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Finite State Machine: HIGH LEVEL OVERVIEW

(Power ON) → [Initializing]

(Feedback Loop)

[Searching For Ball Dispenser]

(Ball Dispenser Located)

[Travel To Ball Dispenser]   (Feedback Loop)

(Arrive at Dispenser)

[Collecting Balls]   (Max Ball Count Not Reached)

(Max Ball Count Reached)
(Ball Count = 6)

[Locating Active Goal]   (Feedback Loop)

(Active Goal Located)   (Active Goal Changes)

(Ball Count = n)

(Feedback Loop)   [Travel To Shooting Location]

(Arrive at Shooting Location)

[Shoot Balls at Active Goal]

(Ball Count > 0)

(Ball count = 0)
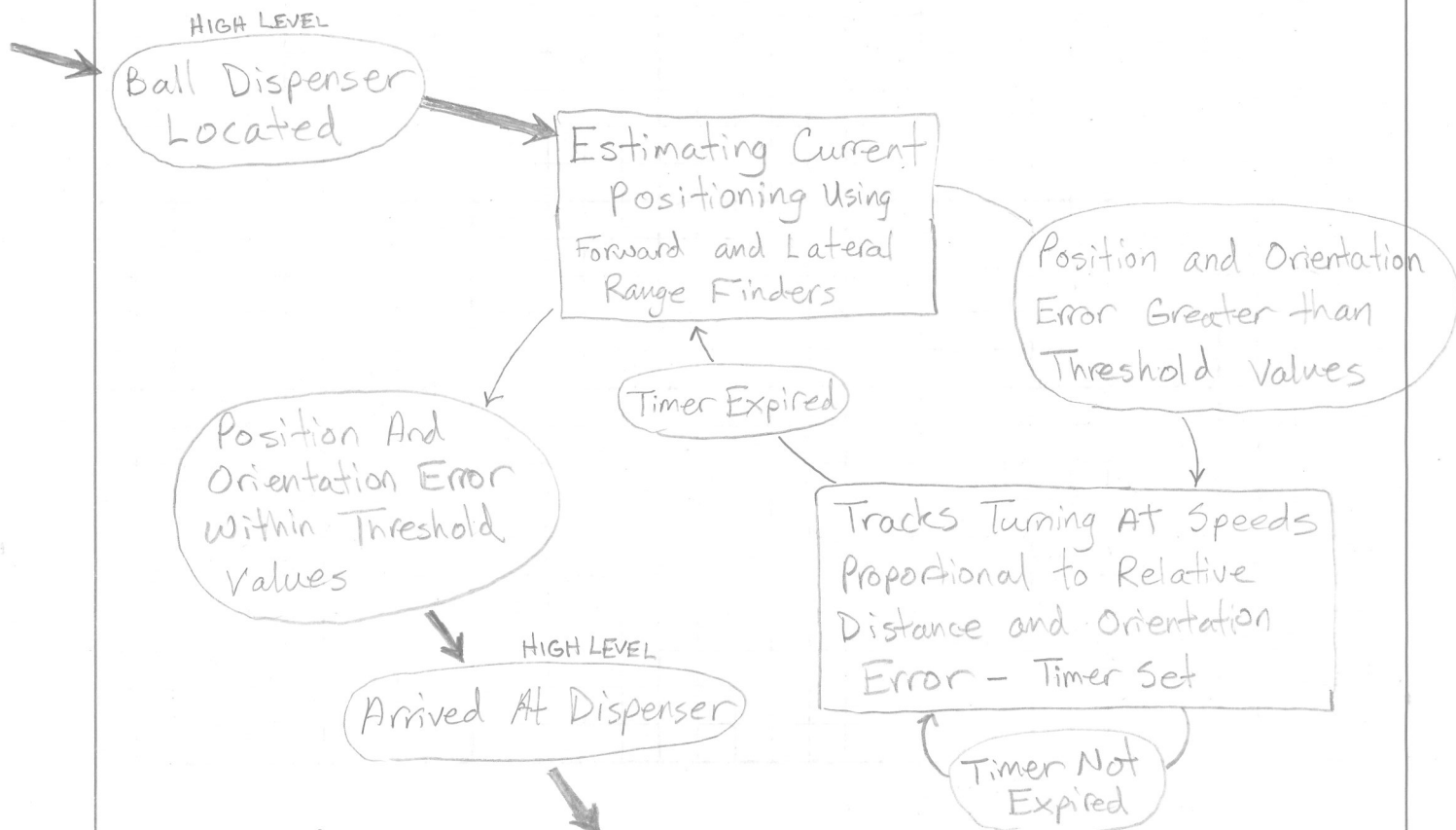
Legend:

