Walking Aid Alert System with Cadence Measurements

Client - Dr. Jane Mahoney
Dept. of Medicine Geriatrics Division
School of Medicine and Public Health

Advisor - Thomas Yen

Leader - Rachel O'Connell
Communicator - Yu (Alpha) Liu
BWIG - Jared Ness
BSAC - Billy Zuleger

Center for Health Enhancement System Studies (CHESS)

"To lead in research and development of innovative health systems, in order to optimize individuals' health behaviors, quality of life, and access to services."

Focus: Falls prevention

- 1 in 3 adults over 65 experience a fall annually
  - 25% of result in moderate to severe injuries
- Falls 5x more likely to bring elderly to hospital then any other condition
- Medical cost of $20 b/yr.

Focus: Dementia

- Alzheimer's affects 13% of population over 65 years, 45% over 85 years
  - Other Dementia's affect 15% of 70+
- Treatment estimated at $183 b/yr in US

Design Requirements

- Device which can be integrated with a walking assist device to alert owner when it's forgotten
- Device also records usage data for care providers
  - Time usage
  - cadence

Competition

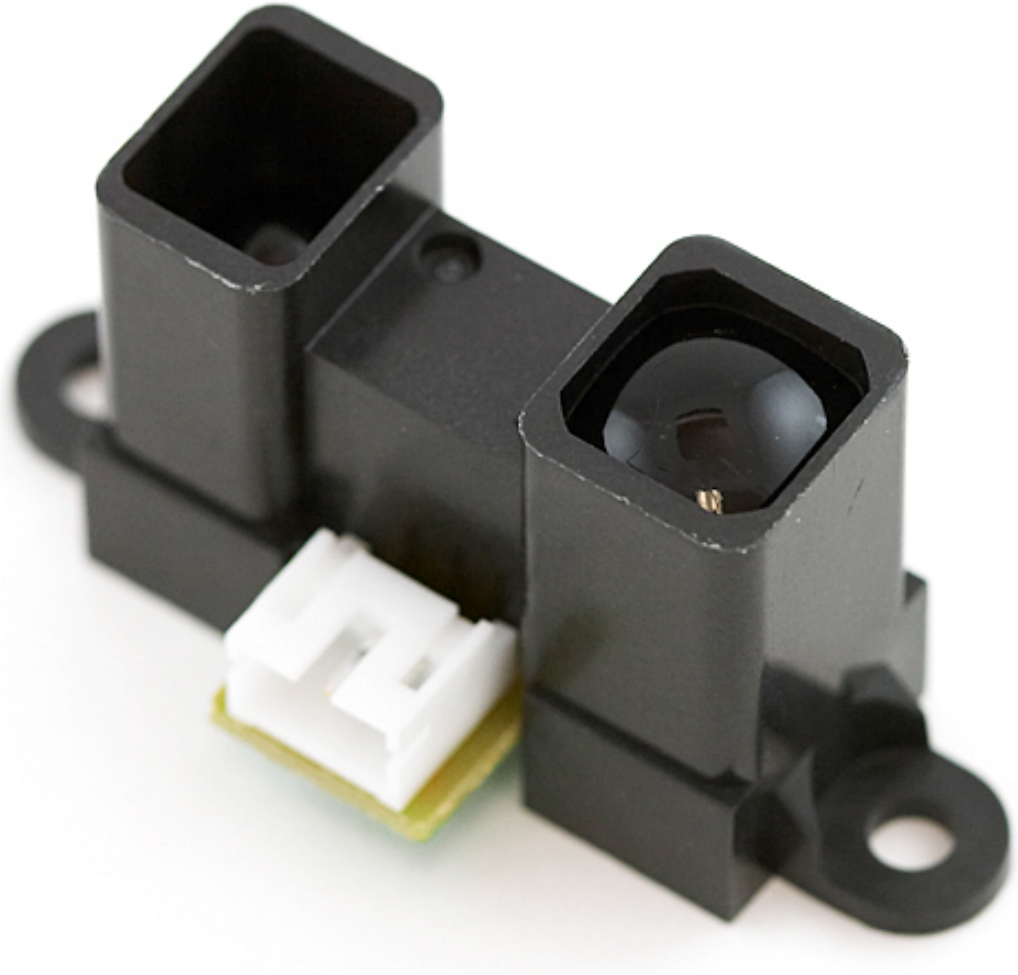
- Fairly new idea
- Similar products
  - Trekane adjustable walking cane
  - Talking stick for blind users

