B.O.S.S System

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Executive Summary

- The BOSS stands for Badminton Open Source Software System
- Badminton birdie launching system that reduces training obstacles for players of all socio-economic backgrounds
- The system contains a physical launching device plus an android app that selects the launching patterns

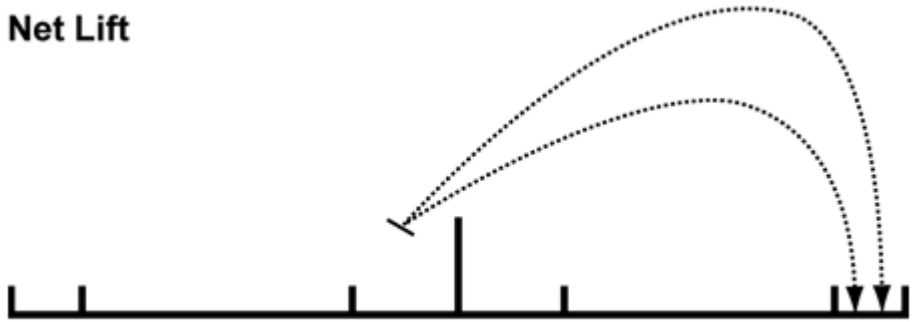
Motivation

“Badminton is a growing sport in Canada and is popular worldwide. A common limitation for players is the lack of consistent training scenarios. The BOSS System is an open source programmable Bluetooth device that will act as an accurate launcher. Ideally this device is an affordable option for players of all levels.”

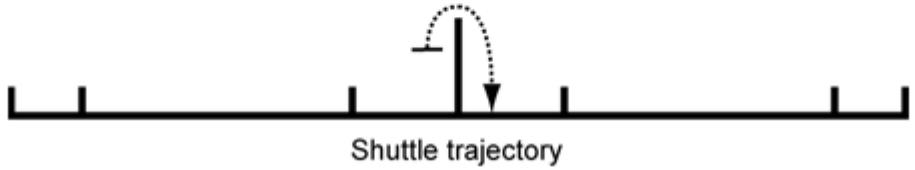
Bronze Project

- One machine at the “front” of the court.
- Linear (up/down) movement
- 3 types of launches:
  - Net Lift
  - Net Shot
  - Drive (note that the device will be stationed at the front of the court)