[ ] – High-Level States

( ) – Conditions / Feedback Loops

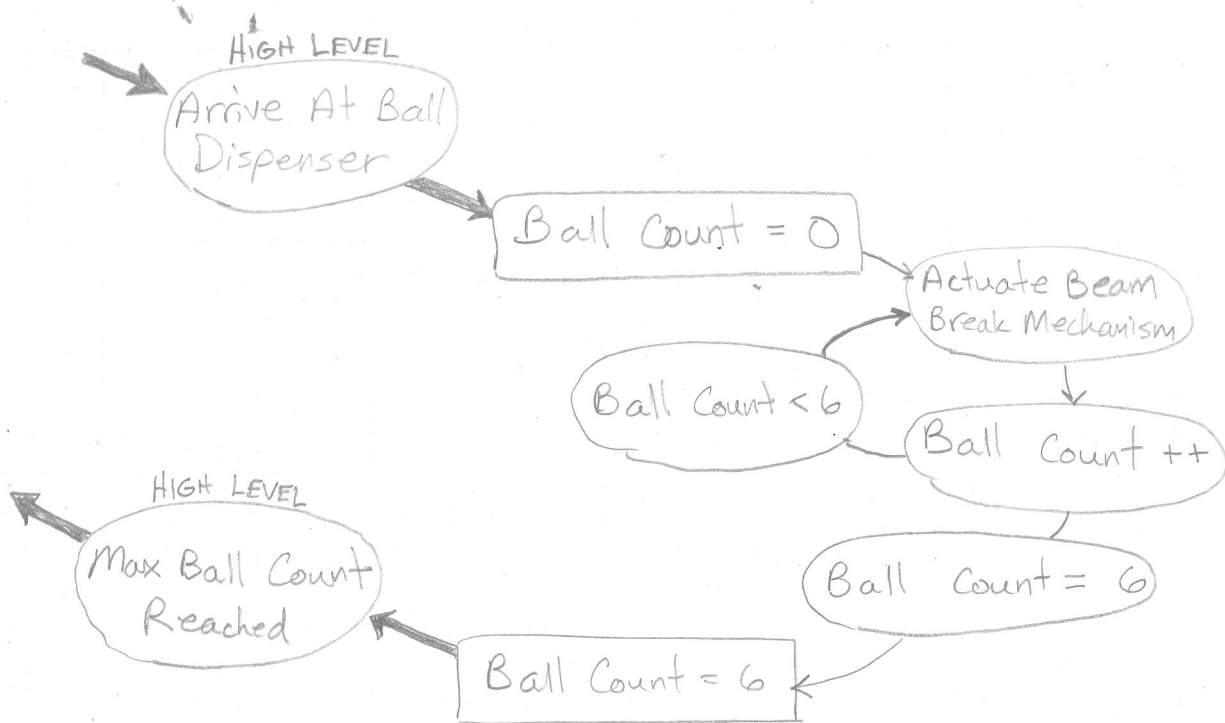Note: These "high-level" states will include subsystem state machines of their own

Finite State Machine: Searching For Ball Dispenser

HIGH LEVEL
Finished Initialization

HIGH LEVEL
Ball Count = 0

$LIR \approx RIR \approx 0$

Rotate Clockwise
(Left Track Forward
RIGHT Track Reverse)

