Project Plan

Abstract

The Assistive Robotics Team (IPRO 334) is faced with the problem of creating a prototype for a robot meant to be used in a hospital setting or assisting the elderly. The robot should be modular so that future improvements and applications can be easily added. The focus of the team will be on the mobility and the interface modules of the robot. Other modules may be designed and prototyped throughout the course of the semester.

Background

As the robotics industry develops, applications for robots become endless. One niche of these machines is in health care. Yet, making robots successfully interact with people or become a part of our experience in hospitals requires some innovation and experimenting. This project proposes a modular design for a robot that can be used in health care or elderly care. Different software and hardware prototypes must be developed to perform a variety of actions as needed. In the beginning, the actions focused on will be as simple as motion and user interface, the point being to develop a platform that can sustain various modules. However, in future semesters of the course, actions may be developed that are much more complicated, such as location awareness and face identification.

Working on this project will be students in the fields of Design, Computer Science, Mechanical Engineering, Electrical Engineering, and Architecture. Based on a successful course from the Institute of Design, labeled robotic system architecture design and business model development, this project will build on previous research and ideas to accomplish the goals set forth by the group, professor, and our sponsor.

Goal

To make a robotic prototype that is capable of navigating between two points, which can be utilized in a health care/elderly setting to deliver items or messages. The hardware design will be modular for future testing and expansions.

Possible expansions include:
- more advanced communication methods such as vocal recording, text-to-speech, touch screen interface
- arms to hand/grab objects such as medicine
- tracking and finding
    - infrared, thermal, compass sensors and navigation
    - elderly care/hospital
    - medication, information/instructions for care

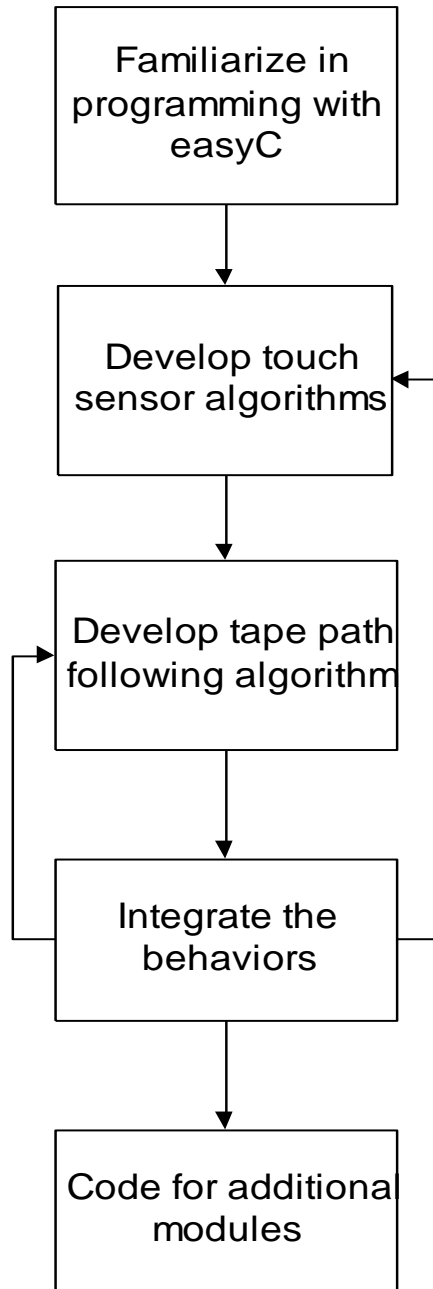**Methodology/Objectives**

```
                    ┌──────────────┐
                    │    Basic     │
                    │    Model     │
                    └──────┬───────┘
                           │
                           ▼
                    ┌──────────────┐
                    │  Modular  &  │
                    │ "Full" Base  │
                    └──────┬───────┘
                           │
              ┌────────────┴────────────┐
              ▼                         ▼
      ┌──────────────┐          ┌──────────────┐
      │  Body /New   │          │   Improve    │
      │    Part      │          │    Base      │
      └──────────────┘          └──────────────┘
```
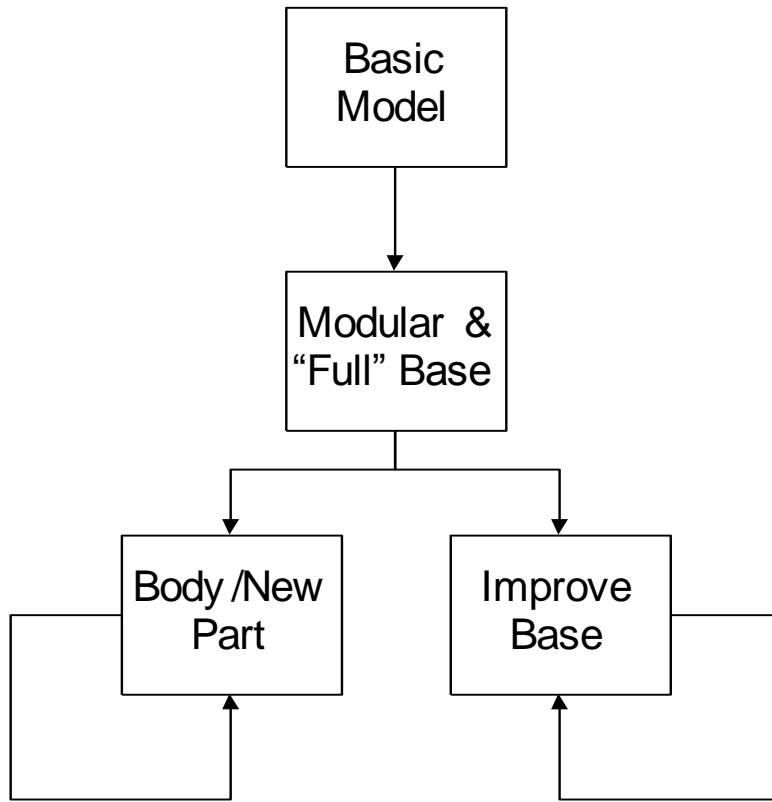
Mechanical Team Procedural Flowchart

```
┌─────────────────┐
│  Familiarize in │
│ programming with│
│      easyC      │
└─────────────────┘
         │
         ▼
┌─────────────────┐
│  Develop touch  │◄───┐
│ sensor algorithms│    │
└─────────────────┘    │
         │              │
         ▼              │
┌─────────────────┐    │
│ Develop tape path│   │
│following algorithm│  │
└─────────────────┘    │
    ▲    │              │
    │    ▼              │
┌─────────────────┐    │
│  Integrate the  │────┘
│    behaviors    │
└─────────────────┘
         │
         ▼
┌─────────────────┐
│ Code for additional│
│     modules     │
└─────────────────┘
```

Software Team Procedural Flowchart

Team Structure - See Attached Table