

TEAM C3 BEST BALL

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USE CASE REQUIREMENTS

01

Real Time Distance

Users shall know distance to hole in real time.

02

Ball and Stroke Feedback

Users shall know putter and ball speed + ball spin.

03

Portable User Interface

Access live stats from mobile device.

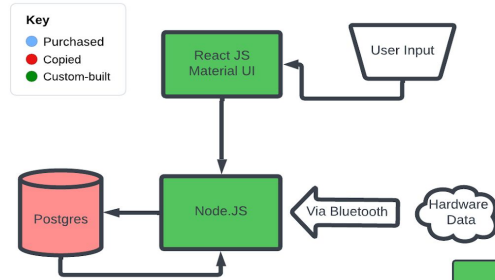
04

Score Tracking

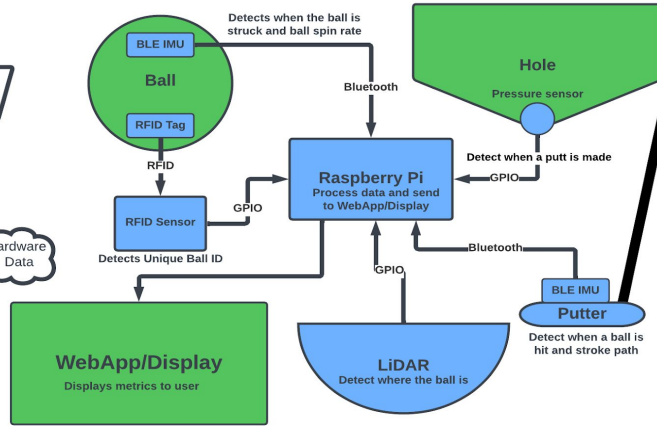
Track live “score” while putting.

SOLUTION APPROACH + CHANGES

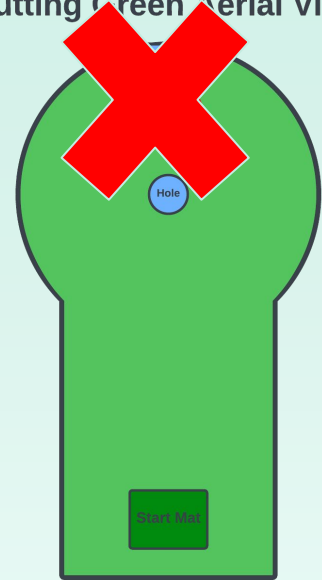
SW Stack Diagram



System Block Diagram



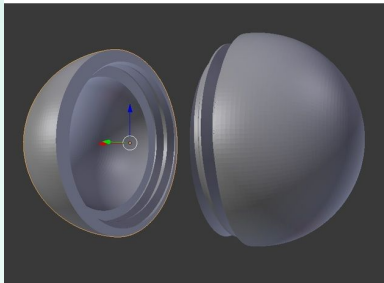
Putting Green Aerial View



1.5 Meters

3 Meters

COMPLETE SOLUTION



TEST PLAN

Metric	Test	Specification
Distance from Ball to Hole	Ball placed randomly 20 times. Compare distance measurements.	Within 3 centimeters of true distance
Club Acceleration Test (TBD)	Swing club at constant, accelerating, and decelerating through the ball.	Correctly states accelerating, decelerating, or constant
Club Angle Test (TBD)	Calibrate club at angle 0 degrees and rotate club	Correctly calculate change within 10 degrees
Ball Metrics Test	Roll ball on path while filming to verify speed and spin metrics.	Within 15 RPM of true spin
Durability + Battery Test	Drop ball with components from hip height to floor 50 times.	Ball tests still pass 100% of time and battery lasts 1 hr