$LIR < RIR \not\approx 0$

$0 \not\approx LIR > RIR$

$LIR \approx RIR \approx 0$

Rotate Counter-Clockwise

$LIR \approx RIR > 0$

LIR ←90°→ RIR

Photo-Diode IR Sensor

POINTED AT BALL DISPENSER

HIGH LEVEL
BALL Dispenser Located
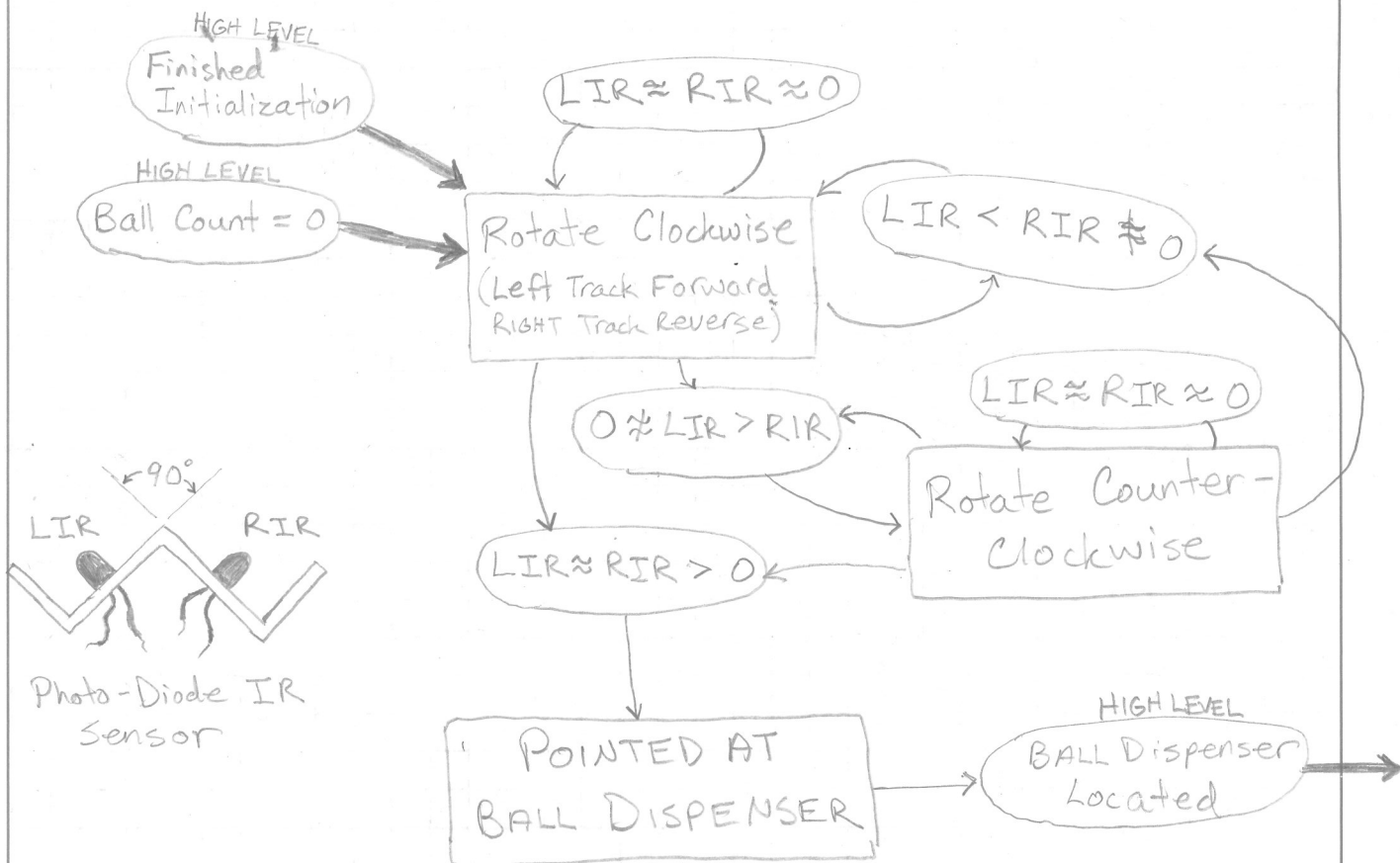
Finite State Machine: Travel To Ball Dispenser

HIGH LEVEL
Ball Dispenser Located

Estimating Current Positioning Using Forward and Lateral Range Finders

Position and Orientation Error Greater than Threshold Values

Timer Expired

Position And Orientation Error Within Threshold Values

Tracks Turning At Speeds Proportional to Relative Distance and Orientation Error — Timer Set