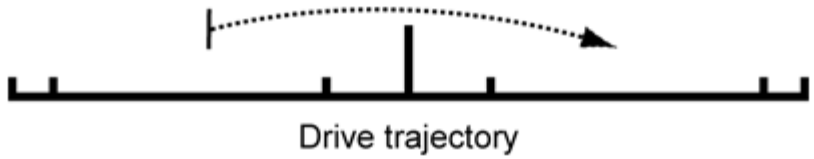
Net Lift



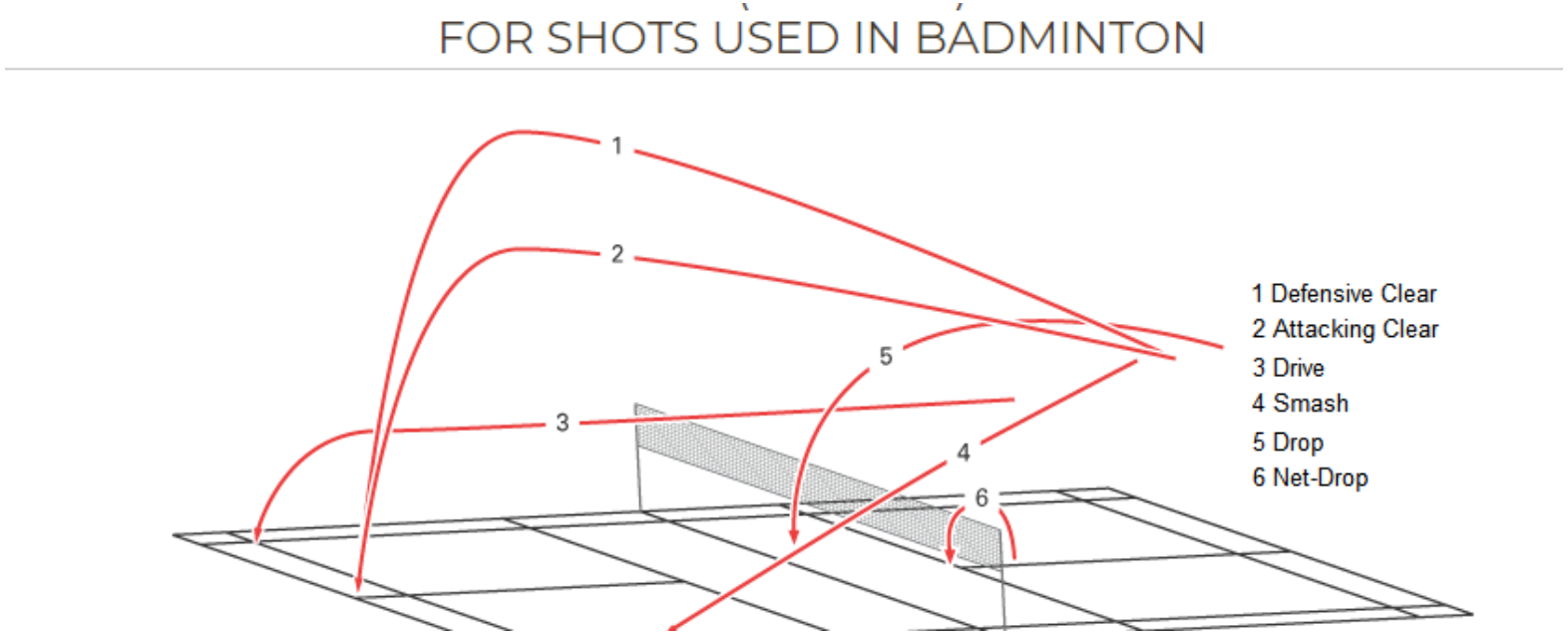
Net Shot



Drive



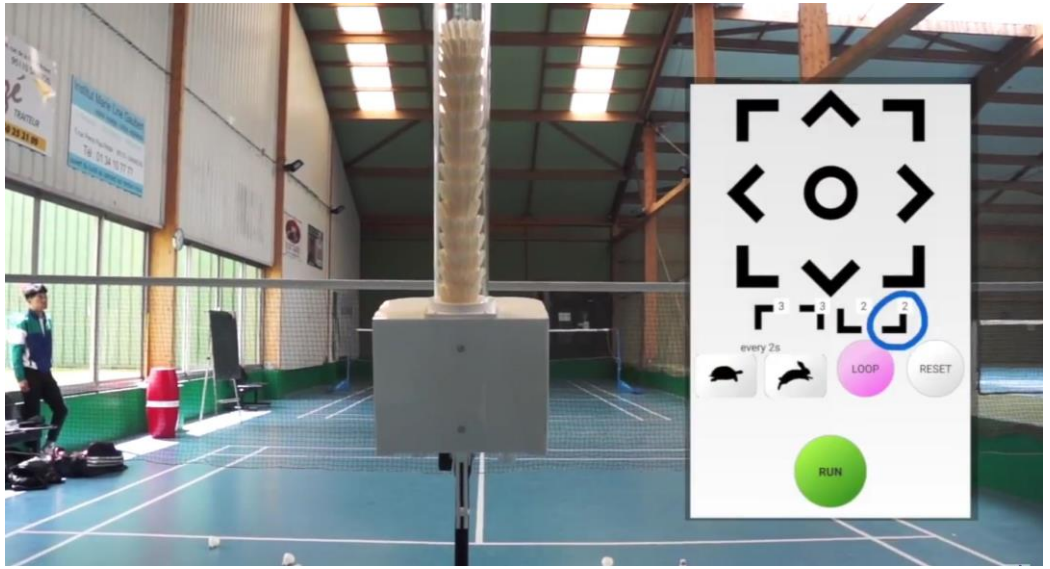
- Silver Project
  - Add shots 3-4 from the diagram. Similar trajectories as bronze project, but additional option to have shots come from the back of the court.
  - Add lateral movement (left/right) for all 6 shot types.
- Gold Project
  - Add shots 1 & 2, defensive & attacking clears with lateral options.
  - Battery powered
  - Build a second device for a multi-launcher system.



Background

BLACK KNIGHT TRAINER PRO

BADDY



Technical Approach

1. Building Shooting Tray
2. Linear Movement (first 3 shots)
3. Housing Device
4. Incorporate microcontroller
5. App development
6. Back of Court Shoots
7. Lateral Movements
8. Testing
9. Battery Powered
10. Build second device

Resources

- Microcontroller interfacing
- Digital Signal Processing
- Android Application development (Java)
- Knowledge of badminton game mechanics
- 3D printing modelling
- Prototyping (assembly)

Components & Funds

Quantity	Parts (1 Device)	Approx. Cost (S)
2	Brushless Motors	$65
1	Plastic Housing	$50
1	Stand Material (Tripod)	$50
1	Microcontroller	$10
1	Plastic Tube	$25
1	Bluetooth Module	$10
1	AC Power Adapter	$40
1	Battery	$60

Schedule & Milestones

Description	Date (Completed By)	Approx. Time Needed (H)
1: Launching mechanism with linear movement & physical housing	Mid-November	5
2: Record voltages needed to achieve Bronze Project launches	December	10
3: Record voltages needed to achieve back shots	Mid-January	5
4: Connect microcontroller to device	January	2
5: Create app	Mid-March	100
6: Add lateral movement and record voltages/angles/timing	Mid-January	10
7: Create additional device & sync with app	February	50
8: Additional testing with launch variances	March	40

Risks & Alternative Plan

- Flywheels as launching source
  - Fast spinning wheels could damage the birdie.
  - Alternative: use slingshot style system.

- Bluetooth range limitations
  - Range = 32 ft, which is 8 ft shorter than full Badminton court.
  - Alternative: use wi-fi system or look at more expensive Bluetooth devices.

- Motor Power
  - Not enough power to launch birdie’s from back of the court.
  - Alternative: purchase a more powerful motor/microcontroller.

Deliverables

1. Bluetooth, Battery powered Badminton Birdie Launching Machine
2. Android App
3. Open Source Microcontroller (Arduino) Code