# Upgraded Smart Shades

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Product Advancements
(Term Project Vs. Propeller Project)

- Basic Functionality Improvements
  - Reduced Speed at Which Shades Move
  - Altered Accel/Decel Profile to Dampen Actuator Noise
  - Implemented Individual Shade Control
    - Left and Right Shades can be Moved Simultaneously or Independently of Each Other
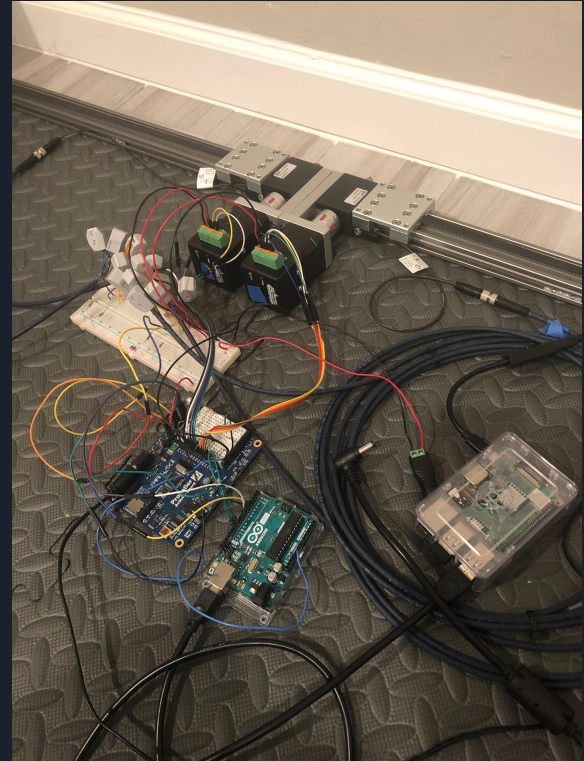
Product Advancements
# (Term Project Vs. Propeller Project)
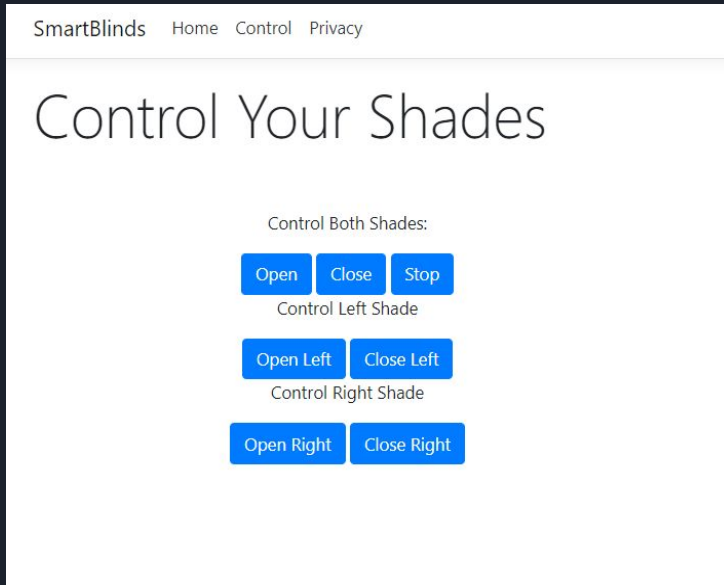
- Enhanced User Experience
  - Developed Web Application Hosted by Raspberry Pi
  - User can now Control Shades From a Browser on any Device on Their LAN (i.e. Laptop, Smart Phone)

Product Advancements
(Term Project Vs. Propeller Project)

