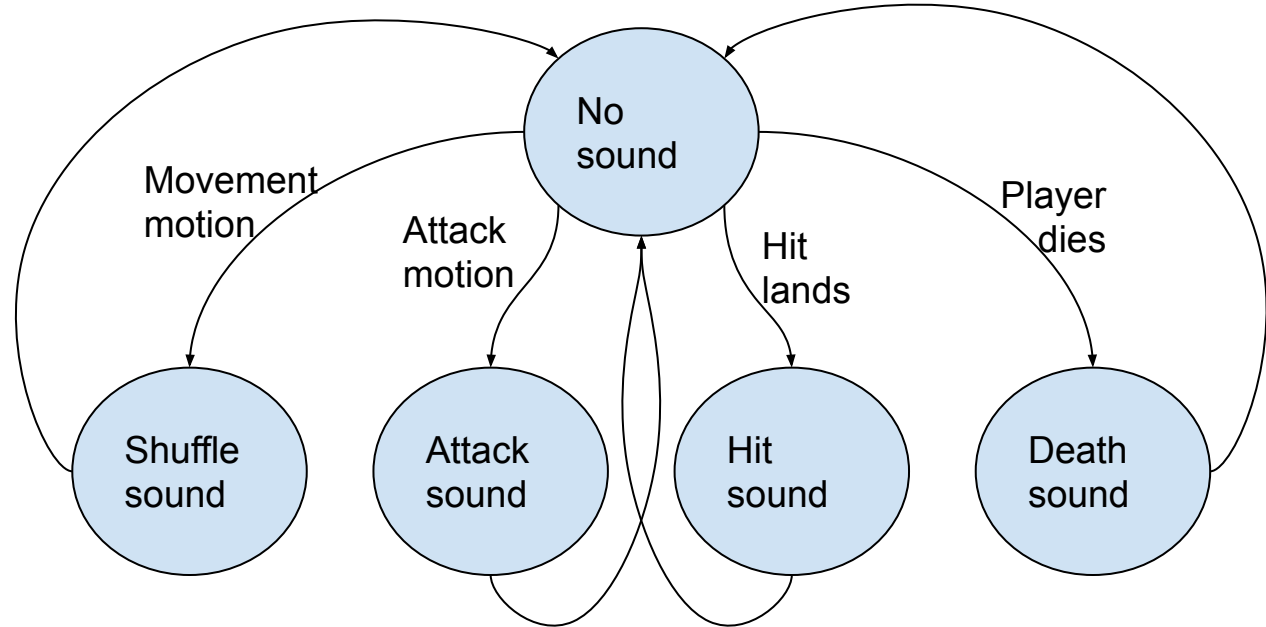# Game Logic Overview

Hardware and Feedback Logic

PJ

Player's LEDs

RGB LEDs that flash and change colour in response to health bar status

Game Sounds

Piezo buzzers that respond to movements and actions of players

Timeline

	week 1	week 2	week 3	week 4	week 5
Diana	display sprites	Map Sprite movements to associated images	Implement moving and combat	Integrate all Sprites with game logic	Play and treat
Ray	get camera working	figure out color thresholding	get location of players' hands	get hand gestures	use hand gestures to get sprite state
PJ	start to make the the sounds	finish making the sounds	checking light sequences	test light and sound	combine light and sound with gestures and hp

Questions?