

Visualising and Analysing Activities of Daily Living Data to Determine How Assistive Technology Can be Designed to Support Independent Living

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Statement of Candidate

I, Benjamin Cavanagh, declare that this report, submitted as part of the requirement for the award of Bachelor of Engineering in the School of Engineering, Macquarie University, is entirely my own work unless otherwise referenced or acknowledged. This document has not been submitted for qualification or assessment in any academic institution.

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Abstract

Background

Advancements in medical technology, availability of healthcare, and living conditions have contributed to increasing the average life expectancy of Australians "by 13.7 years for males and by 11.2 years for females" [32]. As life expectancy continues to increase, the number of elderly Australians also increases. As of 2023, one in six Australians are aged 65 or older [31]. In recent years, a growing portion of these elderly Australians are choosing to live independently in their own home for various reasons despite their risk of accidents growing. As a result, an increasing number of older Australians require assistance in the form of technology to ensure their personal safety. This necessitates the need for extensive research in newer advanced forms of assistive technology.

Methods and Aims

This software engineering research thesis extends the work achieved by previous researchers on a singular large project to address this need. These researchers have recorded a large dataset comprising of body camera images and have classified them into distinct classes of activities.

Through the conduction of a Literature Review, a knowledge gap was found, where (to our knowledge), while many other researchers have conducted investigations for the individual research areas of ADL data-measuring devices, spatio-temporal data analysis and spatio-temporal data visualisation, there are none that specifically explore how data recorded from wearable body cameras can be analysed and visualised both temporally and spatially to inform the next generation of assistive technology that can help older Australians live safer independently in their own home.

The aim of this thesis was to cover this research knowledge gap by finding reasoned answers to the following research questions:

1. Given a large collection of categorised body-camera ADL image data, how can this data be processed, visualised, and analysed with respect to the spatial and temporal movement of an elderly person to inform the design of the next generation of assistive technology?
2. How can this new assistive technology be applied to help the elderly safely live independently?

This was intended to be done by applying this dataset that was previously collected and organised. A software program was planned and designed to be capable of processing the data to form a timeline of activities for numerous participants and visualising these in space and time dimensions. The output visualisation files that are generated by the program are intended to be taken for data analysis and then be practically applied.

Results and Discussion

Ultimately, the final algorithm was successful in achieving the initial aim of the thesis, as it can process datasets of ADL images, create an activity timeline for each participant, and visualise the data in both a detailed and abstract view. These visualisation methods support one's data analysis of both individual activities as well as patterns and trends.

There is strong potential for practical applications of these data visualisation methods in real-world situations. Both visualisation methods are useful tools, and if applied together, a participant's fall hazards can be removed/controlled, diets can be tracked, long-term behavioural patterns can be monitored, personalised plans can be set to encourage healthier daily routines, and progress can be regularly monitored. However, it is possible that certain gaps in the data collection may prevent crucial information from being discovered.

Conclusion

In conclusion, the algorithm that was developed through this thesis contributes well to the continually-advancing design of modern assistive technology, supporting and improving the safety of older individuals who choose to live at home independently by generating useful insights that can be analysed and acted upon.

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Abbreviations, Terms, and Definitions

Term	Definition
Activity class	A defined type of activity categorised by deep learning
ADL	Activities of daily living
AR	Augmented reality
BLE	Bluetooth low energy
Deep learning	One form of machine learning that acts like the human brain for processing data
DT	Date/time
Gait	Human movement by walking
Grid heatmap	Visualises the magnitude of data in a grid using colours
ID	Identification
I/O	Input/output
Java	An object-oriented programming language designed to work for many applications
Merge sort	An efficient sorting algorithm based on the "divide and conquer" approach
Patient Work	The name of the overarching project
PLS-DA	Partial least square discriminant analysis
RE	Rehabilitation engineering
Representative image	An image that represents/identifies an instance of an activity class
RFID	Radio frequency identification
RGBD	Red green blue - depth
Spatial heatmap	Visualises the magnitude of data in a map-like view using colours
Spatio-temporal data	Collected data that contains both space and time aspects
ST	Spatio-Temporal
Visualisation 1	A data visualisation method providing a detailed view
Visualisation 2	A data visualisation method providing an abstract view
VPN	Virtual private network
WIMS	Wearable inertial measurement units

Table 1: Abbreviations, Terms, and Definitions

1 Introduction

1.1 Background of Overarching Project

In recent times, there has been an apparent trend where older Australians are increasingly choosing to live at home independently. While there are many factors that could influence this decision, negative press for aged care facilities and COVID-19 contribute greatly. Many of these older people have developed poor health conditions over their lives, raising concern for their personal health and safety when living at home independently. Consequently, there has been a great need for research in this area. In response to this need, a multifaceted large project was established to explore effective ways that older people can use technology and supportive tools to safely live at home independently.

1.2 Previous Work

Yin et al. [1] began the overarching project in 2017 with an observational study. The researchers gathered 26 elderly Australian volunteers to take part in their research. Initially, the volunteers were interviewed and answered a questionnaire. Then, the volunteers equipped themselves with wearable body cameras for approximately 24 hours, capturing a collection of image data that recorded their daily activities. To conclude their research, the volunteers were interviewed once again and feedback was gathered from them.

Xiong et al. [2] continued the project with their study in 2020. Xiong used the unstructured collection of images that were produced from Yin's study and created a deep learning model (a sub-field of machine learning). This model was used to classify these images into 12 main classes of activities. By classifying the images, Xiong successfully converted the unstructured data into organised data that could be taken for visualisation and analysis in future work. This thesis takes this organised data and proceeds in a direction where it can be applied for useful purposes.

In 2023, Ammar [3] expanded on the work of Xiong by identifying risks for these activities by implementing a novel method of image-based analysis. She selected representative images of each activity class and conducted context-based analysis and routine-based analysis (two different types of image-based analysis) to identify potential risks and hazards associated with the specific activity classes to help these elderly Australians.

The following table presents a concise summary of all contributions to the overarching project at the time of writing this thesis from earliest to latest.

Name	Contribution
Yin	Captured participant data with body cameras and conducted interviews
Xiong	Organised dataset into classes of activities with machine learning
Ammar	Conducted image analysis to identify risks associated with activity classes

Table 2: Previous Contributions to the Overarching Project

1.3 Knowledge Gap and Research Questions

From the Previous Work section, it was shown that the dataset was initially obtained from Yin and was later categorised by Xiong. Prior to the commencement of this thesis, Ammar has conducted one form of data analysis through her research, involving the identification of a set of risks that are associated with the activity classes for participants. This means that at the time of writing, there still remains a wide range of potential areas and uses of data analysis and visualisation that have not yet been explored.

This past work on the overarching project was considered as the Literature Review was conducted. A wide range of projects sharing some similarities involving ADL data measuring, spatio-temporal data visualisation, and spatio-temporal data analysis from other researchers were reviewed. Ultimately, a research knowledge gap was found, where (to our knowledge) *while many other researchers have conducted investigations for the individual research areas of ADL data-measuring devices, spatio-temporal data analysis and spatio-temporal data visualisation, there are none that specifically explore how data recorded from wearable body cameras can be analysed and visualised both temporally and spatially to inform the next generation of assistive technology that can help older Australians live safer independently in their own home.*

After this clear gap in knowledge was defined, two research questions were then identified. These research questions will be answered by carrying out this research project. When the research questions are answered, they will be able to fill this knowledge gap. The following research questions are proposed:

- Given a large collection of categorised body-camera ADL image data, how can this data be processed, visualised, and analysed with respect to the spatial and temporal movement of an elderly person to inform the design of the next generation of assistive technology?
- How can this new assistive technology be applied to help the elderly safely live independently?

1.4 Thesis Goal and Objectives

The primary goal, or aim, of this thesis is to research, plan, and implement a solution to answer the two research questions that were discussed previously, identifying how the next generation of assistive technology can be shaped by processing, visualising, and analysing spatio-temporal data to support older Australians who choose to live at home independently. To achieve this goal, a set of objectives must be satisfied. These objectives are:

1. Develop a functional Java program that is capable of retrieving, processing, and presenting data from the dataset in tabular form. This data includes the amount of time that individual participants spend on specific activities, the respective locations and fall hazards of these activities, and images that are representative of the activities
2. Expand the program to create two different types of visual representations of the ADL data based on the temporal aspects defined by the program and combining this with spatial aspects recorded from images taken from each activity

By achieving the above objectives, the research questions will be answered, and hence, the gap in knowledge will be covered. Achieving these objectives leads to many practical implications for the potential applications of the solution (this is detailed in the Discussion). By completing this research project, it is hoped that the results can be used to:

- Help users self-assess their daily activities by quantifying and visualising their time duration and location
- Help the health providers of these users by giving them insights into routines and patterns to help them make informed decisions and action medical plans for their users

1.5 Thesis Outline

This software engineering research thesis can be considered a solution-seeking research project, building on the work achieved by the previous researchers. In these former studies, the dataset of images was collected and was then categorised into classes of activities. The new knowledge that our work aims to bring to light is how body-camera-based ADL image data can be processed, visualised, and analysed with respect to space and time dimensions. It serves as an effective contribution to the goal of the overarching project by showing how the current design of assistive technology can be enhanced going forward.

Our work will show how wearing body cameras can help generate useful statistics and insights that can be directly applied to help older Australians live at home safely by themselves. By calculating the amount of time that users perform certain activities and visually representing the data with location, the users of the system and their health providers can discover patterns and routines which can then be used to help improve the safety of the user. At the time of writing, this specific area of research has not been thoroughly explored to our knowledge. Therefore, this research thesis is established and aims to fill this gap in knowledge.

1.6 Research Plan Summary

In order to achieve the thesis goal and fulfill the objectives that were previously discussed, the following research plan will be implemented (and explained in further detail in the Methodology):

1. Acquire access to the required resources (the folder containing the dataset of image data)
2. Write the first component of the Java program that performs the following actions:
 - Iterate through the dataset, and parse and record all image data from multiple sources
 - Sort the image data records into chronological order for each participant
 - Identify and then delete all duplicate image records
 - Define all "activities" that were performed by each participant, creating activity data records for every participant
 - Calculate the total combined time duration for all instances of each of a participant's activity classes
 - Print the results (the image data and each participant's activity data) into an Excel file
3. Run the current version of the program on the dataset
4. Ensure that the results stored in the Excel file are accurate and consistent with the actual dataset of images
5. Manually record the location and fall hazard data for each participant's set of activities using the representative images
6. Manually record each participant's demographic data
7. Write the second component of the program that performs the following actions:
 - Create a "visualisation 1" file for every participant
 - Create a "visualisation 2" file for every participant
 - Create a single "visualisation 2" file containing the data for every participant
8. Run the current version of the program on the dataset
9. Ensure that the visual results in the visualisation 1 and visualisation 2 files are consistent with the tabular data stored in the Excel file

1.7 Deliverables

The following describes a list of all items that will be produced upon completion of the project:

- The Thesis A document
- The Thesis B document
- The complete algorithm including its version history
- The Excel output file containing the quantitative and qualitative data in the form of tables after being processed by the program
- A set of image files for both visualisation methods that visualise the temporal and spatial aspects of the results
- A log for weekly meeting discussions and a log for the work achieved from week to week

1.8 Project Timeline Plan

The following section outlines the estimated project plan that will be followed. It contains important milestones in order to ensure that all deliverables discussed above will be produced in the given timeframe and with high quality.

Session	Week	Milestones
1	1	Read past student theses, attend first lecture
1	2	Submit project preferences
1	3	Establish basic document structure, schedule first meeting with supervisor
1	4	Attend first meeting with supervisor, schedule future meetings, begin Introduction
1	5	Begin Literature Review and Methodology
1	6	Begin writing Thesis A component of program
1	8	Finish writing Thesis A component of program
1	9	Complete first draft of Literature Review, Introduction, and Methodology
1	10	Complete first draft of Thesis A and begin Preliminary Results
1	11	Review feedback from supervisor and implement changes
1	12	Complete Preliminary Results
1	13	Submit Thesis A and prepare for presentation
2	1	Establish the basic document structure for all Thesis B sections
2	2	Begin Results, begin writing Thesis B component of program
2	7	Finish writing Thesis B component of program, complete Results and begin Discussion
2	9	Complete Discussion and begin Conclusion
2	10	Complete first draft of Thesis B, complete Conclusion and begin Future Work
2	11	Review feedback from supervisor and implement changes
2	12	Complete Future Work
2	13	Submit Thesis B and prepare for presentation

Table 3: Project Timeline Plan

1.9 Planning for Variations, Failure, and Contingencies

1.9.1 Planning for Variations

When we had initially received the project, we were not able to gain access to the actual dataset for two weeks. However, it was crucial to begin writing the program as soon as possible. Since we did not know the exact format of the folder structure of the images in the dataset, we wrote the program carefully in such a way that it was easily adaptable to work with the actual folder structure once access was approved.

After planning for this initial project variation, we did not know what program features would need to change throughout the project going forward. It was possible that new tables might need to be produced along with the existing image table and activity tables. Therefore, the program was designed to have many single-purpose loosely-coupled functions that could be easily modified or removed further in development if it was necessary.

1.9.2 Planning for Failure and Recovery

Beginning the project, we understood that there were many unknown variables and anticipated many aspects of the project that could lead to unexpected delays that could lead to failure. There could have been data inconsistency of images inside the dataset (such as varying file types or names), writing the program could have been a significant learning curve, and finding relevant papers for the Literature Review could have taken longer than anticipated. Hence, when developing the timeline plan, we decided to include buffer time to allow for sufficient time to recover from these delays and still be able to submit the completed project at the time requested.

When we designed the function that selects a representative image for a user's activity, we anticipated that the image that the function selects may not always be ideal. The image could be dark or unclear. We prepared for this by designing the image-selection process to favour user-chosen images over the image in the middle of an activity.

1.9.3 Planning Contingencies

Contingencies were prepared to ensure alternative methods could be implemented if significant problems were to arise. At the beginning of the project, we did not know if Java was capable of performing every task required for the program to fulfill the program objective. Python was decided to be the alternative option for a programming language to be used if Java did not work, as we have had some past experience with the language and knew there would not be a steep learning curve if writing in Python was necessary. Contingency plans were also made for sorting the records. Initially, we did not know if Java's sorting method would work with this specific set of image records and the specific way it was required to be sorted. Therefore, the idea to write our own version of a traditional sorting algorithm (merge sort) was prepared if it was needed.

1.10 A Software Engineering Research Thesis

”Software engineering” is defined as the process of designing, developing, testing, and maintaining software systems. This work is considered to be a *software engineering* research thesis. This is because the two established research questions can only be addressed through the design and development of a novel complex software solution that is capable of gathering, processing, and visualising spatio-temporal data for elderly Australians to then be analysed. To implement such an algorithm, fundamental software engineering skills and the Agile methodology are required to be applied. By addressing these research questions through following the research plan and creating this algorithm, this thesis contributes to the design of the next generation of assistive technology.