Ethics

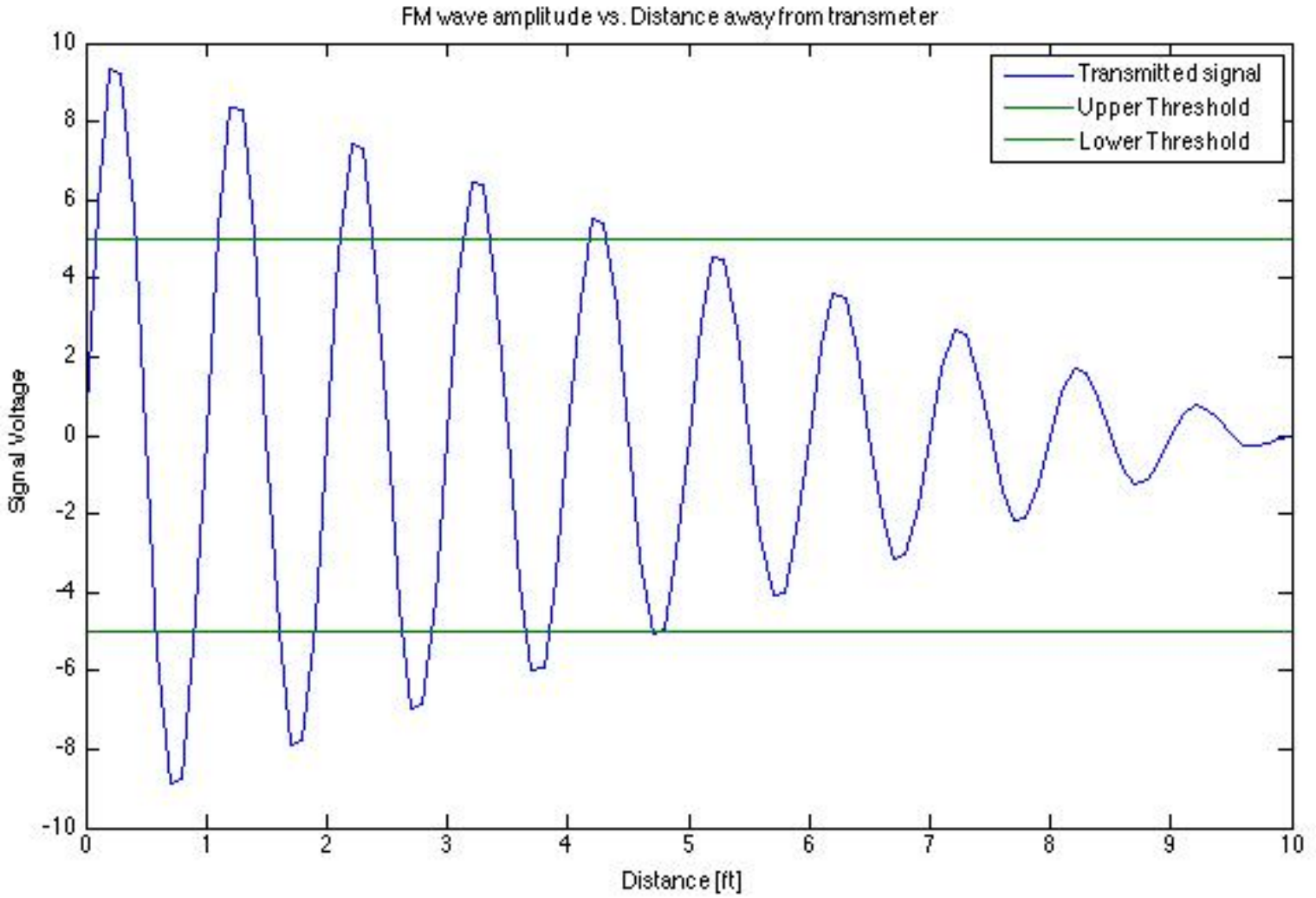
- Cost vs. Performance
- Human subjects for testing
  - CITI training for IRB approval