- Additional Control Modes
  - Users can Toggle Between Manual Control, Light Control and Time Control on our Web Page
  - Added Gesture Control
    - User can Control Shades with Hand Signals from Anywhere Using Their Laptop Camera
  - Added Voice Control
    - Effectively Added Google Home Capabilities to Smart Shades Device
    - User can Open and Close Shades Through Speech
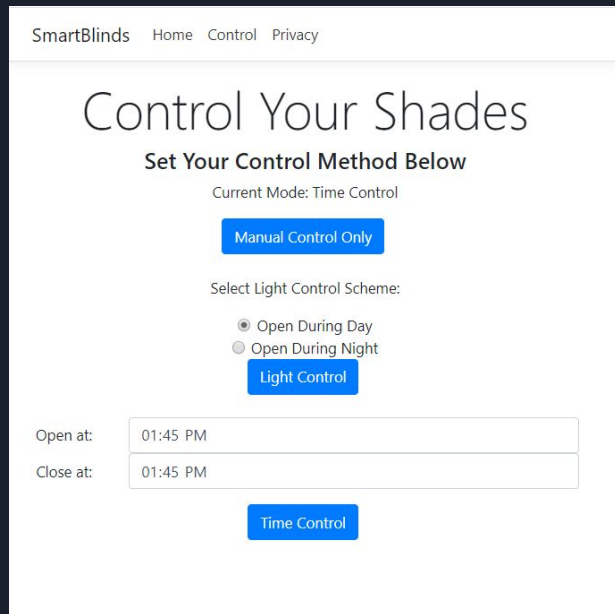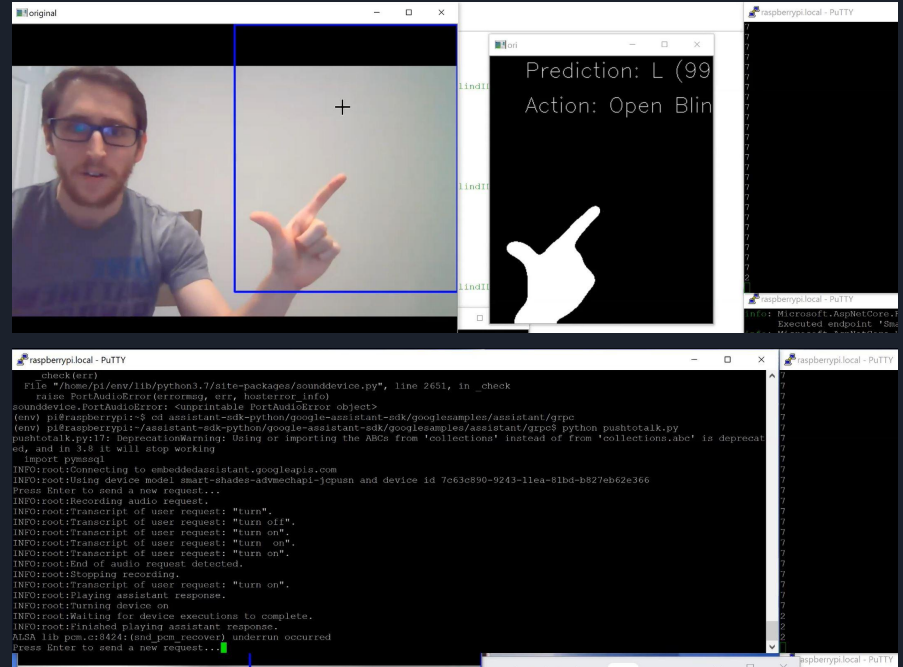
Microcontroller Usage & Integration
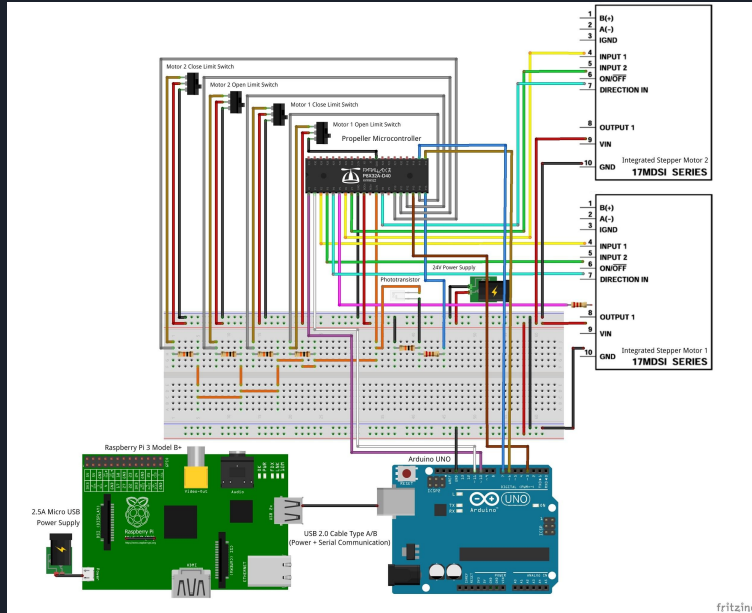
- Stuck with Propeller for its Multi-Core Functionality
  - Had Trouble Establishing Bidirectional Serial Communication Between Prop and R Pi
- Changed Prop Code Logic so Different Smart Shades Commands are Executed when Certain Digital I/O Pins are Pulled High or Low
  - Ordered 5V to 3.3V Level Converters to Safely Connect Prop I/O Pins to Pi GPIO Pins but Shipment was Delayed
- Decided to use Arduino as Intermediary Between Pi & Prop Instead
  - Pi Talks to Arduino Through Serial Connection & I/O Pins on Arduino are Directly Connected to Prop I/O Pins
  - Gave us Opportunity to Test our Knowledge of all 3 Microcontroller Covered in this Course

Web App Design

- .NET Core 2.2 Application
  - Cross Platform
- MVC Architecture
- Javascript/HTML Client Side
  - Bootstrap 4.0
- C# Server Side
- SQL Server Database

SmartBlinds   Home Control Privacy

Control Your Shades
Set Your Control Method Below
Current Mode: Time Control

Manual Control Only

Select Light Control Scheme:

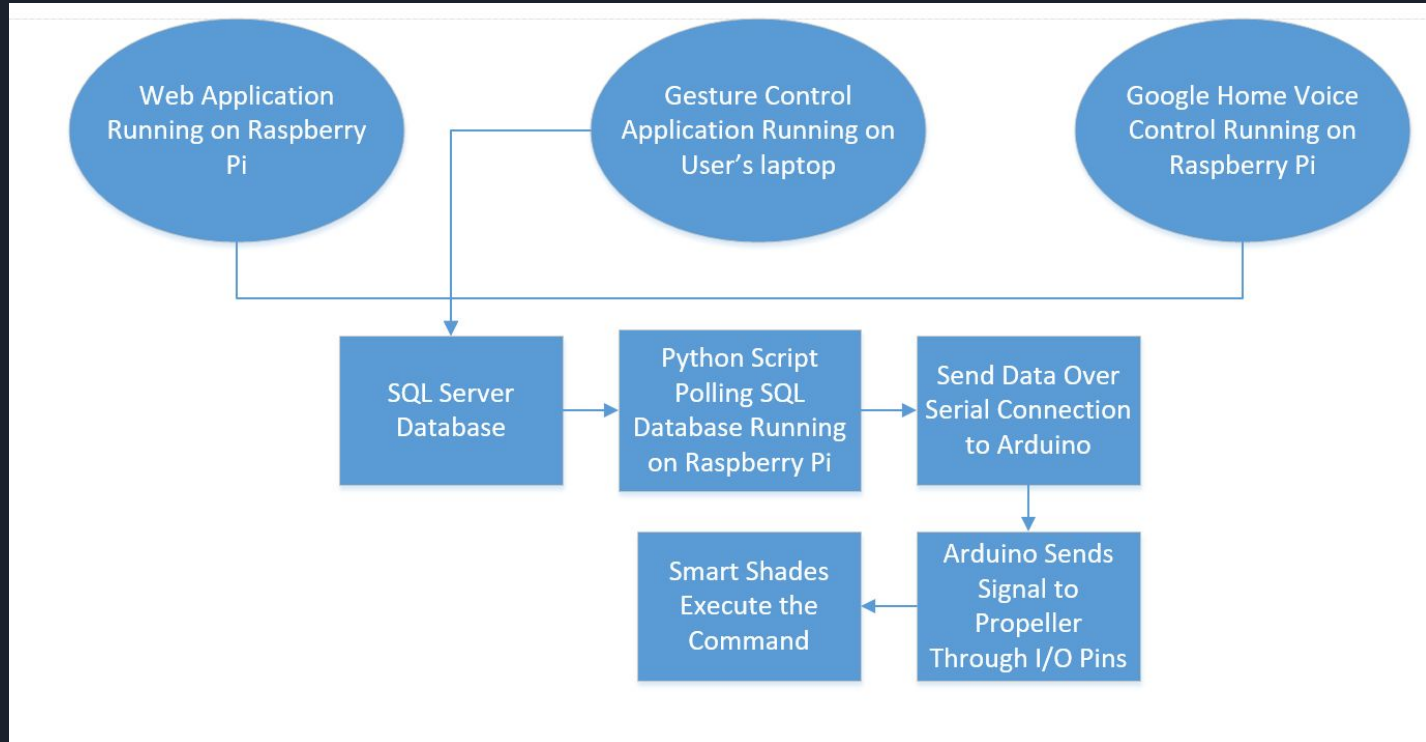- ◉ Open During Day
- ○ Open During Night
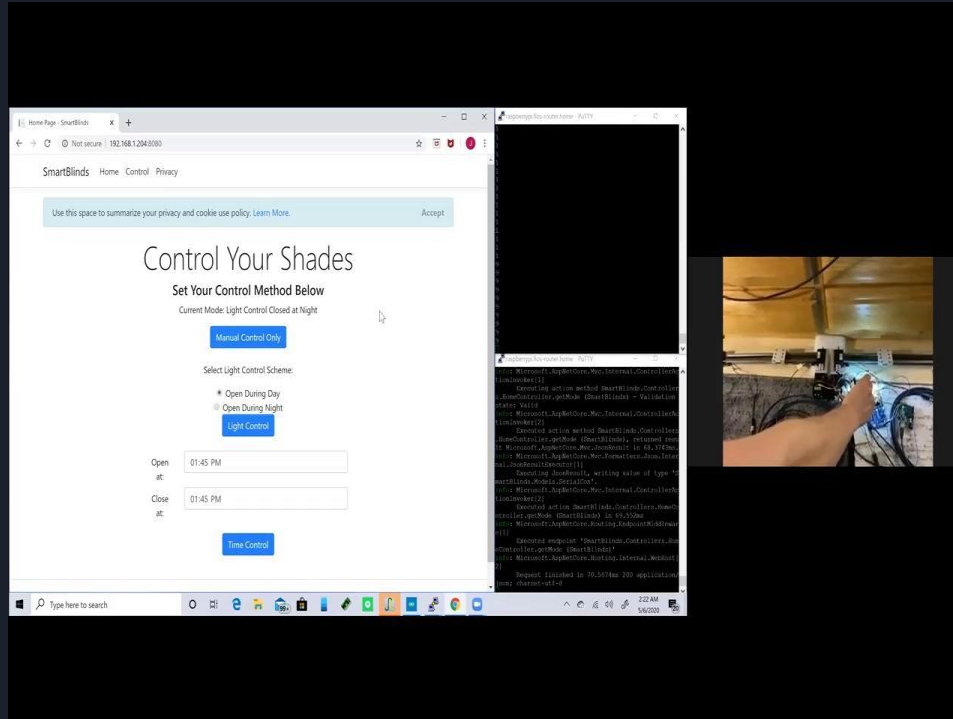
Light Control

