Project Wilbur Design

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Problem Statement:

- 25% of term infants and up to 80% of preterm infants are known to suffer from feeding issues.
  - Improper Speech Development
  - Nutritional Deficiencies
- Client: Dr. Christopher Mayerl
  - Mayerl Lab
  - **Focus:** Evaluate animal systems to better understand the physiology behind infant feeding
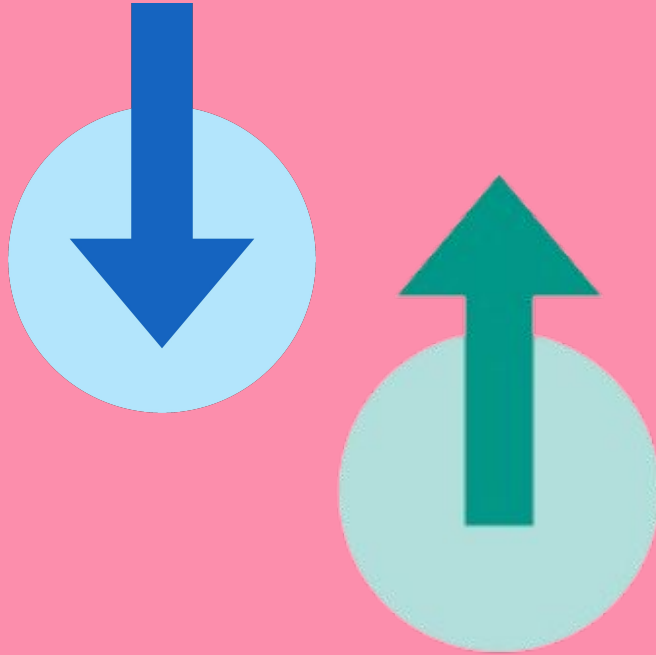 - Streamlined approach to producing research

Solution Overview

- Final system is a working control software (Front-end)

- Variable flow rate with duct valves and stiffness changed with pneumatics

- Hardware control via arduino receiving signals from frontend
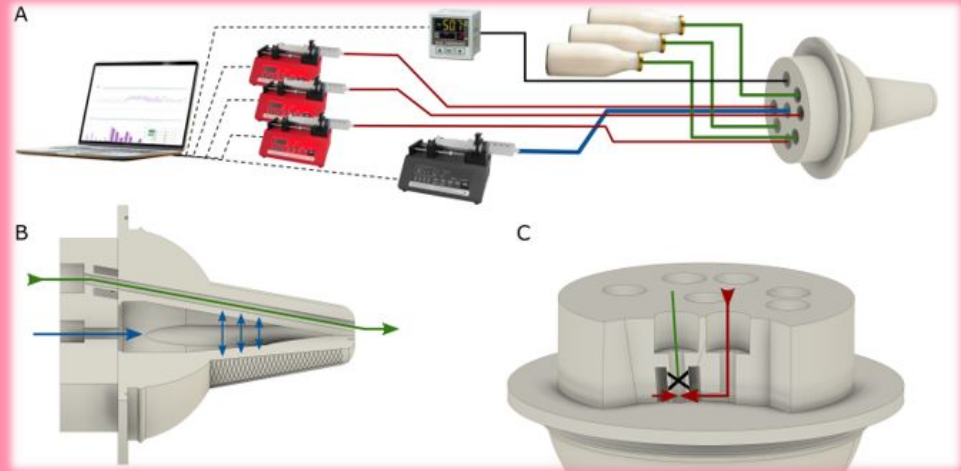
Requirements Acquisition

- Internal
  - Coding Conventions
  - C++
  - Maintainable
  - Scalable
- External
  - Functional
  - Arduino

Key Requirements: Functional

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- Functional
  - Graphical User Interface for functional control
  - Pneumatic Control of Stiffness
  - Valve Control over Flow Rate
 - Interface to Data Acquisition Center

Non-Functional Requirements

- Accessibility
  - Frontend will meet ACM code of ethics requirements for color contrast and visual clarity
- Maintainability
  - Coding convention throughout codebase to ensure readability
  - Documentation in code and delivered individually for future work
- Accuracy
  - Changes triggered by the user will execute in 1-3 seconds or less
  - Backend will verify hardware states

Environmental Requirements

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- Live Animal Testing
  - HHS Specifications
  - Challenges with piglets
- Language Demands of Prototype
  - Expecting Arduino
  - C++ using QT
- Desktop Application
  - Windows Machine
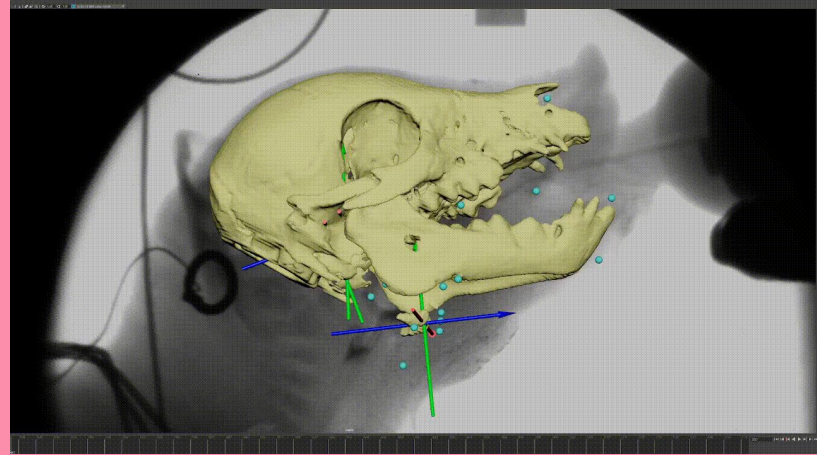
Risks and Measures

- Risks

  - Unexpected Functionality or Missing Functionality in Robot

  - Late Robot Delivery

  - Incompatible Software

- Preventative Measures

  - Framework chosen for best integration

  - Simulator development

  - Modular software to minimize risk of unexpected functionality

Schedule

Task	Start	Efforts (hrs/week)	November	December	January	February	March	April	May
Technology Demo	Now	4							
Requirements Document Final	Now	1							
Team Website	Now	2							
Project Information Mini-video	Now	3							
Issue Control and Conventions	TBD	1							
Front End Development	TBD	4							
Back End Development	TBD	4							
Prototype Simulator	TBD	4							

Upcoming Team Assignments

Conclusion

- Project Wilbur, building software control solution for Dr. Mayerl's robotic nipple prototype.

- Solution will streamline prototype manipulation and data collection for better research on infants with feeding problems.