

ILLINOIS INSTITUTE
OF TECHNOLOGY



IPRO 334
Robotic System Applications to
Healthcare and Elderly Living
Environments

Project Plan
Spring, 2009
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Intro

IPRO 334 has been formed with the intention of creating a robot that will be able to assist elderly and disabled patients in long term care facilities, or the home. The ultimate goal of the team will be to have a full-scale, working prototype of the robot that will be able to move and interact with its surroundings.

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, Biomedical Engineering, and Psychology. 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.

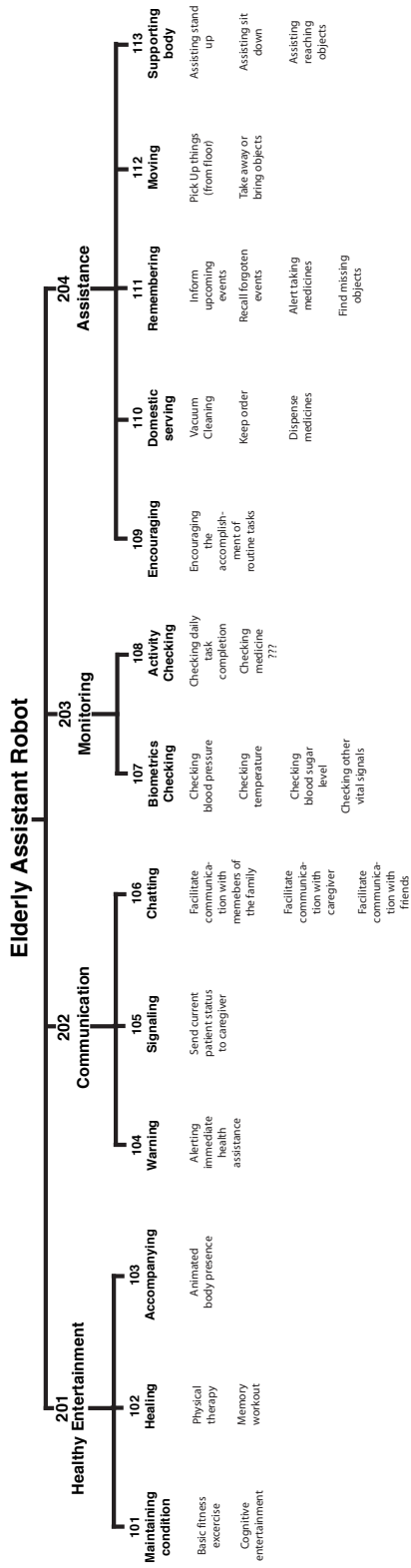
Team Values

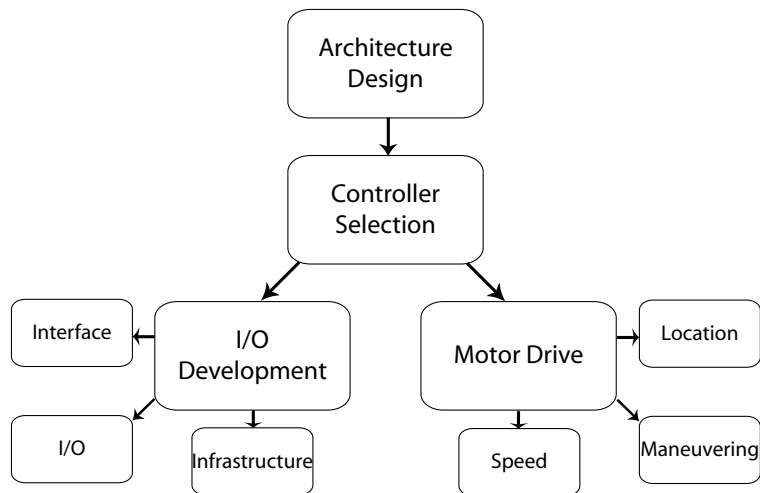
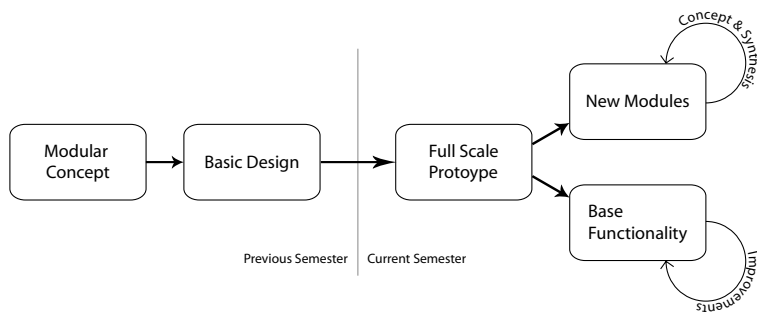
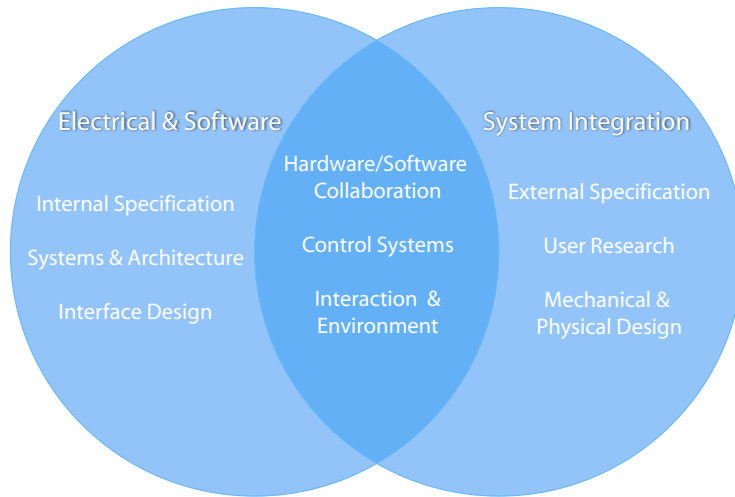
A successful team must have a few basic skills, such as communication, accountability, and respect for fellow team members. Team members are expected to show up on time for the weekly meeting, and to actively contribute to group discussions and development. Additionally, team members shall make an effort to contribute to the best of their abilities, and should not let other students do all the work for them.