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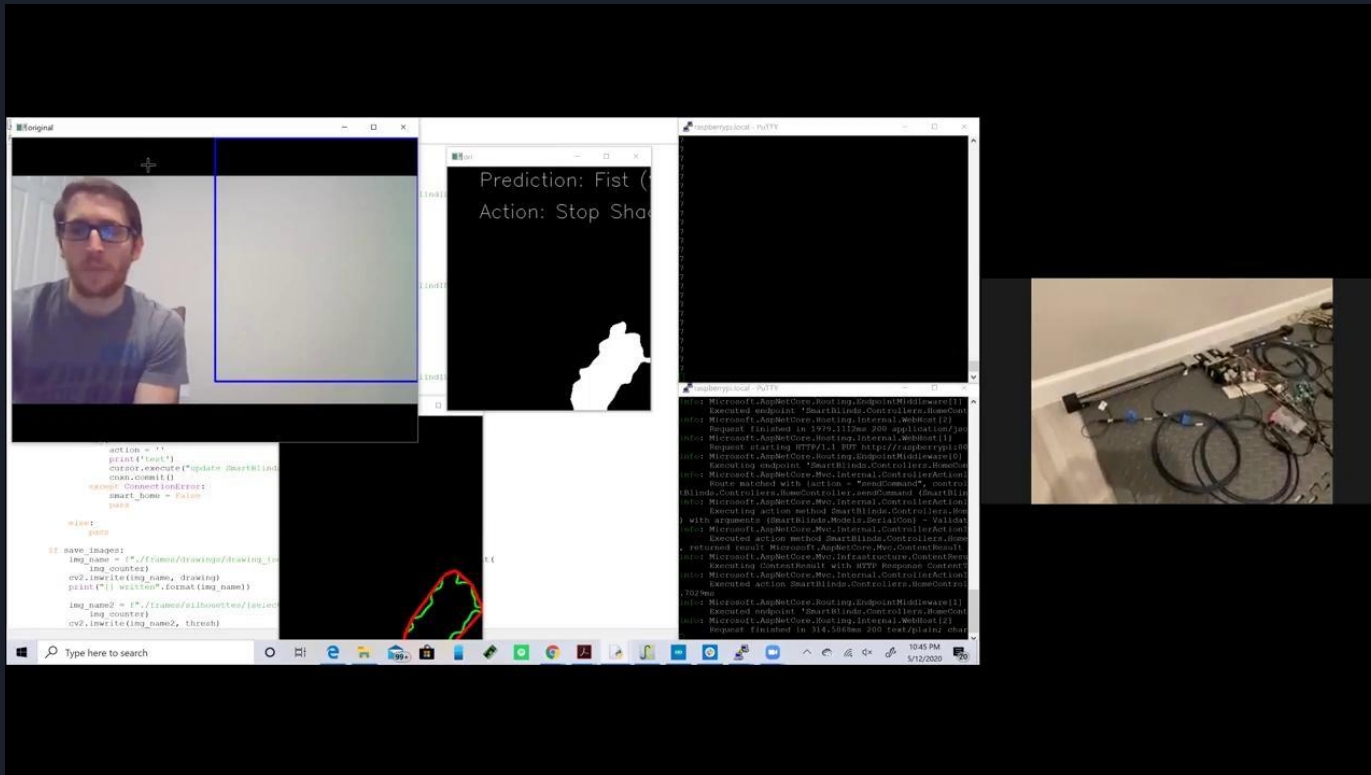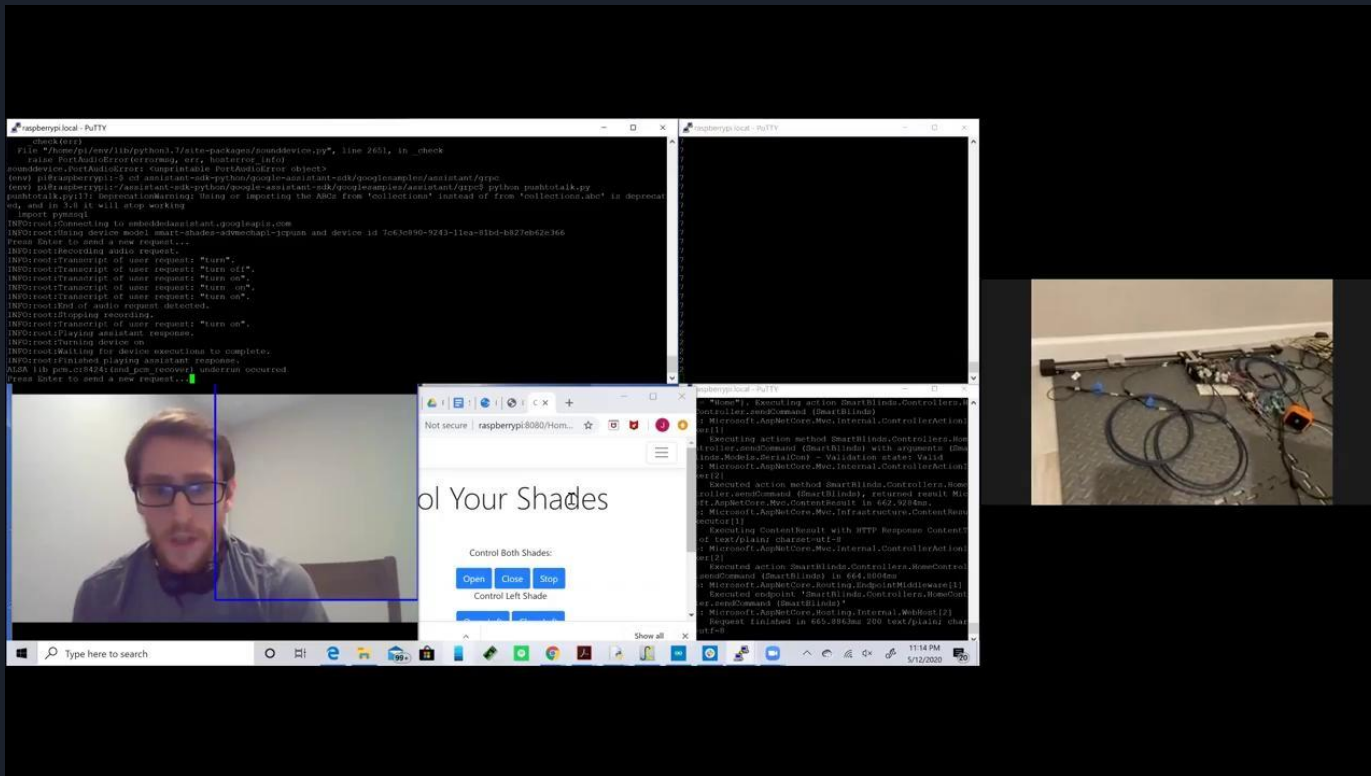Close at: 01:45 PM

Time Control

Data Flow Chart

Web App Control Demo

Gesture Control Demo

Voice Control Demo

Future Work + Q&A

- Refine Electronics Packaging
  - Combine Arduino & Propeller onto Custom PCB
- Design Wall Mounting System for Linear Rails & Develop Brackets to Attach Curtains to Actuator Carriages
- Make Gesture & Voice Control More Accessible to the User (i.e. Give User Ability to Enable These Control Modes Without Needing to Run Python Scripts)
- Modify Raspberry Pi to Automatically Start Programs