About:

Natural disasters and extreme weather conditions pose a threat to property and life, can disrupt daily life or even force people to evacuate their homes. Safe and timely information on these phenomena can be the difference between life and death. Therefore, preparedness for such emergency situations is important for everyone.

Data has shown that aging population is more susceptible to problems created by bad weather due to one or more of the following:

* Impaired Physical Mobility
* Diminished sensory awareness
* Cognitive impairments
* Social Limitations
* Economic Limitations
* Special Needs

The Challenges: Acceptance of technology is quite low among older adults and many do not use mobile phones beyond dialling and receiving calls.

Objective:

We decided to understand the problems faced by older adults during natural calamities and proposed a weather monitoring system that alerts the residents during emergency and guides them with the steps they should take to ensure safety.

Understanding the users:

The system is intended for a broad range of users. However, special care was taken in designing the system making it more accessible to older adults who might have limited or diminished capabilities as they are the ones who will be able to benefit most by our devices early warning and guidance abilities. We visited Wesley Wood Towers in Atlanta to understand the problems faced by older adults and the type of assistance required by them. Our user study revealed that:

Most of them found it difficult to use current technology such as phones and tablets and some did not use mobile phones at all.

Few used computers, but the use was limited to emails and rarely for browsing or news updates.

Tangible interactive objects were more accessible to them than onscreen interfaces

The design challenges

Based on our research and user study we designed a system that had following properties:

It has to be a physical system and not a phone/tablet application

It will not require focussed attention and will notify in case of emergency

It should be easily noticeable from across the room (Clock metaphor)

The notifications would be audio-visual (multi-sensory feedback).

The Prototype

We built a system called WeatherCube that stays connected to weather API’s and simulates the forecasted weather on a physical model of a house. As part of a weather simulation environment, our system aims at providing multi-sensory stimuli to perceive several aspects of weather - sunshine, wind, rain, lightning etc. The system is catered not just for emergency weather situations such as Thunderstorm, tornado etc. but also to provide day-to-day weather updates and simulate outside climate.

The system also has a display that shows time, temperature and weather warnings. During emergency steps for safety notifications are displayed on screen.

Evaluation

We presented the prototype at demos and conducted semi-structured interviews to receive feedback. Our participants were adults, older adults, industry experts and children. While adults perceived it more as an ambient display system our primary target users, older adults, liked the system. The most important features for them was the ability to check the weather without putting on glasses and the negligible learning curve.

#### Findings

In addition to the positive response from older adults the system was also appreciated by small children who were able to easily understand the system and loved interacting with it.

Video: