

# Simple and Effective Home Health Monitoring using Spatiotemporal Data

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## Objectives

As more older adults are choosing to live independently in their homes, there is a need to monitor the level and nature of their daily activities. The aim of this project was to create a simple spatiotemporal prototype system to track an individual's activity in the home. The future prototype will use a smartphone or smartwatch as its platform, be unobtrusive, low cost, and non-invasive.

## Methodology

Methods for this project included creating and testing a semi-structured interview. The data such as that collected from the semi-structured interviews was converted into real-time daily schedules that includes time, location, and duration of activities. In the future, the plan would be to work with computer scientists to create a computer learning algorithm to identify activities using spatiotemporal variables such as sequence, frequency, duration, and location in order to predict an activity an individual is participating in.

## Results

We have conducted three pilot interviews. Each interview lasted between thirty minutes to an hour and was documented on paper and audio recording for accuracy. The interviews consisted of several preliminary questions followed by questions about daily routine, ADL's, and IADL's, and the time it took to complete them. Data was analyzed using an Excel spreadsheet. We have concluded that the time invested in analyzing the semi-structured interviews does not justify the quality of data gathered. The future direction of the project should include adding an activity configuration chart component that will be filled out by the participant with prompting from the researcher and compare the results against the data gathered from the interviews.

Thursday			
Time	Room	Location	Activity
12am	Living Room	Bed	Watching TV
2am	Living Room	Bed	Sleeping
3:07am	Bathroom	Toilet	Toileting
3:11am	Bathroom	Sink	Wash Hands
3:13am	Living Room	TV	Turn off TV
3:15am	Living Room	Bed	Sleeping
6:03am	Bathroom	Toilet	Toileting
6:06am	Bathroom	Sink	Wash Hands
6:08am	Living Room	Bed	Sleeping
9:45am	Living Room	Bed	Wake Up
10:32am	Living Room	Bed	Get Up
10:34am	Bathroom	Toilet	Toileting
10:39am	Bathroom	Sink	Wash Hands
10:40am	Bathroom	Sink	Wash Face
10:41am	Bathroom	Sink	Brush Teeth
10:43am	Bathroom	Sink	Moisturize
10:45am	Hallway	Closet	Get Dressed
10:50am	Entry Way	Front Door	Leave for Yoga
12:10pm	Entry Way	Front Door	Return From Yoga
12:11pm	Bathroom	Toilet	Toileting
12:14pm	Bathroom	Sink	Wash Hands
12:16pm	Bathroom	Sink	Wash Up
12:24pm	Hallway	Closet	Change Clothes
12:28pm	Kitchen	Fridge	Get Food
12:30pm	Kitchen	Cabinet	Get Food

Screenshot of a real-time schedule.



## Conclusions

There is a need to monitor older adult's activity in the home to promote independence. The real-time schedules provide spatiotemporal variables that will be able to make a home activity tracking device possible. Future implementation of a home health tracking device can enable older adults to age in place with ease and safety.

## Literature Cited

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