A range of software engineering skills will be required to be utilised to successfully complete the research plan that was previously discussed. This includes a sufficient understanding and execution of the following software engineering skills:

- Object-oriented programming
- Various data structures
- Java API libraries and classes
- File I/O
- Image I/O and graphics rendering
- Control of execution flow
- String manipulation
- Code readability and organisation
- Software testing and debugging
- Error handling
- Version control
- Software documentation
- Presentation and spoken communication

In addition to the required skills for the project listed above, software engineering project management will be needed. The core principles of Agile methodology will be followed. During the first session, the planning, designing, and half of the developing phase was completed. In the second session, the other half of the developing phase, the testing, reviewing, and maintaining phases will be completed. Weekly meetings will be held to review the current progress of the algorithm and then plan changes to be carried out in the next sprint. After the completion of the research project, the solution will form the core of some industry practices, as the algorithm will continue to be improved and maintained regularly through an internship.

2 Literature Review

2.1 Overview

This Literature Review thoroughly explores numerous literary and scholarly works that are closely related to the research questions of this thesis. It will demonstrate understanding of the conceptual relationships between the reviewed works and the proposed project. It will make intellectual connections between the different parts of the review and relate the work in context. It will also demonstrate critical judgement about the reviewed works in the context of the proposed research project. Finally, it will identify clear research gaps which this thesis aims to cover.

Firstly, the literature for the previous work done on this project will be discussed. Following this, the two main research areas for this thesis will be explored. This will be done by investigating the literature in relation to the current existing data-measuring devices and then investigating the literature for analysing and visualising ADL data.

2.2 Project Background

This thesis applies data that was collected from Yin's study and was then categorised by Xiong's study. Hence, it is essential to explore and understand the context behind the dataset that is being used in this study. While the context has been briefly summarised in the Introduction, this section will discuss the previous research in more detail.

The goal of Yin's component of the project was to "capture the full range of patient work experienced by people with type 2 diabetes and chronic comorbidities" [1]. To fulfill this goal, the researchers applied a novel type of approach based on image-capturing to record ADL data. The primary deliverable from Yin's study was a significant number of unstructured image data from body cameras that were worn by research participants as they performed their daily activities for approximately a 24-hour period.

There were 26 participants involved in this initial study (although only 24 of these recorded ADL data with the camera). The average participant age was 72.15, ranging from 46 to 86 years old. 16 were male and 10 were female. Most participants identified as Australian, while others identified as Indian, UK/Jewish, Chinese, Italian, Caribbean, Indonesian, and Sri Lankan. Most were retired, but some were employed or self-employed. All participants either live alone, with their spouse, or their family. The participants have a range of various comorbidities, and the majority requires insulin.

The goal of Xiong's component of the project was to find a way to process and systematically classify the images in this dataset into 12 activity classes [2]. The name of each final activity class is as follows:

- Socializing
- Electronic Devices
- Food Related
- Managing Health
- Indoor
- Outdoor
- Deliberate Exercise
- Study
- Driving
- Shopping
- Sleeping
- Watching TV

The approach that Xiong took to fulfill his goal was to develop a deep learning model to identify key features of images. The accuracy of Xiong's model improved over the development of his component of the project, starting from an accuracy of 42% and eventually becoming 66% accurate. This degree of accuracy was achieved through a combination of image-level and event-level approaches. To assist with the image classification process, Xiong's model considered the following image properties:

- Local image features: Features of a smaller part of the image (for example, detecting a distinct structure or shape on a part of the image)
- Global image features: Features that describe the whole image (for example, colours, textures, and shapes)
- Contextual metadata: The context behind an image that was taken (for example, date and time)

In the end, Xiong was successful in classifying these images into a set of activity classes.

This study will utilise specific aspects of Yin and Xiong's components of the project. The algorithm will make use of the consistent file-naming structure of the images that were produced by Yin, as well as the folder structure organised into activity classes that was produced by Xiong. While this study does not particularly expand on Ammar's works with identifying risks associated with the images [3], it is recommended to apply the results from this study and Ammar's together to benefit the user as best as possible.

2.3 Review of Established Data-Measuring Devices

2.3.1 Introduction

The use of devices that are capable of recording and measuring a user's daily activities is one of the most significant concepts in relation to this thesis. Many previous researchers have conducted investigations where they have applied various forms of these devices to track ADL data. Therefore, the focus of this section is to identify and acknowledge the recent advancements in such technologies, and the extent of their current capabilities.

2.3.2 Classes of Data-Measuring Devices

To help explore and analyse different types of ADL data-measuring devices, it is important to classify them. Thakur and Han [4] explain that there are two primary types of these devices, which are ones that use "sensor-based recognition" and "vision-based recognition". Devices that utilise sensor-based recognition are sensors that collect various types of ADL-related data to then be processed by pattern recognition and machine learning. Sensor-based devices typically use accelerometers, which work well at detecting sudden movement, meaning that sensors can be useful for detecting falls [5]. Devices that use vision-based recognition are cameras that typically record daily activity videos to then be analysed and interpreted.

Cheung et al. [5] expands on the idea of these two classes of data-measuring devices by adding a third class, which is a hybrid module that combines sensor and vision technology together. This concept of the same 2-3 classes of devices recur in many other research papers, including studies from Clapes et al. [6] and Mazzoni Ranieri et al. [7]. While many studies exist that explore wearable sensor devices, such as Chen et al. [38] and Lockhart et al. [40], studies from Mazzoni Ranieri et al. [7] and Kang et al. [41] show that sensor devices also have a second category, which is "environmental sensors" that are not wearable and are typically placed in a home environment.

From these established definitions of classes of data-measuring devices, the type of approach that was previously used to conduct the investigation for this project best fits into a vision-based approach. It uses chest-mounted wearable body cameras to record ADL data which was then processed with machine learning and pattern recognition. The application of wearable body camera image-capturing devices may allow a wider range of body movement data to be captured in comparison to standard video-recording cameras and sensors that serve only one or few purposes.

2.3.3 Data-Measuring Device Trends

In some research papers that explore the types of data-measuring devices, researchers discuss certain trends that have changed over time for the use of these devices. Researchers Holthe et al. [8] and Camp et al. [9] have conducted their own investigations that share some similarities in terms of their methodologies where they have both thoroughly searched through multiple databases to find ADL-monitoring devices that are commonly used. Holthe et al. concludes that in recent years there has been a shift towards research in body-worn devices. However, Camp et al. claims that from all of their selected articles that focussed on ADL recognition, 34 systems were strictly environmental-based devices, and only 2 were strictly wearable devices. Camp's research suggests that the trend may lean towards non-wearable (environmental) devices. This would appear to contradict the conclusion given by Holthe. The cause of the differing conclusions is unknown but could have resulted from potential biases in the selection of research papers.

2.3.4 Sensor-Based Data-Measuring Devices

After identifying the three main classes of data-measuring devices and exploring recent trends, we now delve into a range of specific existing devices. This subsection discusses multiple existing applications of sensor-based data-measuring devices. Ahanathapillai et al. [11] presents a wearable sensor-based activity monitoring device that provides health indicators and sends data to an established database with the aim to "provide long-term monitoring for older people". Chifu et al. [12] has used a smartwatch-based application and Bluetooth beacons to record accurate ADL data. Lee et al. [13] has developed a novel method for monitoring the physical activity of users with the use of wearable accelerometers and then calculating loading intensity to differentiate between different types of activities. Bellagente et al. [14] presents a type of home environment sensor approach, describing a non-invasive "ambient assisted living application" to monitor the physical lifestyle of an older person. Lockhart et al. [40] has investigated the use of wearable sensors that record IMU (inertial measurement unit) to identify fall risks with older adults.

2.3.5 Vision-Based Data-Measuring Devices

This subsection discusses multiple existing applications of vision-based data-measuring devices. Kim et al. [15] presents a unique camera video-based human activity recognition system that uses "skeleton joints features" to identify specific daily activities for older people. This approach has a 84.33% correct recognition rate. Miguel et al. [16] proposes another camera image-based approach that utilises a machine learning algorithm that accurately detects falls from elderly people. While Miguel's approach captures image data with cameras (like this project does), it could only be used for fall-detection and not detecting ADLs. Steinert et al. [42] proposes the use of mobile phone cameras and other cameras that are commercially available to serve as an alternative low-cost method for gait analysis. In a different investigation from Ponte [43], fall risks were assessed "through two-dimensional video gait analysis". Her methodology involved recording a control group and an elderly group for two separate activities with a 1080p video camera at 50 frames per second to gain her dataset, which was taken to calculate "gait and time parameters for both activities". Ohnishi et al. [44] establishes a unique "wrist-mounted camera" approach to record objects that participants handle to help better recognise daily activities.

2.3.6 Hybrid Data-Measuring Devices

This subsection discusses existing applications of hybrid data-measuring devices. Clapes et al. [6] implemented a novel system of the hybrid type, comprising of a vision module and a wearable module. The vision module processed data from two RGBD cameras and the wearable module processed data from "wearable inertial measurement units" (WIMS). Patel and Shah [10] propose a similar framework that uses environmental sensors, wearable body sensors, and cameras. When set up in a smart home, all these devices work together to collect, aggregate, and then store data in a central database.

2.3.7 Other Technology

There are also other forms of technology that are unrelated to physical activity tracking but still have great potential in assisting older people to live independently and safely. For instance, Martinez-Martin and Costa [17] discuss certain ways that "cognitive and personal robot assistants" could potentially help older people by assisting with medical tasks and engaging with human-like conversations. Additionally, Ong et al. [18] discusses the potential applications of augmented reality (AR) and Rehabilitation Engineering (RE), training older people in daily living activities to better facilitate independent living. Ando et al. [19] proposes a "RFID-based system" where a user's food, beverage, and drug intake, as well as activity rate is monitored.

2.3.8 Analysis of Technology

After researching a range of past studies from researchers, we have created *Table 4* to help summarise and compare the types of data-measuring devices and technology used by these researchers, as well as the participants in the study or targeted user type, the applied or targeted environment to use the technology, and the findings from each investigation.

By observing this table, we can clearly see that the data-measuring devices that were used in almost all investigations was intended to be eventually used by older adults. While many of these investigations were carried out with elderly participants, some of the studies used younger participants instead. The number of participants varied greatly from study to study.

Most of the studies intended the ADL data-measuring devices to be applied in a home environment. A portion of these studies emphasised that their devices were required to be implemented in a smart-home. Some other studies intended their devices to be applied in settings where many people gather regularly, such as elderly day care centers. In these situations, elderly people have others readily available to help them in the event of a fall or health-related problem. However, when the elderly live independently, they are fully dependent on assistive technology. This highlights the importance of reliable devices when living independently.

Researcher/s	Publication	Technology	Purpose	Participants	Number of Participants	Setting	Findings
[6] Clapes et al.	2018, Spain	“Vision inertial system”	To detect activities of daily living	Targeted for elderly people, participants were older adults	14 participants	Targeted for a home environment	The researchers conclude that their system is better at detecting actions. However, the vision module is better at predicting temporal extent
[10] Patel and Shah	2020, India	Video and environmental sensor hybrid framework	To enhance the living standards of the aged person	Targeted for elderly people, participants were males aged 55	2 participants	Applied in an indoor environment, targeted for a smart-home environment	The researchers found that their approach is promising but it is still too soon to transform it into a working model
[11] Ahanathapil-lai et al.	2015, United Kingdom	“Wrist wearable unit”	To monitor older people in their own home	Targeted for elderly people	Not specified	Their own home	The researchers conclude that their results look good and could lead to developing an algorithm that would help to identify and classify activities
[12] Chifu et al.	2022, Romania	Distributed monitoring system that uses “Beacon technology”	To identify the daily routines of seniors	Targeted for elderly people, participants were older adults	10 participants	Applied in their own homes, targeted for their own homes	The researchers acquired promising results, claiming that their proposed techniques can identify daily routines with confidence
[13] Lee et al.	2018, United Kingdom	“Accelerometers and mobile phones”	To promote musculoskeletal health	Targeted for elderly people	Not specified	Applied in a non-laboratory environment, targeted for their own homes	The researchers found that mobile phones and accelerometers can be used to promote musculoskeletal health
[14] Bellagente et al.	2018, Italy	“Ambient assisted living application” - a sensory system	To monitor the life style of an elderly person, non-invasively	Targeted for elderly people	Not specified	Not applied when written. Targeted for a home environment	The researchers conclude that their proposed application can successfully monitor the lifestyle of an elderly person in a non-invasive way
[15] Kim et al.	2019, South Korea and Pakistan	“Depth video-based HAR system”	To recognize daily activities of elderly people in indoor environments	Targeted for elderly people	Not specified	Applied in and targeted for smart homes and smart environments	The researchers conclude that their experimental results for their proposed HAR system show promising performance
[16] Miguel et al.	2017, Spain	“Fall detection system based on computer vision techniques”	To detect falls from elderly people	Targeted for elderly people	Not specified	Applied in both a laboratory and a home. Targeted for smart homes.	The researchers conclude that their new fall detector shows promising results in detection accuracy
[17] Martinez-Martin and Costa	2021, Spain	“Cognitive assistants” and “robot assistants”	To give an overview of research projects for elderly care	Targeted for elderly people. No participants	0 participants	Targeted for their own home	The researchers conclude that there is still a lot of work that needs to be done to provide fully autonomous elderly healthcare at home with human-like social interaction.
[18] Ong et al.	2011, Singapore	“AR-based RE and AT systems”	To investigate how AR can help improve the quality of life of the elderly	Targeted for elderly people and for people with disabilities	Not specified	Targeted for their own home	The researchers conclude that by integrating GPS, sensors, and wireless communication devices, portable AR systems can be created
[19] Ando et al.	2020, Italy	“RFID System”	To find a way to constantly monitor deviations from users’ normal behavior	Targeted for elderly people. Applied for participants aged between 22 and 39	10 participants	Targeted for a home environment. Applied in a simulated home-like environment	The researchers conclude that their RFID system is robust and reliable
[40] Lockhart et al.	2021, USA	Wearable sensors	To determine the predictive ability for future falls using a wearable system	Targeted for elderly people. Applied for older adults with a mean age of 74.3	171 participants	Applied in and targeted for “community-dwelling settings”	The researchers achieved high accuracy and sensitivity for their best-trained model
[41] Kang et al.	2023, South Korea	“Smart Plug Hub” – system that utilises sensors and environmental signals	To analyze time-series environmental signals and accurately estimate a patient’s ADL	Targeted user unclear. Applied for some patients with dementia and mild cognitive impairment	Not specified	Targeted for a home environment, applied in patients’ living environment	The researchers achieved high accuracy in classifying patient ADLs
[42] Steinert et al.	2020, Germany	Mobile phone and commercially available cameras	To quantify gait parameters	Targeted for elderly people. Applied for participants aged 65 and above	44 participants	Applied in a laboratory environment.	The researchers conclude that the smartphone camera-based application was not able to detect gait parameters as well as an established system
[43] Ponte	2022, Portugal	Video camera	To develop a quantitative and objective approach to assess fall risk through two-dimensional (2D) video gait analysis	Targeted for anyone at risk of falling, particularly elderly people. Applied for participants with a mean age of 47.8	33 participants	Targeted for day care centers and other elderly institutions	Ponte concludes that her algorithm can provide promising fall risk indicators
[44] Ohnishi et al.	2016, Japan	Head and Wrist-mounted cameras	To recognise activities of daily living (ADL) from a first-person wearable camera	Targeted and applied participants not specified	Not specified	Applied in their own homes	The researchers conclude that a wrist-mounted camera can provide many benefits over a head-mounted camera and some other approaches for recording ADLs

Table 4: Summary of Data-Recording Devices and Technology

2.4 Review of Data Analysis and Visualisation Methods

2.4.1 Introduction

Spatio-temporal data analysis and visualisation combines spatial and temporal data together to enhance a non-technical person's understanding of a user's daily activity patterns [34]. This thesis involves the curation and analysis of ADL-related data that was previously collected, which is then graphically represented temporally and spatially. The main purpose of this section is to identify and acknowledge the recent discoveries and best practices in curating ADL data into useful information, as well as analysing and visualising spatio-temporal data. This will be done by investigating similar research projects in these areas.

2.4.2 Machine Learning Methods for Analysing ADL Data

As we researched many studies, we identified an emerging trend where there has been a shift towards the use of machine learning in ADL data analysis. Cheung et al. [5] proposes their own system that accepts recorded video, passes the data to machine learning algorithms to recognise certain activities and then generates and sends alerts to those who are close to the elderly person in real-time. Patel and Shah [10] take this approach one step further, emphasising how in day-to-day situations in the real-world, "human behaviour is unpredictable". In response, they have proposed a novel method that uses machine learning to recognise unusual activities and append the new activity types to the end of a pre-defined list of activities. Miguel et al. [16] presents an alternative system designed for recognising falls with a machine learning algorithm. By processing data through several algorithms and then using the output as the input for the machine learning algorithm, they achieved a fall-detection accuracy of higher than 96%.

2.4.3 Machine Learning Methods for Analysing ADL Data - Analysis

The project for this thesis also follows the machine learning trend, as it uses deep learning to categorise the image data into various activity classes. The deep learning algorithm that was designed by Xiong and used in this project is most similar to Cheung's system, as both are capable of recognising a pre-defined set of activity classes despite having different approaches to achieve this. However, the machine learning algorithm for this project is not capable of picking up new activity classes (like Patel's) or detecting falls (like Miguel's).

2.4.4 Other Methods for Analysing Spatio-Temporal Data

Investigating literature for processing and analysing ADL data revealed various ways that tables can be utilised to present useful and actionable information. In the study conducted by Chifu et al. [12], after the researchers collected the ADL data from their investigation, they have presented it in a table containing columns for the name of the activity class, the start time of the activity, and the end time. Petrich et al. [27] decided to analyse their dataset by using another type of table to compare various types of activity classes with its corresponding number of occurrences per hour and the average execution time for each activity class.

”Partial least square discriminant analysis” (PLS-DA) is a data analysis technique used to extract features from a dataset and is well-suited for multi-dimensional data [45]. After Zhou et al. [36] collected data from their investigation, the researchers conducted PLS-DA based on ”spatio-temporal gait variables” so that they could distinguish between their participants who fell and did not fall.

We also investigated how modern commercial smartwatches like the Apple Watch [29] and the Galaxy Watch [30] curate and present their activity-based data, as these smartwatches have wearable sensors that record both spatial and temporal physical activity data. The most recent data from these activities (from the past week) is displayed in chronological order in a list-like structure for the user to review.

2.4.5 Other Methods for Analysing Spatio-Temporal Data - Analysis

The data curation method that was used by Chifu could be highly useful if adapted and modified to use additional columns that are needed in this study, such as time duration and location. Petrich’s idea to present the total number of occurrences of activity classes can also be useful. However, it may be more useful to instead sum the total duration for each activity class. The method that the Apple Watch and Galaxy watch use to present spatio-temporal data to their users is effective, as they can easily interpret the results. However, the activities these smartwatches record is limited to only workout-related activities and do not record other types of activity data such as watching TV, driving, or socializing.

Both this thesis and Zhou’s study perform data analysis to extract features from multi-dimensional data. However, the methods applied to do this greatly differ. Additionally, while Zhou’s study also carries out spatio-temporal data analysis, their focus is on neurological patients, whereas this thesis focuses on elderly people.

Many existing data analysis methods for predicting risks utilise gait analysis [37], sensor data, or clinical assessments [38], [39]. However, it was found that many of these methods do not analyse both when and where these activities of daily living happen inside an elderly person's home. This is highly important in order to gain insights into an elderly person's environment and routines to help improve their safety. Therefore, this idea of analysing both "when and where" will be done in this thesis.

2.4.6 Heatmap Methods for Data Visualisation

When investigating the literature for methods to visualise spatio-temporal data (particularly ADL data), it was found that a common emerging trend is the use of heatmap approaches. Aloulou et al. [20] conducted an investigation that is considered to be similar to this research project, involving the use of similar devices but for the purpose of helping dementia patients in a nursing home rather than older people in their own home. In their investigation, they have used grid-based heatmaps to graphically present the number of hours that a patient performs specific activities each day for one and a half months. The use of colour in their heatmaps indicates a greater or fewer number of hours in a single day (see *Figure 3*).

Researchers Yu and He [21] have proposed an alternative heatmap-based data visualisation method. In their methodology, the steps taken prior to creating heatmaps involve gathering the data, performing mathematical calculations to find data intensity, meshing the area to a "tiny number of grids", and then selecting centroids for each grid. To generate a heatmap, they created a matrix that contains the intensity values where each value was represented as a colour (see *Figure 4*). Olawoyin et al. [22] employed another heatmap approach that used an algorithm to measure the frequency of time and location data. This data was taken and aggregated to be visualised using a heatmap with a structure of a real-world map (called a spatial heatmap) showing "temporal representative points" (see *Figure 5*).

Researchers Dhont et al. [23] have proposed three new techniques for conducting spatio-temporal data analysis that are named "temporal fingerprinting through circular heat maps", "spatio-temporal comparison through circular heat map subtraction" and "temporal behaviour characterisation through label maps" (see *Figure 6*). The use of heatmaps in their project differs from others, taking spatio-temporal data visualisation to the next level by subtracting values from two heatmaps to highlight differences between them both locally (comparing each heatmap with the previous heatmap), and globally (comparing each heatmap with a baseline to recognise global differences).

2.4.7 Heatmap Methods for Data Visualisation - Analysis

Because a heatmap approach appears to work well in a similar type of project such as Aloulou's, this thesis has the potential to greatly benefit from a similar grid-based heatmap-style approach to visualise daily activity data for each participant in the study. However, we believe that we could take this concept a step further by using location in addition to the name of the activity. The approach used in Olawoyin's study is effective and could also be adapted for this thesis. While the use of their method is unrelated to tracking participant activities, they claim that their method "provides actionable insight to enhance data-driven decision-making", which is partially the goal for this thesis.

Considering the study from Yu and He, the need for extensive use of mathematics is not necessary, but some other main ideas behind their approach (including creating a matrix of intensity values) could still be effectively adapted and modified to suit the visualisation approach needed for achieving the goal of this thesis. While the application of data visualisation in Dhont's study differs greatly from this study, this thesis could still be enhanced by using a similar approach where heatmaps for participant activities over an extended period of time can be compared by subtracting values.

2.4.8 Other Methods for Data Visualisation

Continuing to investigate the literature revealed other forms of new methods of spatio-temporal data visualisation. Surian et al. [24] implemented a methodology that utilised "Bluetooth Low Energy" (BLE) beacons. Their approach processed the number of signals received by wearable sensor technology to estimate or predict a user's location. Ultimately, the use of this new method allowed the researchers to visualise their collected data through a plot-based graph, comparing time with the predicted user location (see *Figure 7*). Bach et al. [25] proposes a novel visualisation approach called the "generalized space-time cube". The conceptual three-dimensional cube represents data across space and time, which can be transformed into a two-dimensional visualisation for the analysis of "all datasets that can be represented in two dimensions plus time" (see *Figure 8*). Liu et al. [26] proposes an interactive spatio-temporal data visualisation system designed for large-scale data called "TPFlow". This method uses an algorithm that can automatically "slice multidimensional ST data" along with a "visual analytics framework" that allows for partitioning through interactive visualisations (see *Figure 9*).

Kim et al. [15] visualises their recorded data using a three-dimensional cube that presents data from "skeleton joints features" (sensors placed on a person's body joints) (see *Figure 10*). Petrich et al. [27] uses a column-graph-based method to visualise the frequency of ADL activity classes with the activity classes on the y-axis and the day frequency on the x-axis (see *Figure 11*). Cheung [5] uses a simple pie chart and column chart to visualise the total distribution of a user's daily activities based on their own activity classes they have defined (see *Figure 12*). Similarly, the study from Camp [9] also visualises the frequency of participant ADL data through a bar chart (see *Figure 13*). Stucki et al. [28] also uses graphs to visualise the frequency of ADL data for participants, however, these researchers use a stacked bar chart with a 24-hour timeframe on the y-axis and a 20-day period on the x-axis (see *Figure 14*). Ahmadian et al. [35] visualises spatio-temporal data by comparing a box-plot for time with a box-plot for distance for the movement of their participants (see *Figure 15*).

2.4.9 Other Methods for Data Visualisation - Analysis

The body cameras used when Yin carried out the data-gathering component of this project did not use signal-processing or location-predicting, however, a plot-based visualisation method like Surian's could be useful for presenting user activity location and time-related data together. Considering the proposed project from Liu, this thesis will also require spatio-temporal data to be extracted for analysis with an algorithm. While an interactive approach like Liu's could be considerably useful, this type of approach will not be implemented as this is beyond our skillset. Both Bach and Kim visualise data with a three-dimensional cube. Because Bach's approach is fairly complex and Kim's does not visualise temporal data, a more unique three-dimensional cube visualisation method could be implemented for this thesis that uses temporal and spatial data in a more understandable, insightful, and actionable way.

A box-plot approach like the ones Ahmadian uses may be effective but may not be easy for a non-technical user to interpret, and hence, it would be difficult to make decisions. The column graph-based approach presented by Petrich is significantly applicable to this thesis. However, it does not show a location to represent the data spatially, which this thesis could benefit from. Likewise, Cheung's two visualisation methods and Camp's bar chart visualisation method lack a spatial dimension. However, the idea to visualise the frequency of participant activities could greatly help users easily assess the amount of time they spend on certain activity classes from day to day. The stacked bar chart method that Stucki implements could be considerably effective as it can be easily understood by regular users, and hence, help them make decisions. It also lacks a way to track spatial movement, however, the approach could be modified. For example, one axis could be used to track spatial movement and the other for time.

2.5 Conclusion

In this Literature Review, a range of existing research was explored in relation to the two main components of this study. These components are the data-measuring devices and methods to analyse and visualise data temporally and spatially. Through our research, we have found that many studies exist that cover various aspects of these topics. However, it was also found that there is a gap that currently remains unexplored.

Our research has found that most studies do not use a camera image-capturing approach to record data, and those that do are not used for the application of detecting and recognising a user's daily activities. Our research has also found that while many studies successfully identify and classify a participant's daily activities and calculate their duration over time, many methods and results that the researchers use do not consider a spatial aspect. The studies that do visualise spatial and temporal data are not related to tracking a user's ADL data.

The gaps that have been discussed above can be combined to form a singular knowledge gap for clarity. *To our knowledge, while many other researchers have conducted investigations for these individual research areas, there are none that specifically explore how data recorded from wearable body cameras can be analyzed and visualized both temporally and spatially to inform the next generation of assistive technology that can help older Australians live safer independently in their own home.* This is the specific knowledge gap that this thesis aims to address.

To help create an effective solution, different concepts of a select few of these studies will be taken and adapted. In the study from Chifu et al. [12], the researchers collated their temporal data into a table that recorded the names of activities, their start time, and end time. This idea will be applied in this thesis, but multiple other columns will also be used, including time duration, spatial data, fall hazard data, and the file name of a representative image.

In the investigation from Petrich et al. [27], the researchers presented the total number of occurrences for each activity class. A similar idea will be implemented in this thesis, where instead, the combined time duration for each activity class will be displayed in the Excel file. Stucki et al. [28] was able to visualise their ADL data through the use of a stacked bar chart. A component of the methodology of this thesis will involve a similar type of approach, where the time duration of a participant's activities will be represented as various colours along the x-axis, and the location will be represented as letters above or below the activities with a key indicating the name of the location. The following Methodology will further explain how these ideas from these researchers can be effectively adapted to help find an answer to both research questions and cover the gap in knowledge.

3 Methodology

3.1 Introduction

In order to fulfill the research goal and answer the research questions, a structured methodology or research plan was required to be established and followed. This methodology has been well-informed by the literature review and will include or adapt certain ideas. The methodology was decided to be split into two sections, including a data extraction/processing component and a data visualisation/analysis component. The algorithm was chosen to be written in the Java programming language. It consists of multiple classes and many methods. It is organised to clearly show how it works and to facilitate ease of maintenance.

3.1.1 Data Extraction/Processing Component Overview

In the data extraction and processing component, the program firstly searches through all folders in the dataset, taking different elements of data to create a collection of "image records". After this, the program sorts these image records into chronological order for each participant. Next, the program removes any unwanted duplicate records that are found. Then, the program outputs all the processed image records into an Excel file as a long table. Following this, the program iterates through all participants in the dataset. For each activity for each participant, the program defines the start and end time/date, calculates the time duration, determines a "representative image", defines the location of the activity, defines the fall hazard of the activity, and then calculates the combined overall time duration for each activity class when all individual activities are recorded. The program prints a separate activity table for each participant that contains this information. All participant activity tables that are presented in the Excel file are intended for non-technical users to view, understand, and help them make decisions.

3.1.2 Data Visualisation/Analysis Component Overview

In the data visualisation and analysis component, the program applies the processed data and generates two separate visualisation files for each participant, titled "visualisation 1" and "visualisation 2" respectively. Visualisation 1 shows a participant's activities using their representative images as a more detailed view. Visualisation 2 shows a participant's activities in a more abstract structure using colours and letters to represent activities and locations respectively.

3.1.3 Summary

In summary, the complete solution comprises of implementing both the data extraction/processing and data visualisation/analysis components that are outlined above. The remainder of the Methodology will describe the solution in more detail. Firstly, the preparatory work that was required to be completed prior to writing the program will be discussed. After this, the program's classes, methods, and libraries will be explained. Then, each step of the full solution will be explained in thorough detail.

By implementing the proposed solution, the spatio-temporal data that has been gathered from the former studies can be effectively processed, visualised, and analysed, showing how the next generation of assistive technology can be designed to aid the health-related decision-making process of users and their health providers. This will fulfill the research goal and answer the research questions.

3.2 Preparatory Work

The algorithm could not be written and run without completing some initial preparatory work. Before accessing the sensitive data, connection to the Macquarie University network was required. While this was possible by being present on campus, the ongoing development of the project needed to be done primarily off-campus. The use of the Macquarie VPN was required to access the Macquarie University network remotely. Following this, we were required to request access and gain authorisation to the shared dataset folder. After connecting to the Macquarie University network and gaining access to the dataset folder, the shared network drive of the computer with the program was required to be mapped to the following shared folder: \\mqauth.uni.mq.edu.au\shares\data\MED\AIHI\Consumer Informatics. *Figure 16* shows evidence for this completed preparatory work.

When this was done, we needed to ensure that the folder structure was correct and consistent. The shared folder must contain a sub-folder called "Patient work project". This folder must have its own sub-folder called "Body Camera Data". This folder should contain a collection of activity classes. Each activity class should contain a few sub-folders, including one named "Processed". Another folder with the same activity name should be found inside the Processed sub-folder. After clicking on the activity name, a list of participants should appear. Finally, a set of body camera images should be found inside these participant sub-folders.