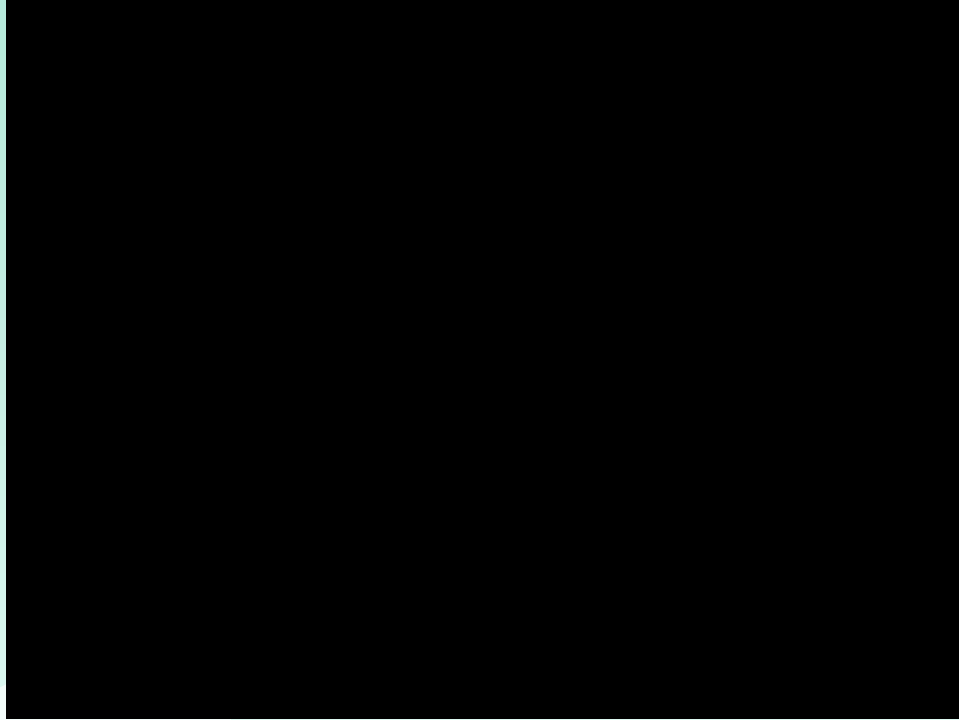
DISTANCE TEST RESULTS

True Distance (Avg.)	Measured Distance (Avg.)	Delta (Avg.)
92 centimeters (~3 feet)	94.2 centimeters (Ran high)	2.2 centimeters
Largest Delta	Smallest Delta	Pass or Fail
4.3 centimeters	0 centimeters (Hand Measured)	Failed spec, close enough to still rule a success.

BALL METRICS TEST

Real Spin Rate (RPM)	Measured Spin Rate (RPM)	Pass or Fail
140, 130, 115, 100, 85, 60, 50, 50	142, 132, 104, 94, 80, 61, 51, 42	Pass, average within 5 rpm
Ball Struck Test Pass or Fail	Ball RFID Test Pass or Fail	Ball Speed
Pass, detected 100% of strikes	Pass, RFID uniquely identifies the ball 100% of time	Function of ball spin

BALL METRICS TEST



DURABILITY TEST

Success!



REMAINING TESTS



Multiplayer Ball Tracking

- Test multiple ball locations on course
- Original Goal: 3 player tracking at once



Whole System Integration

- Test the whole system entirely
- Ensure previously mentioned thresholds

ADDITIONAL DEVELOPMENT



WebApp Visuals

Add visuals to webapp to better describe data



Course Beautification

Add felt & real putting hole to course



WebApp Security

Add csrf tokens for POST requests

Gantt Chart and Lessons Learned

Build "Putt Made" Mechanism	03/29/2023	Seaver	5	04/02/2023	100.00%	<div style="width: 100%; height: 10px; background-color: green;"></div>
Build "Ball Hit" Mechanism	03/29/2023	Erik	5	04/02/2023	50.00%	<div style="width: 50%; height: 10px; background-color: green;"></div>
Build "Putt Properties" Mechanism	02/25/2023	CJ	5	03/01/2023	90.00%	<div style="width: 90%; height: 10px; background-color: green;"></div>
Build "Putt Made" Software	03/29/2023	Seaver	5	04/02/2023	90.00%	<div style="width: 90%; height: 10px; background-color: green;"></div>
Build "Ball Hit" Software	02/16/2023	Erik	5	02/20/2023	50.00%	<div style="width: 50%; height: 10px; background-color: green;"></div>
Build "Putt Properties" Software	02/16/2023	CJ	5	02/20/2023	90.00%	<div style="width: 90%; height: 10px; background-color: green;"></div>
Refine "Putt Made"	03/29/2023	Seaver	3	03/31/2023	50.00%	<div style="width: 50%; height: 10px; background-color: green;"></div>
Refine "Ball Hit"	03/29/2023	Erik	3	03/31/2023	50.00%	<div style="width: 50%; height: 10px; background-color: green;"></div>
Refine "Putt Properties"	03/29/2023	CJ	3	03/31/2023	50.00%	<div style="width: 50%; height: 10px; background-color: green;"></div>
Build Connected App Software	04/02/2023	All	3	04/04/2023	80.00%	<div style="width: 80%; height: 10px; background-color: green;"></div>
				12/29/1899	0.00%	
Test "Putt Made"	04/02/2023	Seaver	5	04/06/2023	80.00%	<div style="width: 80%; height: 10px; background-color: green;"></div>
Test "Ball Hit"	04/02/2023	Erik	5	04/06/2023	0.00%	<div style="width: 0%; height: 10px; background-color: green;"></div>
Test "Putt Properties"	03/01/2023	CJ	5	03/05/2023	20.00%	<div style="width: 20%; height: 10px; background-color: green;"></div>
Test Connected App	04/02/2023	All	5	04/08/2023	20.00%	<div style="width: 20%; height: 10px; background-color: green;"></div>