As a group, IPRO 334 seems to have good conflict resolution skills. A professional attitude is expected, and opinions offered are expected to be respectful to other students and to the project. Differences of opinion are expected, however personal attacks will not be allowed. The group will decide on how to best concentrate our efforts, should a disagreement on design or implementation occur.



Function Structure
Interaction Design Workshop
Feb, 2009





Expected Results

I PRO 334 hopes to create a full-scale robot that will be able to move around on various surfaces in various environments. The robot will contain a battery pack in order to be self-sufficient. Control will be handled by an onboard computer, which will interface to the operators via devices such as a touch-screen monitor, a speaker and microphone, various warning lights, bells, and alarms, as well as connect to an existing infrastructure.

A principle goal of the design will be to create a modular platform allowing different components to be hot-swapped in and out of the system. These components will enhance the functionality of the robot, and allow the user to tailor the system to meet each user's individual needs. Various modules can include:

- Dispensing Medicine
- Measuring blood glucose levels
- Interfacing with various EKG/heart monitors
- Dexterous arms, allowing the robot to grab and manipulate objects
- Food transport
- Communications modules

Project Budget

As the team will be building a full robot, a large budget is necessary. The group will initially request \$1,000 for initial supplies, and will request more money down the road as additional materials are needed.

Item	Cost	Available
Budget	\$1,000.00	\$1,000.00
On-board Computer	(\$250.00)	\$750.00
Motors	(\$130.00)	\$620.00
Controllers	(\$150.00)	\$470.00
Structure	(\$450.00)	\$20.00
Production Materials	(\$20.00)	\$0.00

Team Members



Name	Year/Major	Skills	New Knowledge	Expectations	Team
Sarah Bowes	4th year ME	AutoCAD, Robotics Knowledge		Lead the team to a successful completion	System Integration, Project Leader
Jeffrey Cink	4th year PSYC				System Integration
Harmony Clauer	2nd year CS & CPE	Programming Communication	Development Process	A working prototype	Electrical & Software
Brent Fry	3rd year CPE	Logistics UI Design	System Integration	Help develop a well organized team	Electrical & Software, Financial Officer
Faye Garfinkle	3rd year BME	CAD Experience Psychological Factors	Robots & Mechanical Limits	Develop strong time management & communication skills	System Integration
Srinighi Kaushik	MC Graduate				
Kevin Mooney	4th year CS	Software Engineering	Electronic & Embedded Design	Understanding & appreciation for other fields	Electrical & Software
Harshill Parikh	4th year EE	Power Requirements, Mobility, Control Systems	Hands on experience	To be an excellent team member	Electrical & Software
Payal Patel	ID Graduate	Interaction Design, Product Development	Rapid Prototyping	Work with a team with different priorities	System Integration
Juan Salamanca	ID Graduate	Creative thinking, product design	Interdisciplinary Teamwork	Basic robotics	System Integration
Grant Shindo	4th year PSYC				System Integration
Prash Surendran	3rd year EE	Programming skills	Microcontrollers	A working prototype	Electrical & Software

Roles

Group 334 will not be assigning static rolls to the team members. Team members will be expected to upload materials to iGroups as necessary, and it would only be redundant to delegate additional roles. All decisions will be noted in the design materials, and as such will be available to the group members via iGroups.

Agendas will be set by each specific team, and will be given freedom to decide how to best set up their structure. A Google Group will also be created, allowing for time outlines and discussions to be hosted.