After verifying the correct folder structure, we needed to ensure that the data being read by the program was correct. All files inside each participant folder must be in JPG format. Then, the name of each file must have the following structure: PSSYYYYMMDDHHMMSSUTC1000_???

- PSS: These three characters must always appear at the start of each image
- YYYYMMDD: These eight characters identify the approximate year, month, and day that the image was recorded
- HHMMSSUTC: These six characters (plus "UTC") identify the approximate hour, minute, and second that the image was recorded
- 1000_???: The '?' characters represent a number that helps identify the actual correct time the image was taken

After ensuring that the file path was correct, the folder structure was exactly as described, and the image files were precisely as described above, the program was then able to process the images correctly.

3.3 Classes, Methods, and Libraries

3.3.1 Classes

This section explains the purpose of each class that was implemented in the final solution.

- Main: The Main class is used to execute the main program
- ImageRecord: The ImageRecord class is used to group the data of an image into a single object that can be stored in its own ArrayList
- ActivityRecord: The ActivityRecord class is used to group the data of a single activity for a participant into a single object that can be stored in its own ArrayList

ImageRecord Object	ActivityRecord Object
fileName	participant
imageID	name
participantID	representative
year	representativeImage
month	location
day	fallHazard
hour	startDay
minute	startMonth
second	startYear
activity	startHour
sortingVariable	startMinute
	startSecond
	endDay
	endMonth
	endYear
	endHour
	endMinute
	endSecond
	duration
	durationInSeconds
	durationHours
	durationMinutes
	durationSeconds

Figure 1: Image and Activity Record Objects

3.3.2 Methods

This section explains the purpose of each method of the Main class that was implemented in the solution in the correct order that each one is presented in the program.

- main: Executes the whole program. It makes calls to recordImageData, sortImageTable, removeDuplicates, fillImageTable, participantActivities, fillActivityTable, participantActivitiesTotalDuration, createVisualisation1File, createVisualisation2File, createActivityLegend, and createLocationLegend. It clearly shows how the whole program works at a high-level
- recordImageData: Searches through each image file in the dataset, taking all the required data elements and storing it into a consistent list of image records

- `adjustTimestamp`: Gets the original timestamp information from an image and makes specific calculations to ensure the actual timestamp stored in the image record object is correct
- `sortImageTable`: Sorts the list of image records in chronological order for each participant
- `removeDuplicates`: The image records table can have duplicate entries. This method iterates through the sorted list and removes these duplicate records
- `participantActivities`: Considers only one participant, and for this participant, the method defines all of their own activities by calculating their time duration and determining a representative image for each activity
- `getDuration`: Receives time duration in seconds and converts the data into a more standard form (hours, minutes, and seconds)
- `fillImageTable`: Iterates through each image record object and writes the data in the Excel file. It also prints the table headings
- `fillActivityTable`: Iterates through a participant's activity records and writes the data in the Excel file. It also prints the table headings
- `getLocationData`: Retrieves location data for an activity from the corresponding participant's text file containing the data
- `getFallHazardData`: Retrieves fall hazard data for an activity from the corresponding participant's text file containing the data
- `participantActivitiesTotalDuration`: Calls the `participantActivityTotalDuration` method for every type of activity class
- `participantActivityTotalDuration`: Considers only one activity class for one user and sums the user's total time duration for all instances of this activity class from their own activity records
- `createVisualisation1File`: Creates a visualisation 1 PNG file for a specific participant
- `addDemographics`: Retrieves demographics data from a certain participant's text file containing the data to be used in the `createVisualisation1File` method
- `addVisualisation1Entry`: Adds a new entry (representative image, activity, location, fall hazard, duration) to a visualisation 1 file
- `createVisualisation2File`: Creates a visualisation 2 PNG file for a specific participant
- `locationToLetter`: Receives location text (e.g., "outdoors") and assigns it a letter or letters (e.g., "AG") to be used for visualisation 2
- `createActivityLegend`: Creates an activity legend for visualisation 2
- `createLegendBox`: Creates a coloured box to be used for an activity legend

- `createLocationLegend`: Creates a location legend for visualisation 2
- `clearImage`: Clears or resets an image so that it can be re-processed when the program is run again

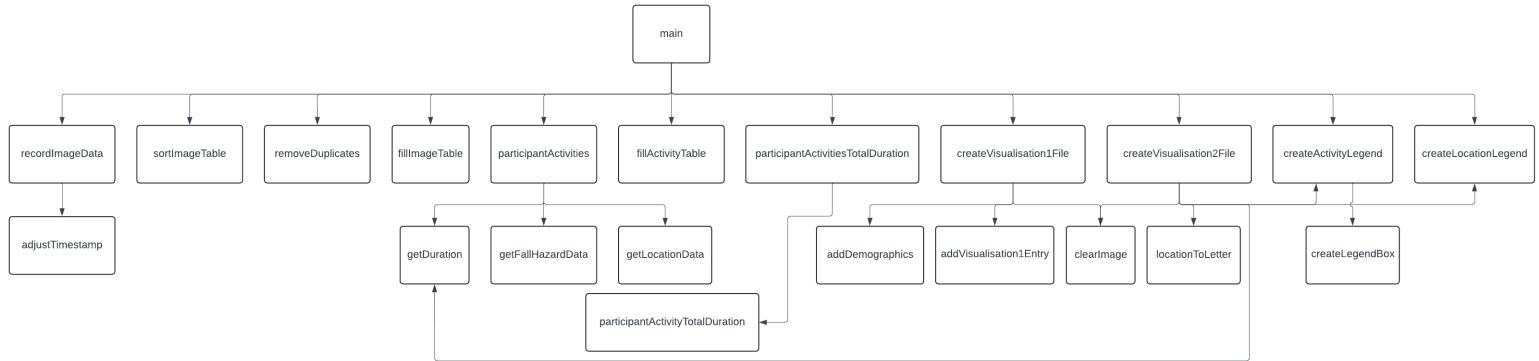


Figure 2: Program Method Hierarchy

3.3.3 Libraries

- `java.io.File`: Required for Java to be able to recognise system files and set the file path
- `java.io.Writer` and `java.io.FileWriter`: Required for Java to be able to write text to the Excel file
- `java.util.ArrayList`: Required for Java to be able to use ArrayLists; an ideal data structure to use for storing lists of records
- `java.util.Collections`: Required to sort the location names in alphabetical order
- `java.io.BufferedReader` and `java.io.FileReader`: Required to read text from multiple text files
- `java.awt.image.BufferedImage`: Required to identify image files
- `javax.imageio.ImageIO`: Required to edit image files
- `java.awt.*`: Required primarily for graphics. It includes fonts, colours, graphics2D, and more

3.4 Extracting Image Data and Creating Records

To perform the required data processing, the first step is to convert all relevant data from the dataset into a set of image records. The main method calls the *recordImageData* method, which performs all actions that this task requires.

The *recordImageData* method begins by establishing the file path for accessing the image data. Then, it will iterate over every folder in the order specified by the folder structure previously discussed. The program reads the file name of every image file. It also reads the ID of the participant and the activity name from their respective folder names, and stores all of this data in an *ArrayList* called *imageTableRecords*.

The data that the program needs to extract from the folder structure is presented as follows:

- The ID of the participant
- The name of the activity class that the participant does

The program retrieves this data by using Java's *getName* method on the name of the correct folders.

The data that the program needs to extract from the file name of the image is presented as follows:

- The ID of the image
- All the timestamp information:
 - The year the image was taken
 - The month the image was taken
 - The day the image was taken
 - The hour the image was taken
 - The minute the image was taken
 - The second the image was taken

The program retrieves this data by using Java's *substring* method on the correct character indexes of each file name.

It was discovered that the timestamp presented in each image's file name is not correct. The actual timestamp is equivalent to the timestamp from the file name plus a certain number of seconds determined by the image ID multiplied by 10. Hence, the *adjustTimestamp* method was established to solve this problem. This method is called by the *recordImageData* method to modify every timestamp's hour, minute, and second values based on the number of seconds required to be added.

After adjusting the timestamp to be correct, the *recordImageData* method creates a new ImageRecord object, and then sets the record's attributes to the image data that was collected. After this, the program adds the new record to the *imageTableRecords* ArrayList. The program continues this process of adding image records until all images in the dataset have been processed.

While the program adds new image records to the *imageTableRecords* list, it eventually reaches the "Representative Images" folder. This folder contains a set of manually-selected images that are preferred to be used instead of the default representative image that is selected. At this stage, the program searches through this folder and stores the names of these images into a different ArrayList of records called "preselectedRepresentativeImages".

3.5 Sorting Records

The second task that the program must perform is sorting all of the records that it has currently stored in *imageTableRecords*. This sorting step must be done in order to have a full timeline of individual user activities from start to end and separate multiple instances of the same activity class. The main method makes a call to the *sortImageTable* method, which performs all actions that this task requires.

This task requires the use of a "sorting variable" to ensure the order to sort by is correct. It was decided that this order should be chronological for each participant. Therefore, the sorting order was selected to be: participantID, year, month, day, hour, minute, second. This specific sorting order will be useful soon for calculating the duration of participant activities.

Each ImageRecord object contains this sorting variable property. The *sortImageTable* method uses Java's ArrayList "list.sort" method, comparing the sorting variable of two image records at a time until all records have been sorted according to the specified order. This sorting method was inspired by and adapted from [46]. The time complexity for this method is $O(n\log n)$.

3.6 Removing Duplicate Records

After recording all the required data in a consistent format and sorting the data in a useful order, any duplicate records found in the *imageTableRecords* list must be removed. The *removeDuplicates* method completes this task by simply comparing the file name of the next image in the list with the file name of the current image and removing the record from the *imageTableRecords* list if they are equivalent.

3.7 Defining Participant Activities

At this point in the program execution, a participant's activities must be defined. The main method will make multiple calls to the *participantActivities* method, which will perform all actions that this task requires. The number of times that this method is called depends on the number of participants found in the image records.

This method uses a second ArrayList called *activityTableRecords* to store all the required information in relation to each participant's activities. The method accepts the ID of a participant and clearly defines each of their activities found from their recording period. It does this by iterating through all the sorted image records until it finds the correct participant specified by the parameter in the method call.

After finding the correct participant, the program searches through their image records, identifying the start and end of each activity by comparing the current activity name to the next activity name. If they are different, then the method records the end of the activity, comparing the time difference between the first and last image timestamp to calculate the activity duration. Additionally, the method defines an image that is "representative" for each activity. If a record for the activity is found in the pre-selected Representative Images folder, then it chooses to use this image. Otherwise, the method chooses a default representative image by selecting the image from the middle of the images for the activity. After searching through all image records for this specific participant, the method then returns all the records of this participant's activities, which include their time duration and representative image.

3.8 Recording Processed Data Records in Excel File

After gathering and then storing all the required data about participant activities, the program must then print this data into an Excel file. An Excel file was chosen as a data store because it is a format that is widely accepted by and used in data analysis tools and the data can eventually be imported into a database in future versions of the system. A non-technical user of the program should be able to easily understand the results as they are stored in well-defined tables. The main method makes a call to the *fillImageTable* and *fillActivityTable* methods, which performs all the actions that this task requires.

The *fillImageTable* method firstly writes a header for the image table containing all headings for each property of an image table record. Then, it iterates through each image table record and writes each of its elements in their respective table columns.

The activity tables are printed underneath the image table. Just like the *fillImageTable* method, the *fillActivityTable* method also starts by writing its own header for the participant activity tables. Then, it iterates through each activity table record and writes each of its elements in their respective table columns. The main method calls *fillActivityTable* for as many times as there are participants found in the image records.

The main method also calls *participantActivitiesTotalDuration* for as many times as there are participants found in the image records. The final type of table that must be written in the Excel file is a table that presents the combined time duration of all activities for each type of activity class. The method calls the *participantActivityTotalDuration* method multiple times to produce results for each type of activity class. The *participantActivityTotalDuration* method finds the time duration for all of a single participant's records containing a specific activity class name, sums the duration, and writes the results in the Excel file.

3.9 Location and Fall Hazard Data

The *location* for each activity in every activity table must be retrieved by the program and stored in its respective activity record object. For example, the name for a location could be "bedroom", "bathroom", "car", or anything similar. For every activity record, a corresponding location is manually identified and written in an individual participant's text file. The representative images that were selected by the program help easily define a location for the activities.

Next, the *fall hazard data* for each activity in every activity table needs to be retrieved by the program and stored in its respective activity record object. An example of a fall hazard could be "unstable objects" or "uneven ground". Again, for every activity record, a fall hazard is manually identified and written in an individual participant's text file. The representative images that were selected by the program help to manually identify the fall hazards.

3.10 Visualising Results

At this stage, all the image data has been extracted by the program and has been processed to create a list of activity records for every participant in the study. Each activity record includes data for the activity name, start date/time, end date/time, duration, location, fall hazard, and representative image. It was decided that it would be beneficial to implement two different types of visualisation methods for analysis, called visualisation 1 and visualisation 2 respectively.

3.10.1 Data Visualisation 1

The purpose of visualisation 1 is to provide a detailed view of the activity record data for a participant. Visualisation 1 displays the representative images that were selected by the program in the previous algorithm steps. The start date/time and end date/time is displayed above each of the images. The activity duration, location, name, and fall hazard data is displayed underneath the images. Arrows connect the images, showing the correct sequence of activities. The program will generate one visualisation 1 file for every participant in the dataset. These files show all activities that the user has performed during their recording period (which is no longer than 24 hours in this study).

Each participant in the study has their own demographic data that must be displayed when visualising the results. This demographic data includes the ID of the participant, their gender, age, co-morbidity, whether they use insulin, and who they live with (if applicable). The demographic data is retrieved and displayed in all visualisation 1 files in the same way that the location and fall hazard data is located and stored through the use of text files.

3.10.2 Data Visualisation 2

The program will also generate one visualisation 2 file for every participant in the dataset, and in addition, generate a single file containing the visualised data for all participants, which makes the process of comparison and analysis easier. Visualisation 2 is intended to be a summary view of the data. In visualisation 2, horizontal bars are displayed, representing activities as colours and locations as letters above or below the bars.

A solid line is displayed underneath every participant's time-block data with time intervals that show the time of day in which the activities occurred. The visualisation 2 file is structured as a two-day period, and each participant's bar is placed in its correct position according to the time of day. In this way, the length of activities and their time of day for one participant is consistent with all others. The start date and end date for each participant's recording session is presented underneath this line, as the recording date varies between participants.

Two different legends are present underneath the visualisation 2 files. The first is a legend for activities, showing which colours correspond to which activity classes. The second is a legend for locations, showing which letters correspond to which location names.

3.11 Running Program and Ensuring Correct Results

3.11.1 Testing the Data Extraction/Processing Component

After creating the algorithm to perform all the functionality discussed in the previous sections, the program was run. All output was recorded in the Excel file by the program.

Firstly, the activity definition needed to be tested. After randomly selecting a participant and then one of their activities, the name of the activity, the start date/time and end date/time was compared with the corresponding first and last image records in the image table. Certain edge cases were also considered and tested, such as how the end of an activity is marked when the next participant appeared in the image records. This process was repeated numerous times until we achieved high confidence that no errors were present.