Bluetooth Sensor

Infrared Sensor



FM Transmitter

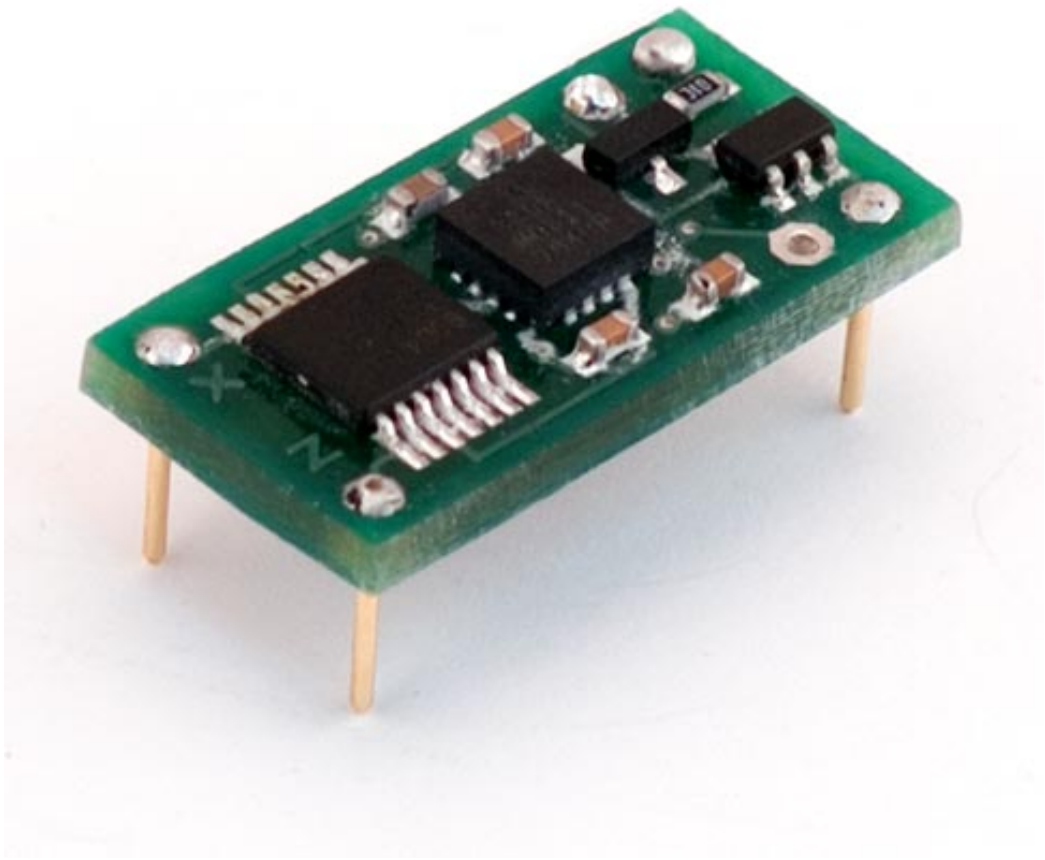


Alarm System Sensor

Alarm Sensor				
Criteria	Weight	FM Transmitter	Bluetooth Sensor	Infrared Sensor
Acurracy	35%	4	1	2
Interference	25%	3	1	2
Feasability	15%	4	3	2
Size/Weight	15%	3	4	3
Cost	10%	4	2	4
Total	5	3.6	1.85	2.35

Pedometer

Accelerometer



Speedometer

Measuring Cadence

Cadence				
Criteria	Weight	Accelerometer	Speedometer	Pedometer
Accuracy	45%	3	4	2
Attachment	25%	3	4	1
Feasability	20%	1	5	3
Cost	10%	4	3	2
Total	5	2.7	4.1	1.95

Final Design

User

Alarm

FM Receiver

Micro-controller

Output to Care Provider

Future Work

- Assisted living visitation
- Purchasing speedometer and FM transmitter – receiver
- Test both on 2-wheel walker
- Incorporate care provider feedback feature
- Second Semster
  - Accuracy and Human Subject Testing

Thank You

- Professor Yen
- Dr. Mahoney
- Dr. Gustafson
- Rachel Smedley
- Patricia Henneman

Questions?

Sources

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