non-intrusive monitoring system for isolated elderly

introducing GLOBAL CLINIC 2012

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What is Global Clinic?

Getting experience working with a team with different training and mindsets

Solving open interdisciplinary issues in a global context

This project runs from Aug 2011 to Jan 2013
Overview of the Presentation

1. Motivation
2. Solution
3. Technology

Creating monitoring devices out of common items for isolated elderly in Japan
Motivation: there is a large underserved elderly population in Japan

And this population is growing.
As of **2005**, 15% of all elderly individuals live alone. [1]

As of **2011**, 20.3% said they have no one whom they can rely on. [1]

By **2060**, 40% of the Japanese population is expected to be over 65 years old. [2]
Cyclical Decline due to Isolation

Based on consultation with Takao Calling Services
Breaking the Cycle

Improve health by giving the elderly a sense of security

Bring Peace of Mind by connecting family members
The Japanese government is trying to find a solution.

At the local prefecture level, the Japanese government has funded various projects to gather and monitor health status. [4]
Existing Systems: functionality over user

Continuous measurement

At home measurement

Consultation services

Image courtesy of [4]
Problem:
Current solutions require users to change their lifestyle
Solution: sensor-embedded monitoring devices in the form of common items from which elderly users can choose to suit their own lifestyle

Adjust the product to the user, not the user to the product
Project Goals

Develop a variety of sensor embeddable **form factors** from a suite of common items

Develop a versatile **sensor system** that can integrate into various form factors
Who are our users?
Technology and Lifestyle

Familiar items are not considered “technology”
Form Factors Considered
Walking Aid

- Cane, walking stick, or walker
- Useable as a physical support
- Familiar form factor for elderly
- Monitors outside activity

Status: Working Prototype
Accessory Clip

• Attaches to a piece of clothing, shoe, or purse

• Put it on and forget about it
• Adaptable to clothing choice
• May have size and comfort issues
• Has to be durable

Status: Form factor only
Stationary Handheld Device

• *TV remote*, photo frame, game controller

• Elderly often watch TV
• Collects health data during use

Status: Form factor only
Technology: how we can implement this monitoring device

With a lot of hard work!
Choices based on:

Survey conducted by Kogakuin University

Consultation with a medical doctor

Sensor Preference Survey

- Body Temperature
- Body Orientation
- Ambient Temperature
- Heart Rate
- Physical Location
- Humidity
Data Processing: Heart Rate

Digital Filter

Count Peaks

3 Peaks / 3 Seconds = 60 BPM
Data Transfer

Prototype

Bluetooth Device

Android Phone

Final Product

3G Transmission Module

Online Database

Image courtesy of HUAWEI, Sparkfun electronics, at&t
Online Data Viewer
But wait...
There’s More!

Poor kids gotta keep workin’
Refine prototype for robustness
User testing
  Improve form factor ergonomics
  Adjust sensor choices
  Refine data display
“We went to Japan and had steak for breakfast.”

International Collaboration
Plenty of Traveling

3 Weeks in Japan
3 Weeks in America
Teleconferencing with Kogakuin

In weekly teleconferences the team discussed designs and brainstormed together.
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