Next, the time duration for participant activities was required to be tested to ensure its correctness. Due to the large number of activities and participants that were recorded, random testing was decided to be carried out. The random testing process can be described as follows:

1. Randomly select a participant
2. Randomly select an activity
3. Manually calculate the time difference between the start and end date and time of the activity
4. Compare the result of this calculation with the value inside the "Duration" column for that activity

This process was implemented numerous times to discover bugs that were present in the algorithm. After correcting these bugs, the random testing process was implemented again until we had reached a degree of confidence that there were no more bugs.

3.11.2 Testing the Data Visualisation/Analysis Component

After testing the correctness of the data extraction and processing component, testing was required to ensure that the data displayed inside the visualisation 1 files was consistent with the data inside the activity tables. After selecting several random participants, the start date/time, end date/time, duration, activity name, location, and fall hazard data was compared.

Following this, additional testing was needed to ensure that the data displayed in the visualisation 2 files was consistent with the data displayed in the visualisation 1 files. After selecting several random participants, the start and end time of all activities, the name of the activity, and location was compared with the same data displayed in the visualisation 1 files.

4 Results

Throughout session one of 2024, all necessary background for the research was acquired, the research plan was defined, and a substantial portion of this Methodology was implemented. In session two, the remainder of the Methodology was fully carried out. All the steps of the Methodology were executed, resulting in the successful development of a novel and functional algorithm that is capable of processing and visualising ADL data to be measured and analysed with ease.

The following Results section of the report details the final results that have been achieved through the completion of this research project. Firstly, the algorithm itself will be discussed, including all the functionality that it was able to achieve in the end as well as the visualised results that the algorithm generates. Following this, the objective insights and information that the visualisation methods reveal when data analysis is conducted will be explained with supporting examples.

4.1 The Algorithm

4.1.1 Data Extraction/Processing Component

The first part of the Methodology to be implemented was the "data extraction and processing component", which was carefully followed and continually refined throughout its execution. At the end of session one, this component of the algorithm was successfully able to perform all of the tasks that it was required to do, including the following:

- Taking elements of data from multiple sources and storing the parsed data into a list of records
- Sorting this list of image records by the ID of the participant and by date/time
- Deleting duplicate records and other unwanted records
- Printing the image table records into an Excel data store file
- Defining participant activities by comparing the names of activity classes, calculating time duration, and finding representative images
- Calculating the total time duration for all instances of each of a participant's activity classes
- Printing one activity table for each participant in the same Excel data store file underneath the table of image records
- Printing one total activity duration table for each participant in the same Excel data store file underneath the respective participant's activity table

The tabular results that were produced by the "data extraction and processing" component of the program after running it on the dataset can be found in the Appendix of this report. Since two out of 26 participants in the study chose not to record any data, *Figure 42 - Figure 65* presents the activity tables that the algorithm produced for all other 24 participants. Just as it was planned in the Methodology, each activity table presents the ID of the participant, the name of the activity class, the start date and time, the end date and time, the time duration, the representative image file name, the location, and any fall hazards identified for the activity.

Following these activity tables, *Figure 66 - Figure 89* presents the tables that show the total duration of activity classes that the algorithm creates for the same participants. The left-hand side shows the ID of the participant. The middle column presents the name of each type of activity class. The column on the right-hand side shows the combined total time duration of all activity instances for the respective activity classes.

As planned in the Methodology, the data extraction and processing component of the algorithm was thoroughly tested, ensuring that the activities from participants inside the image table were present in the respective activity tables. We also tested that the correct time duration was consistently produced and that the correct representative images were identified by the algorithm. While it is difficult to prove with certainty that the algorithm does not contain errors, numerous rounds of testing has not revealed any errors in the final version of the algorithm.

4.1.2 Data Visualisation/Analysis Component

Closely following the completion of the "data extraction and processing" component in session one, the "data visualisation and analysis" component was executed in session two. At the end of session two, this second component was also able to fulfill all its required tasks. Now, when the complete algorithm is run, a visualisation 1 file is created for every participant found in the dataset. The program is then able to create one visualisation 2 file for every participant in the dataset, as well as a single visualisation 2 file that contains the data for all participants. All these results produced by the "data visualisation and analysis" component of the program can also be found in the Appendix.

Figure 17 - Figure 40 shows all the visualisation 1 files. Each participant's demographic data is listed at the top of their own file, showing their ID, gender, use of insulin, co-morbidity, age, and who they live with. All activities in visualisation 1 are presented in the form of representative images underneath the demographic data, structured as rows. The activities are connected by arrows that show their chronological order. The program retrieves the data stored in the respective activity record object and displays it in the file. Most details of the activities are presented underneath the images, including their duration, location, activity class name, and any fall hazards. The timestamp information for the activities are displayed above the images, including their start date, start time, end date and end time. To provide some examples, the following data is displayed for the *first* activity for the following participants:

- Participant 8:

- Start Date/Time: 18/10/2017, 16:02:01
- End Date/Time: 18/10/2017, 16:02:41
- Duration: 00:00:40
- Location: kitchen
- Activity: Indoor
- Fall Hazard: Dark/dim lighting

- Participant 11:

- Start Date/Time: 13/11/2017, 17:33:18
- End Date/Time: 13/11/2017, 17:50:18
- Duration: 00:17:00
- Location: kitchen
- Activity: Food Related
- Fall Hazard: Cluttered workplace, Unstable objects

- Participant 17:

- Start Date/Time: 09/02/2018, 20:29:25
- End Date/Time: 09/02/2018, 20:39:15
- Duration: 00:09:50
- Location: car
- Activity: Driving
- Fall Hazard: glare

Figure 41 shows the main visualisation 2 file that presents the data for all participants in the study. This visualisation 2 file consists of 24 "bars" (one for each participant), where each bar contains "blocks" of time that represent each of the activities. Activities can be identified through the use of colour (e.g., brown represents an indoor activity). Locations can be identified through the use of letters (e.g., "AD" represents the living room). The activity and location connected to the colours and letters can be found through their own legends at the bottom of the file. To give some examples, the following data is displayed for the *first* activity for the following participants:

- Participant 1:
 - Activity: Electronic Devices
 - Date: 10/07/2017
 - Start Time: 17:02
 - End Time: 17:30
 - Location: bedroom

- Participant 4:
 - Activity: Outdoor
 - Date: 23/09/2017
 - Start Time: 11:50
 - End Time: 12:05
 - Location: backyard

- Participant 25:
 - Activity: Electronic Devices
 - Date: 22/11/2018
 - Start Time: 19:21
 - End Time: 20:34
 - Location: bedroom

It was decided that visualisation 2 would be best structured as a period of two days, where background colours represent the time of day in which the activities occur, such as morning or afternoon. Time intervals are also displayed under every participant's time-block data, showing the exact time of day, such as 9am. The algorithm is capable of working out where to place the participant activity data so that it fits in its correct position according to the time that the activity occurred.

As we continued to follow the Methodology, we then conducted testing for the second component of the program. Visualisation 1 was tested first. Multiple random participants were selected, and the tabular data found in their respective activity table in the Excel file was compared with the visual data in their corresponding visualisation 1 file. Then, the same process was repeated for visualisation 2 with different random participants. All errors that were discovered during this process, such as some activities not appearing in visualisation 2, were able to be fixed. However, the algorithm's capabilities of visualising data across a time period greater than two days (especially for visualisation 2) requires further testing in the future when larger datasets are able to be collected and processed into activity classes through the deep learning model.

4.2 Capabilities for Data Analysis

After the algorithm produces the Excel data storage file and all visualisation files, the visual results are then able to be taken and analysed. The purpose of conducting data analysis on these visualisation files is to discover both individual and group patterns, routines, and other valuable information. This information may then be practically applied by the users of the system and their respective health providers. Some of these practical applications are explored in the Discussion.

4.2.1 Visualisation 1 Data Analysis

The following section describes how data analysis can be conducted on the visualisation 1 files to uncover useful information. Visualisation 1 (shown in *Figure 17 - Figure 40*) displays activities in the form of representative images, with timestamp information positioned above the images and other event-specific information (duration, location, activity name, and fall hazard) positioned below the images. With visualisation 1, the focus is on individual participants and events rather than comparing multiple.

Visualisation 1 is designed to break down individual activities in detail so that precise information can be found quickly. The exact start date, start time, end date, and end time, duration, location, activity name, and fall hazard of any activity can be found. For example, the third activity for participant 7 gives the following results:

- Start Date/Time: 14/10/2017, 18:12:58
- End Date/Time: 14/10/2017, 18:25:38
- Duration: 00:12:40
- Location: living room
- Activity: Indoor
- Fall Hazard: Unstable Objects

Visualisation 1 allows the analyst to better understand the conditions of the user's environment through the images rather than only having the name of the location. For example, consider participant 7 who has a "backyard" location. Without seeing the image, the analyst would not know that they were facing a staircase. Consider the first activity for participant 15. Visualisation 1 allows the analyst to accurately understand the participant's furniture placement, as well as obstacles or unstable objects in their environment.

4.2.2 Visualisation 2 Data Analysis

The following section describes how data analysis can be conducted on visualisation 2 to acquire useful information. Visualisation 2 (shown in *Figure 41*) displays activities in the form of coloured blocks of time, with letters positioned above or below the blocks to indicate location. It also uses background colours to indicate the time of day, for example, blue to represent the morning and orange to represent the afternoon. Using the file containing data for all participants, visualisation 2 is more capable of supporting the comparison of data between multiple participants so that similar behaviour can be found.

Visualisation 2 is designed to facilitate fast comprehension and measurement of the frequency of types of activity classes. For example, it can be seen that participant 3 has a high count of "indoor" and "electronic devices" activities. In comparison to the other participants in the dataset, it can be seen that:

- Participant 6 has the largest count of "watching tv" activities (17 activities)
- Participant 9 has the largest count of "socializing" activities (9 activities)
- Participant 19 has the largest count of "driving" activities (8 activities)

This visualisation method also allows the duration of activity classes to be understood quickly. For example, some time blocks for "indoor" activities for participant 15 are large, indicating long duration. The time blocks for the "managing health" activity across all participants are generally small, indicating short duration.

Visualisation 2 is also capable of easily clarifying when specific activity classes are not performed by the user. To give a few examples, if a health provider would like to track:

- The amount of exercise that participant 10 performed during her recording period, they would find 0 dark green time blocks, meaning no "deliberate exercise" activities were performed by the user
- The amount of health-management that participant 10 performed during her recording period, they would find 0 red time blocks, meaning no "managing health" activities were performed by the user
- The amount of shopping that participant 23 performed during her recording period, they would find 0 magenta time blocks, meaning no "shopping" activities were performed by the user

Some classes of activities may occur more frequently at specific times of the day and less frequently in other times of the day. Visualisation 2 helps reveal these patterns. For example, the "food-related" activity class appears to occur more frequently in evenings and mornings across most participant data and less frequently in afternoons and overnight. Now, consider the following examples for specific participants:

- For participant 22, 5/6 yellow "electronic devices" activities occur in the morning
- For participant 4, 4/5 light green "outdoor" activities occur in the afternoon
- For participant 3, all dark green "deliberate exercise" activities occur in the morning and none in the afternoon or evening

Sequential activity patterns refer to when a certain activity class appears to commonly occur before or after another type of activity class. Visualisation 2 is capable of revealing these sequential activity patterns. One example of this is how the "shopping" activity typically occurs before, after, or both before and after the "driving" activity. This can be clearly seen in the visualised data for:

- Participant 3
- Participant 4
- Participant 10
- Participant 11
- Participant 15
- Participant 26

Another example of sequential activity patterns is that taking medication (the "managing health" activity) occurs commonly before or after eating food (the "food related" activity). This is evident in the visualised data for:

- Participant 1
- Participant 6
- Participant 9
- Participant 11
- Participant 18
- Participant 20
- Participant 21
- Participant 22
- Participant 24
- Participant 26

Visualisation 2 is also capable of revealing the degree of consistency of participant behaviour over multiple consecutive days. However, because the data collection period in the initial investigation for all participants was less than 24 hours, this means that these patterns could not be produced from this dataset.

5 Discussion

After the results for this investigation were obtained and documented in the Results section of the report, the results were interpreted and analysed to determine their significance and value in real-world situations. The following Discussion section will firstly discuss these implications, exploring how visualisation 1 and visualisation 2 can be practically applied. Following this, it will discuss multiple limitations of the system and limitations of the study itself. It will demonstrate a deep and critical understanding of the results and provide numerous interesting use cases and many insights. By determining the practical significance of the methods of data visualisation and acknowledging the limitations of the system, reasoned answers to both research questions will be identified.

5.1 Applications of the System

Both visualisation 1 and visualisation 2 provide their own unique advantages in numerous open-ended scenarios, which will be thoroughly explored in this section. When conducting data analysis for users of the system, it is highly recommended to apply both data visualisation methods together. Abstract trend analysis using visualisation 2 can be combined with detailed activity analysis using visualisation 1 to generate insights that can be transformed into informed action.

5.1.1 Applications of Visualisation 1

The features of visualisation 1 make it an effective tool for conducting analysis of a single participant's behaviour over a specific and shorter period of time in high depth. By presenting a set of images that are representative of the environment of a participant's activities, this level of detail allows precise fall hazard risks to be identified. As a result, fall-prevention adjustments to the patient's environment can be implemented in order to enhance their personal safety. Fall hazards that are considered easy to remove (e.g., an untidy workplace) or control (e.g., furniture) can be identified and handled more effectively.

While many fall hazards can be either removed or controlled fairly easily, there are some areas of the home that are considered difficult to control. For example, having uneven ground surfaces in the backyard is infeasible to fix. Visualisation 1 can help a health provider identify these areas of the home as high risk areas. They can then create plans and communicate them to their patients. Health providers can inform their patients to avoid or spend limited time in the high risk areas, helping to minimise their risk of falling.

By conducting analysis with visualisation 1, health providers could also track the diet of their patients by using the representative images of all food-related activities. Health providers are able to quickly look up all instances of activities of the class "food related" and view the types of food that the patient consumes. Then, the health provider can determine if further action is needed to ensure the patient continues to consume healthier foods.

Visualisation 1 presents the comorbidities associated with an individual participant, and this information can be useful for the health providers of the patient. The health provider can create a personalised health plan for the patient in order to help them manage their comorbidities. To give an example, recognising that a patient (such as participant 16) has hypertension could help their health provider understand that their patient may need an increase in deliberate exercise activities and an improved diet. The frequency and duration of exercise activities can be monitored with visualisation 2, and the diet can be monitored through visualisation 1.

5.1.2 Applications of Visualisation 2

The features of visualisation 2 make it more practically beneficial for monitoring long-term behaviour and routines. By presenting the data in such a way that reveals trends and relationships, various insights can be revealed which can be used for health-related decision-making.

Visualisation 2 could be applied by the health provider of a patient using the system to assess whether their patient is engaging in what they define to be "too much" of an unhealthy activity class. To give one example, a health provider may require their patient to spend no longer than two hours on "electronic devices" per day. Visualisation 2 can be used to show if their agreed plan is being followed. If it is shown that the patient is not following this plan, the health provider can follow up and determine if further action is needed to help minimise the patient's screen time.

Because visualisation 2 is capable of showing the frequency and duration of activities, it can be applied by the health provider of a patient using the system to assess whether the patient is engaging in what they define to be "enough" of a certain activity class. For example, a health provider may require their participant to undertake 30 minutes of outdoor exercise every day. Visualisation 2 can be used to help the health provider determine if their exercise plan should be modified or show if not enough progress is made.