HIGH LEVEL
Arrived At Dispenser

Timer Not Expired

Finite State Machine: Collecting Balls

HIGH LEVEL

Arrive At Ball Dispenser

Ball Count = 0

Actuate Beam Break Mechanism

Ball Count < 6

Ball Count ++

Ball Count = 6

HIGH LEVEL

Max Ball Count Reached

Ball Count = 6

Finite State Machine: LOCATING ACTIVE GOAL

MAX Ball count Reached

Active Goal Changes

$LIR \approx RIR \approx 0$

$LIR < RIR > 0$

Rotate Clockwise

$0 < LIR > RIR$

$LIR \approx RIR \approx 0$

Rotate Counter-Clockwise

$LIR \approx RIR > 0$

POINTED AT ACTIVE GOAL CORNER

HIGH LEVEL

Active Goal Located
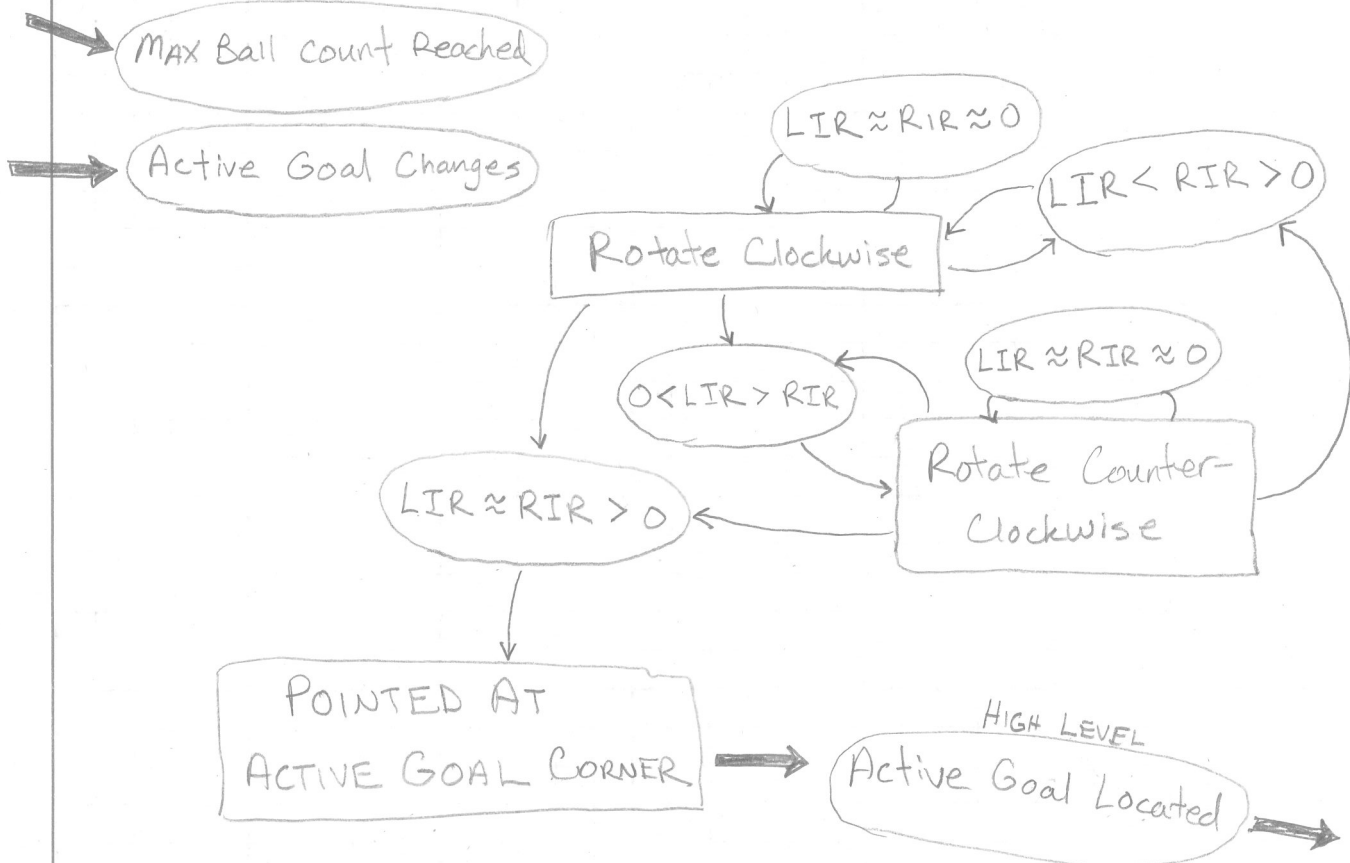
Finite State Machine: <u>Travel To Shooting Location</u>

- See "Travel To Ball Dispenser" Proportional Feedback control loop

Finite state machine: <u>Shoot Balls at Active Goal</u>

HIGH LEVEL

Arrive at Shooting Location

Activate Launcher Motors

Ball Count = n

Cycle Chamber Solenoid

Ball Count --

Ball Count > 0

Active Goal Still Active

$LIR \approx RIR \approx 0$

HIGH LEVEL
Ball Count = 0

"Active Goal" No Longer Active

HIGH LEVEL
Active Goal Changes