Since it was demonstrated that visualisation 2 is capable of revealing sequential data patterns, visualisation 2 could be used to reveal if a patient is performing a sequence of activities that is considered dangerous. For example, a patient can discuss their medication requirements with their health provider. It may be the case that the patient cannot drive within a two-hour period after taking their medication. Visualisation 2 can show that while driving in general is acceptable, if there are any red-coloured "managing health" activities that are found two hours or less before the gray-coloured "driving" activity, then the health provider can understand that their patient is engaging in dangerous behaviour. Further action can then be taken to ensure that they do not engage in future driving activities soon after taking their medication.

By conducting analysis with visualisation 2 to identify commonly-occurring patterns, health providers are able to monitor a patient's routines over an extended period of time and determine whether their routines are consistently healthy. If a patient's daily routines are considered to be unhealthy, plans can be put forward to change the patient's routines.

After discussion between a patient and their health provider, plans can be set for regular meal times and regular times to take medication each day. Health providers are then able to use visualisation 2 to confirm whether their patients are following this set plan and then determine if it needs to be adjusted.

Certain patterns in visualisation 2 that are present for an individual patient could potentially provide evidence of certain disorders. If the evidence is sufficient, the health provider who is given this data to analyse can then diagnose the patient. To give an example case, if a patient unknowingly has dementia, they might accidentally take medication multiple times throughout day, which is significantly dangerous to their health. Using visualisation 2, the number of red "managing health" activities can be checked. If there is a greater number of "managing health" activities than there should be at different times of the day, then this may be a strong indication of dementia, and the health provider can then hold meetings with the patient to make plans to avoid taking medication too frequently.

Because visualisation 2 is designed to allow behaviour between multiple participants to be compared, this implies that insights into age-related patterns can be identified through the comparison of data collected from younger people with the visualised data from these elderly participants. For example, younger people may perform a greater number of "outdoor" and "socialising" activities, while older people may perform more "managing health" and "indoor" activities. It is important for health providers to understand these differences in behaviour so that they can more effectively support their patient's needs based on what is considered an "average lifestyle" for their age.

Finally, while the system is primarily focused on addressing physical health concerns for patients, it could also be applied to help monitor and improve their mental health. Visualisation 1 shows that participant 6 and participant 25 both experience depression, which could be connected to a lack of socializing. Plans could be actioned to increase day-to-day social activities to help improve mental wellbeing. Visualisation 2 can then be used to monitor how frequently the user socializes with others, tracking the progress they are making.

A manager of a retirement home could put together a socialising initiative, hoping to get more older Australians socialising. If these people wore the body cameras, the manager could then use visualisation 2 to monitor individual user engagement in the social activity class. The data could then be used to identify trends for certain demographics. For example, women could appear to be socializing more than men over a duration of a week.

5.2 Limitations

While this body-camera approach that uses deep learning and a visualisation-generating algorithm to track ADL data for older people has strong potential for real-world applications, there are a set of limitations and challenges that must be addressed. It was discovered that a large amount of participant data was missing and some of the data that was recorded is not usable. The following sections discuss the causes for these problems, and then suggest some solutions to help manage them.

5.2.1 Ethical Considerations

In the initial investigation that was conducted by Yin, it was recognised that while users gave consent to collect the data, there are some activities that participants may not want to be recorded, for example, using the bathroom or sleeping. As software engineers, it is crucial to respect the privacy of the users of the system. Hence, the participants involved in the study were allowed to either stop recording for certain periods or delete a set of images after they were recorded. This caused a substantial impact on the data collection process, creating many gaps that can be seen in *Figure 41*. The intentional exclusion of this data means that, for example, bathroom routines and fall hazards (such as a slippery floor or shower area) could not be recorded at times, raising concern for their safety in these areas.

5.2.2 Participant Lapses in Camera Usage

In multiple cases, it was found that when some users chose to stop the camera recording due to privacy reasons (as discussed above), they appeared to forget to begin recording again after the confidential activity had taken place. This means that the regular activities that would have occurred after the confidential activity were not recorded, which could have been useful data. This resulted in much larger gaps in their activity dataset, which can also be clearly seen in *Figure 41*.

5.2.3 Image Quality

In addition to the data that could not be recorded in Yin's study, many of the images that were collected are considered to have poor quality. Poor images commonly occurred when the participant was in a dark environment, when the camera was moving quickly (resulting in a blurry image), or when the participant was facing the ceiling (by lying down) or a wall. In these cases, limited information about the environment is captured, making it difficult or not possible to identify the location and fall hazards connected to the activity. Wearing the camera upside down (such as participant 11) also made it difficult to identify locations and fall hazards.

5.2.4 Minimal Dataset

Two of the 26 total participants in the study chose not to record any data with their given body camera, meaning their daily activity data could not be captured and visualised. It has been decided that data being collected from 24 participants is too little to provide an acceptable indication of behaviour considered average. Determining average behaviour from a small group of people introduces unintended biases, creating inaccurate trends. The greater the number of participants, the more this bias is reduced and a closer true average is found. Determining average user behaviour from many different participants is important because it adds a layer of context, allowing a health provider to compare their own patient behaviour to the average and assess how typical their behaviour is.

While the system should be capable of revealing patterns across multiple days, the 24 participants that recorded data did not record for longer than a 24 hour period. In the initial investigation, it would have been more beneficial for analysis if the data for each participant was recorded over multiple days so that more frequent day-to-day patterns can be discovered. For example, a user may spend more time socialising, shopping, or exercising on weekends compared to weekdays where indoor and electronic devices activities may be more common. If this was done, the program would be able to display these routines clearly in visualisation 2.

5.3 Overcoming the Limitations

It is crucial to consider all the above limitations so that specific strategies to mitigate them can be identified in order to ensure that the quality of the data that is collected is sufficient enough to be processed and visualised adequately. This would improve the information presented, facilitating improved health-related decision-making.

Firstly, it is highly recommended to inform the participant to record data for a longer period of time. In Yin's study, the total data collection duration was less than 24 hours for each participant. Recording for a shorter time may be acceptable for visualisation 1 to focus on individual activities, however, this is not enough time for visualisation 2 to reveal patterns that occur across multiple days or multiple weeks.

If longer recording periods were to occur, then it is important to consider this means that the participant must routinely charge the battery of the body camera at a certain time of the day. It is recommended that this time of day should be when the least physical activity usually occurs. It is likely that this would be overnight while the participant sleeps.

Next, it is important to inform the participant that they must ensure their body camera is consistently kept in a position that captures their environment well. This means that the participant must be aware they need to face the camera more towards open spaces, less towards walls, less in dark spaces, and not upside down.

Finally, while it is important to respect that participants may want to keep certain activities private, it is also important to regularly remind the participant to continue recording the data after their private activities occur. Perhaps this could be done by measuring the amount of time that the camera is not recording, and if this duration exceeds a set limit (e.g., more than one hour), then the participant can be alerted to turn their camera back on.

5.4 Answering the Research Questions

After interpreting the results through the Discussion, this section presents a concise summary of the final established answers to the two initial research questions.

5.4.1 Research Question 1

The first research question is as follows: "Given a large collection of categorised body-camera ADL image data, how can this data be processed, visualised, and analysed with respect to the spatial and temporal movement of an elderly person to inform the design of the next generation of assistive technology?".

Through the completion of this software engineering research thesis, an algorithm was designed and developed that is capable of processing and visualising data to be analysed. When provided with a dataset of body-camera ADL data, the *data extraction/processing* component of the algorithm retrieves and structures the data into tables of records for each participant. The *data visualisation/analysis* component then generates two distinct methods of data visualisation: one offering detailed information in relation to individual activities, and the other presenting aggregated coloured blocks of activities to reveal patterns and trends.

Together, these tools that visualise spatio-temporal movement give health providers valuable actionable insights into the daily behaviours and routines of their elderly patient/s. Through the identification of daily activity patterns and routines, this research directly informs the design of future assistive technology, allowing for personalised adjustments to a patient's environment and lifestyle to support the ability for elderly individuals to safely live independently.

5.4.2 Research Question 2

The second research question is as follows: "How can this new assistive technology be applied to help the elderly safely live independently?".

There are numerous open-ended ways that the complete solution could be applied to help improve the safety of older individuals who live independently. Visualisation 1 is an effective data visualisation tool that is capable of assisting health providers of these individuals by revealing specific fall hazards in specific areas of the home so that the health providers can then recommend practical adjustments to manage these fall hazards. In addition, visualisation 1 provides a way to monitor the diets of patients so that changes can be put forward to promote healthier eating habits. Visualisation 2 is highly effective in showing trends and patterns. These patterns can be applied to help health providers identify abnormal behaviour/routines, assess levels of engagement in healthy/unhealthy activities, identify dangerous behaviour, diagnose disorders, and support many other use cases. The application of the full solution supports data-driven decision-making, enabling health providers to give their older patients personalised environmental and lifestyle-based recommendations for safer independent living.

6 Future Work

The research project has been completed and both research questions have been successfully answered. However, there still remains multiple ways that the work can be expanded in the future, potentially forming the core of future research and industry practices. This can be done by improving the algorithm to process and visualise the data being collected by a participant in real-time, creating other methods to visualise the data, and enhancing the deep learning model to automate the process of recording location and fall hazard data.

6.1 Real-Time Data Processing and Visualisation

Currently, the algorithm is designed to process and visualise the data after the full dataset has been recorded and collected. In the future, it may be possible to enhance the solution by having it constantly run, process the data, and visualise the results in real-time. In order to achieve this, Xiong's deep learning model would also need to be adapted to categorise images into activity classes in real-time. If the system was further adapted to store new spatio-temporal data into a database rather than an Excel file, the visual results could be displayed via a web application rather than a through set of image files. The advantage of the former over the latter is that the web application would be able to update the data more effectively, as the image files would need to be continually re-processed.

6.2 Additional Visualisation Methods

Implementing additional methods of visualisation could further help reveal meaningful information for a participant. An example of a proposed "visualisation 3" is presented in *Figure 90* (designed by Nida Afzal). This visualisation method features a bee line plot placed over a floor plan where the thickness of the arrows represent the amount of time spent in a location and its colour represents the time of day. This would improve visualisation 2 in multiple ways. The floor plan structure makes it easier to read and understand for a user. Accurate times are also presented at the ends of arrows, as well as percentages for how long the user stays in the location. The use of arrows better visualises the flow/sequence of movement in comparison to blocks of time in visualisation 2.

6.3 Automating Location and Fall Hazard Detection

In this thesis, the location and fall hazard data for activities was required to be recorded by manually viewing each representative image and writing the required data due to time and skill constraints. However, if the project was to be scaled up in the future, then this is not a feasible approach. More automation would be required to quickly process larger datasets. In its current form, Xiong's deep learning model is capable of identifying relevant features of images and then classifying the images into activity classes. This deep learning model could be modified to identify common features connected to a set of locations. Additionally, the model could also be improved to identify certain objects that could be a potential fall hazard.

7 Conclusion

In this research project, a dataset containing spatio-temporal Activities of Daily Living (ADL) data was processed, visualised, and analysed with an algorithm to help answer two research questions. The temporal aspects of the data was used to define a set of activities for each participant. These activities were then visualised using two different methods involving representative images and blocks of time so that users can easily track their day-to-day activities.

The two main objectives, involving the creation of a valuable algorithm that can extract, process, and visualise data to be analysed, were both achieved in the end. By applying core software engineering skills and Agile methodology to successfully develop the algorithm that can produce these results, we have made an impact on the future design of assistive technology, showing the potential of wearable body-cameras to monitor ADL data.

By visualising the data in two different forms, data analysis can be conducted to uncover risks to a user's safety and identify trends in their daily activities. This can inform the user and their health provider in their health-related decision-making process, allowing them to create personalised plans by changing the layout of items in their home and modifying daily activity behaviour to create healthier and safer routines. Because the two primary research questions have been answered, it is concluded that the initial research goal was successfully achieved.

While the tabular and visualised results produced by the algorithm from the dataset of this study appear to be promising, further testing of larger datasets (with respect to a greater number of participants and longer recording sessions) is required. In addition, a degree of manual work is still required to identify the locations and fall hazards associated with the activities. For these reasons, it is believed that while the solution in its current state may not yet be completely ready for frequent use in real-world situations, if given additional time to enhance the algorithm, it may be ready for implementation in the near future.

If more time was allocated to continue this work in the future, it would be beneficial to modify the solution so that new activities performed by a participant can be processed and visualised in real-time. Furthermore, it is believed that Xiong's work involving a deep learning model for activity recognition can be modified to automate the process of identifying the location and fall hazards for each representative image, as this data currently must be entered into files manually. This could be followed by modifying the algorithm developed for this thesis to support the creation of a third method to visualise participant data.

Appendix

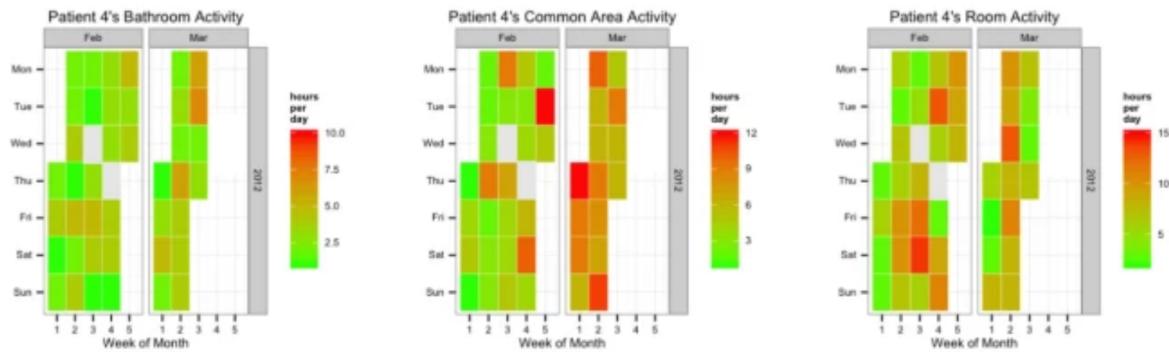


Figure 3: Heatmap Visualisation Method by Aloulou et al.

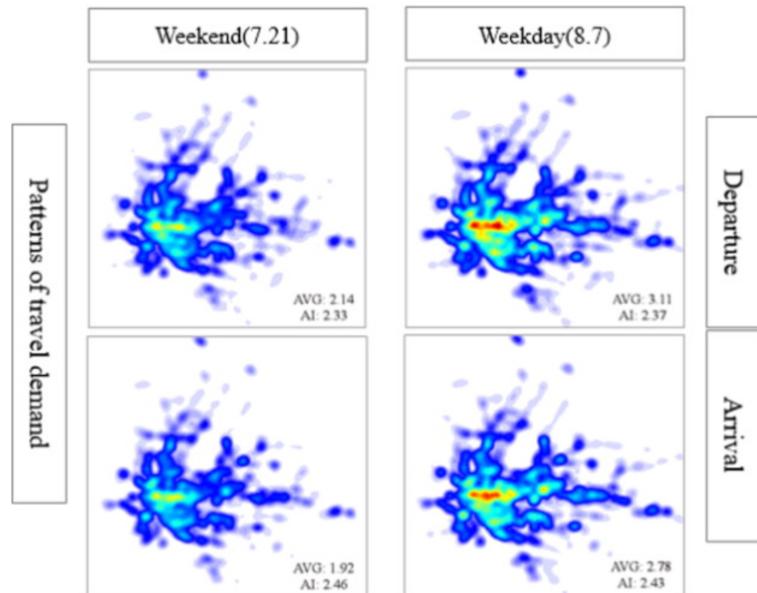


Figure 4: Heatmap Visualisation Method by Yu and He



Figure 5: Heatmap Visualisation Method by Olawoyin et al.

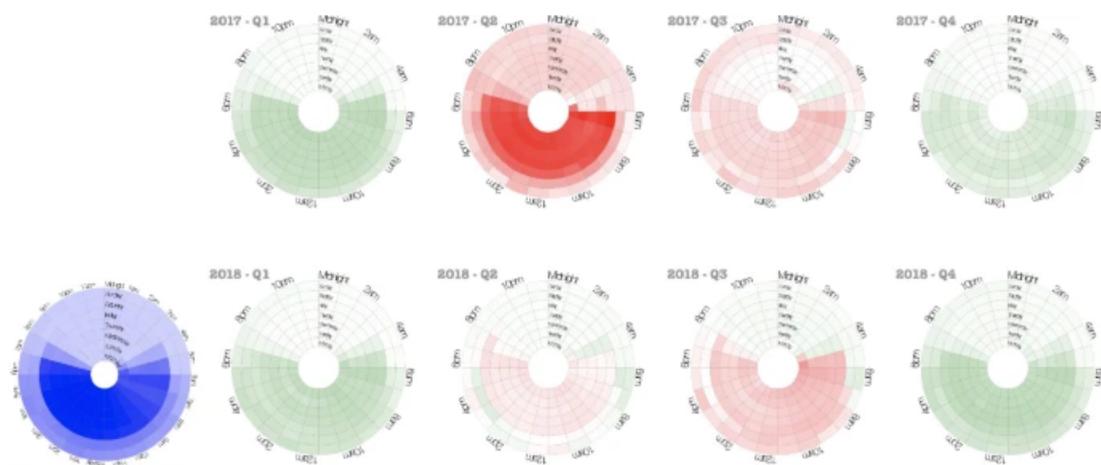


Figure 6: Heatmap Visualisation Method by Dhont et al.

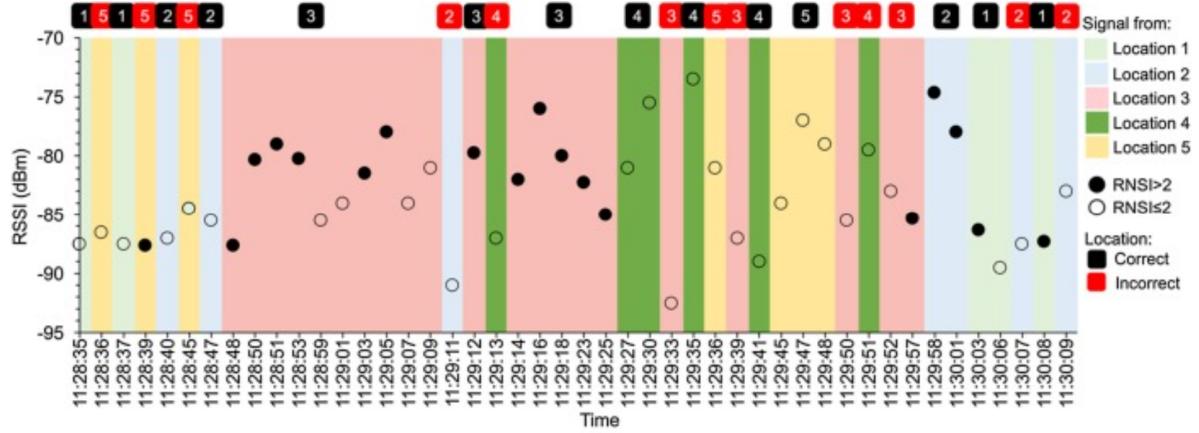


Figure 7: Data Visualisation Method by Surian et al.

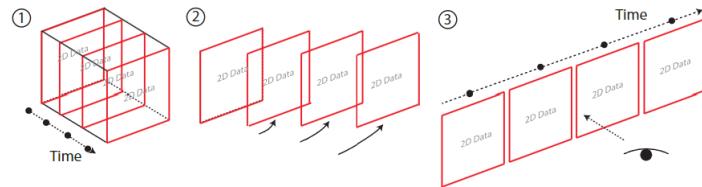


Figure 8: Data Visualisation Method by Bach et al.

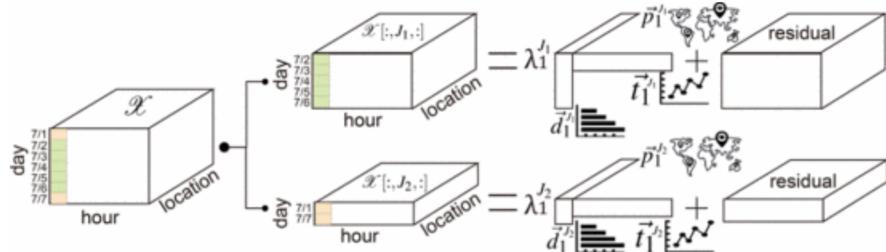


Figure 9: Data Visualisation Method by Liu et al.

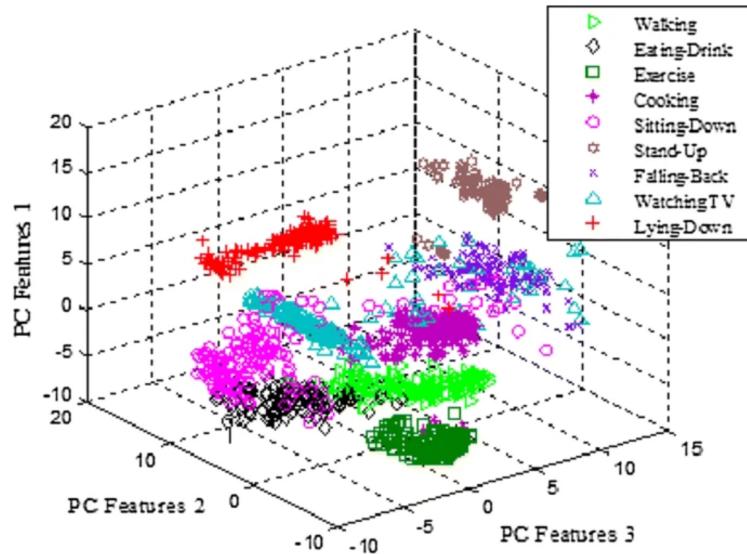


Figure 10: Data Visualisation Method by Kim et al.

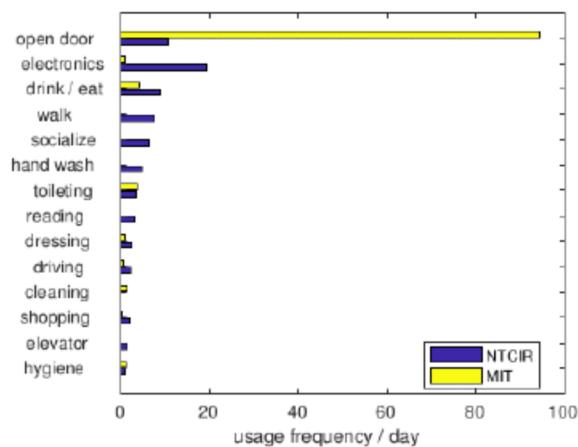


Figure 11: Data Visualisation Method by Petrich et al.

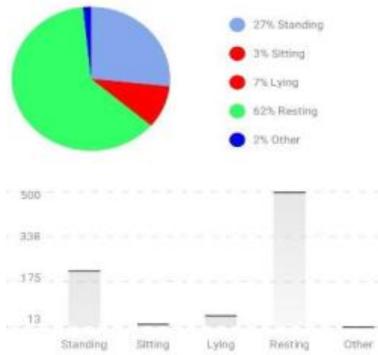


Figure 12: Data Visualisation Method by Cheung et al.

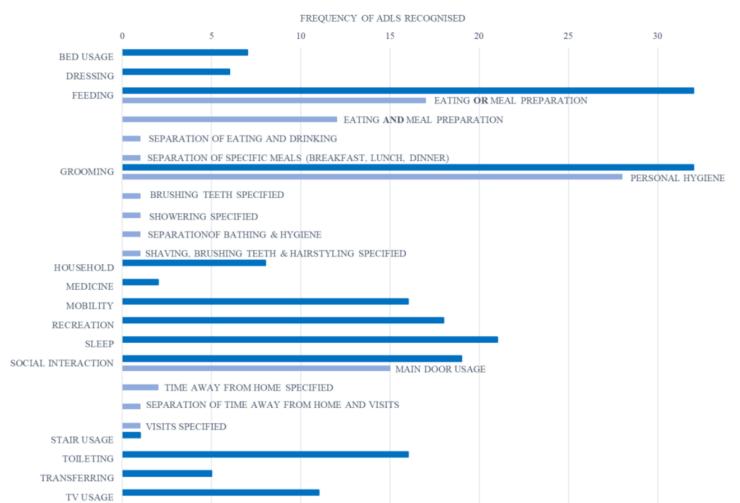


Figure 13: Data Visualisation Method by Camp et al.

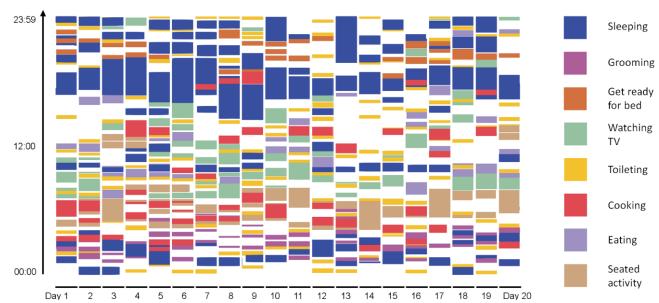


Figure 14: Data Visualisation Method by Stucki et al.

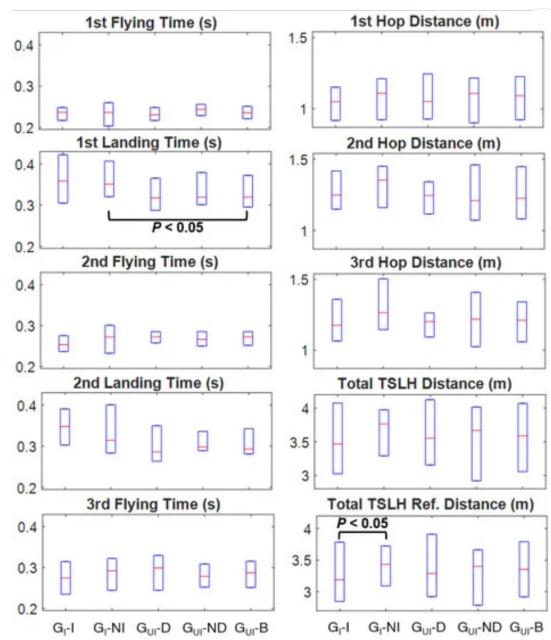


Figure 15: Data Visualisation Method by Ahmadian et al.

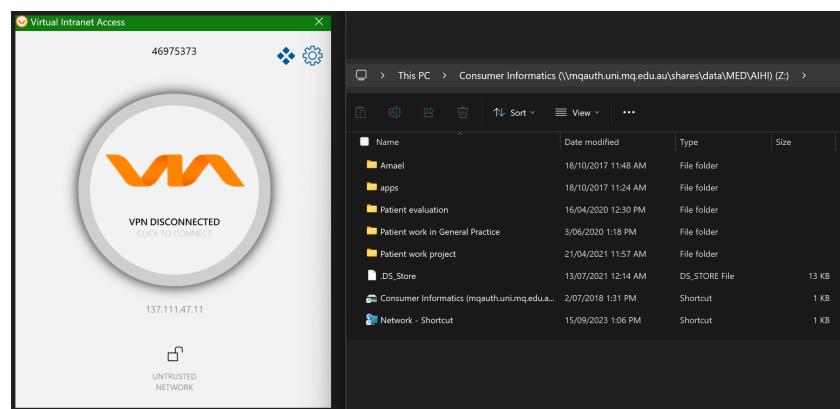


Figure 16: Evidence of Completed Preparatory Work

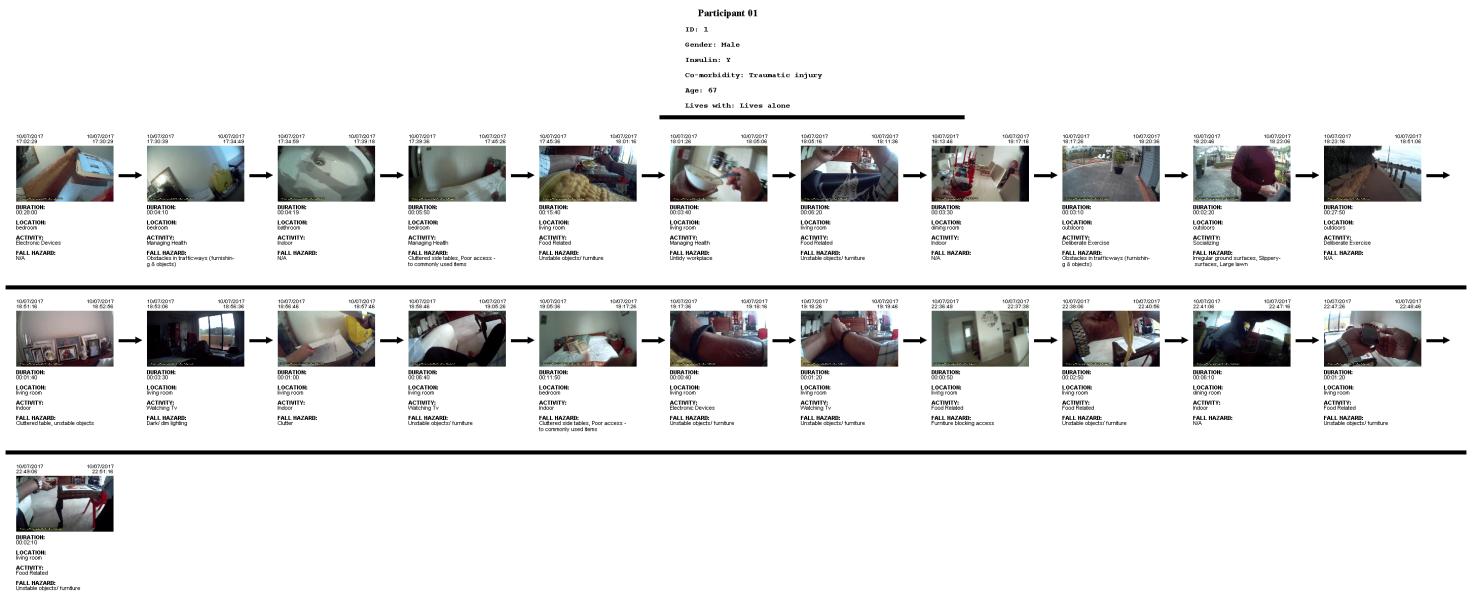


Figure 17: Participant 1 - Visualisation 1

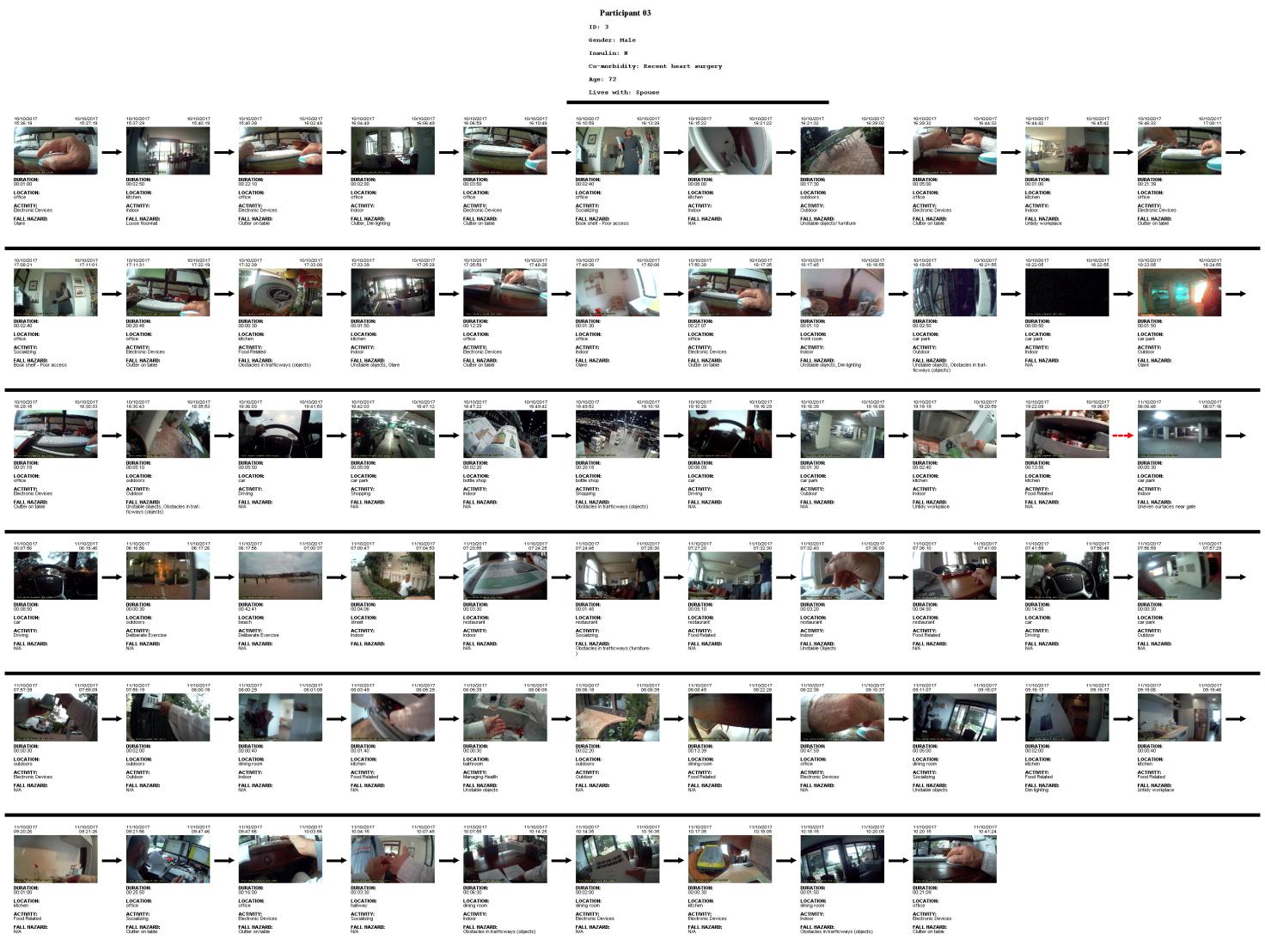


Figure 18: Participant 3 - Visualisation 1

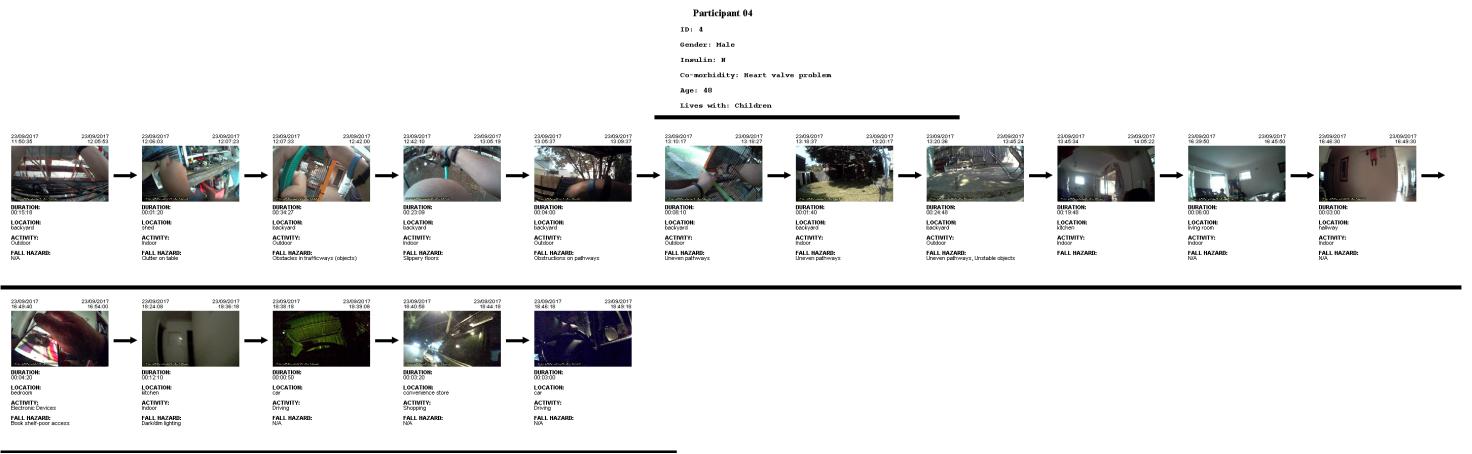


Figure 19: Participant 4 - Visualisation 1

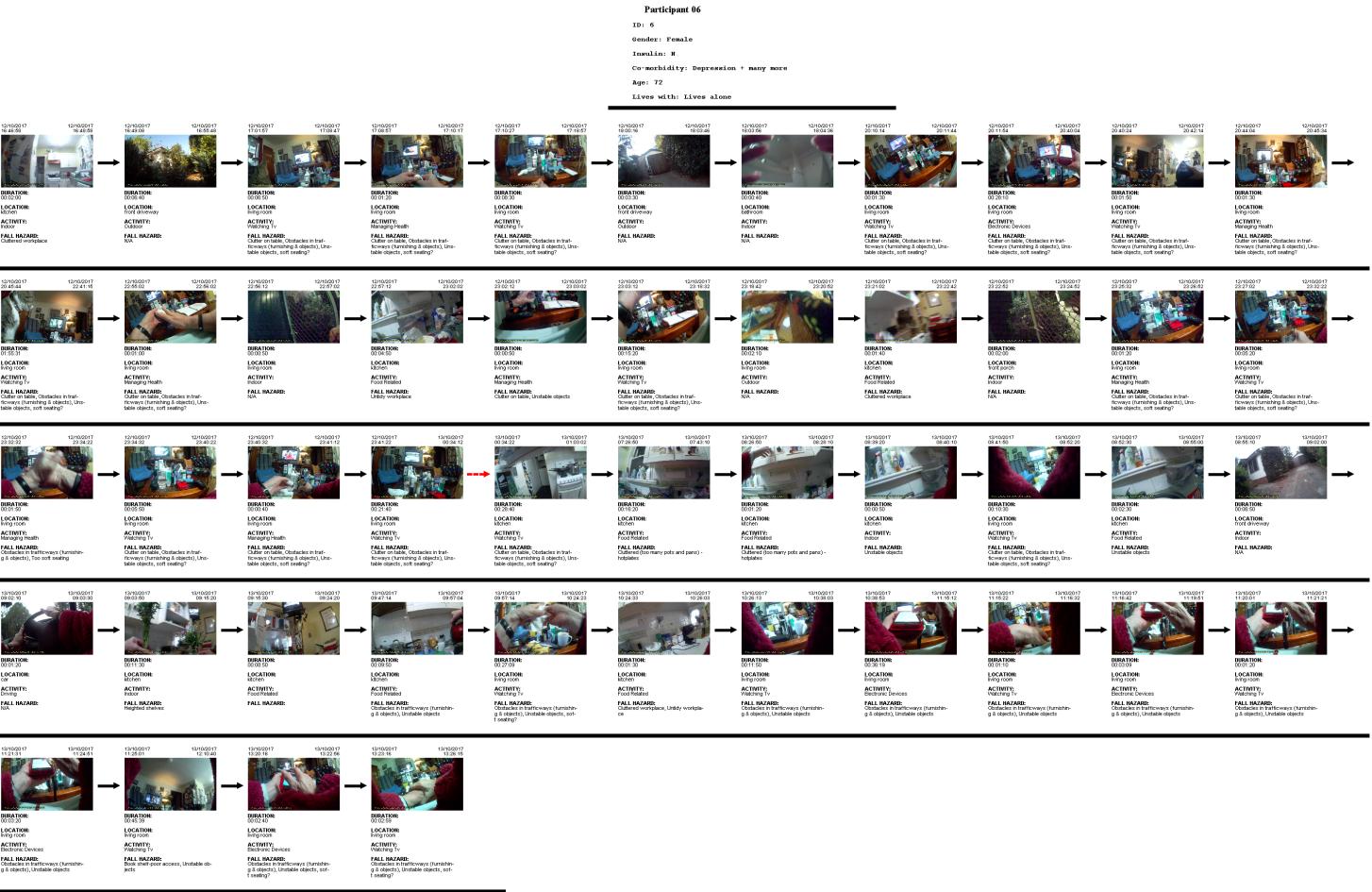


Figure 20: Participant 6 - Visualisation 1

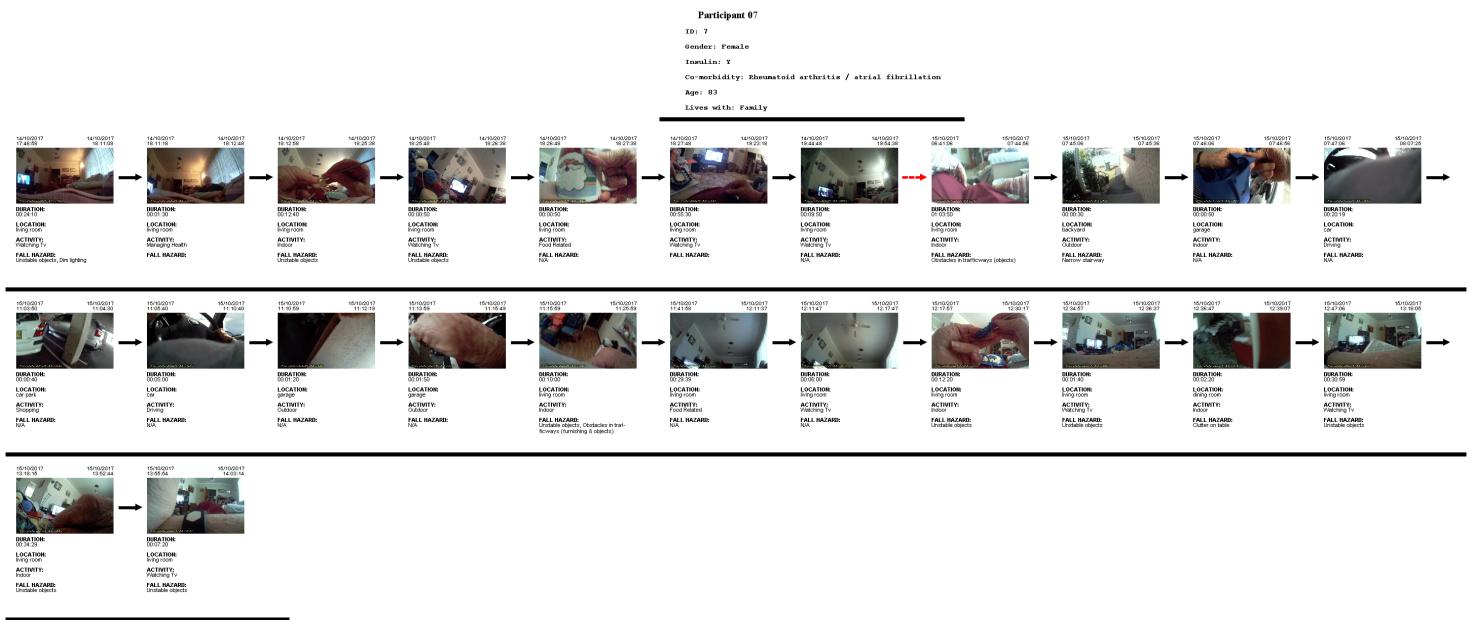


Figure 21: Participant 7 - Visualisation 1

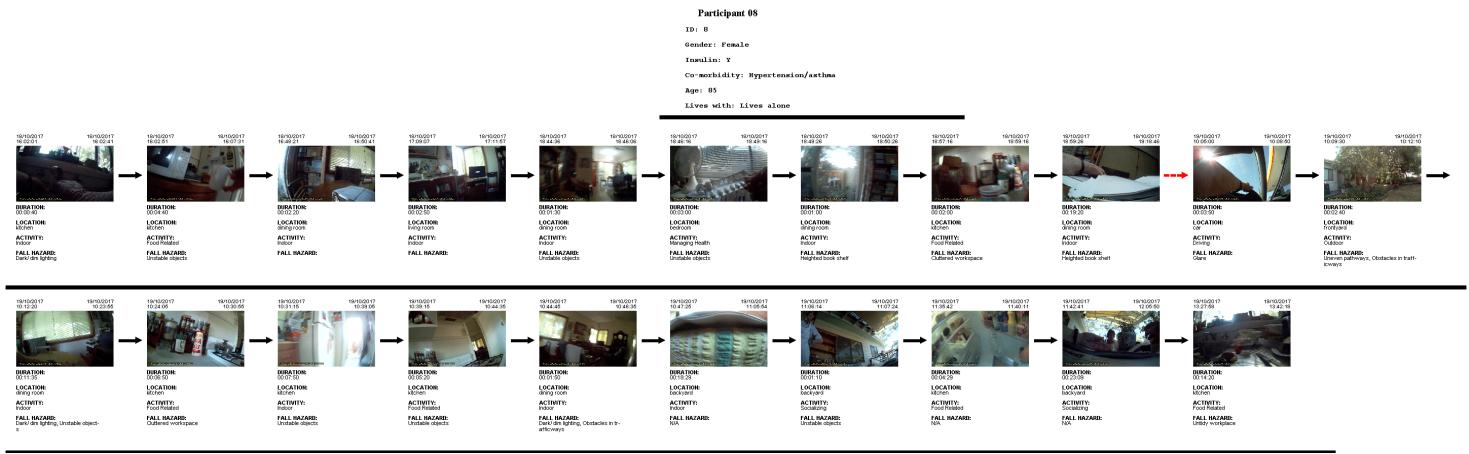


Figure 22: Participant 8 - Visualisation 1

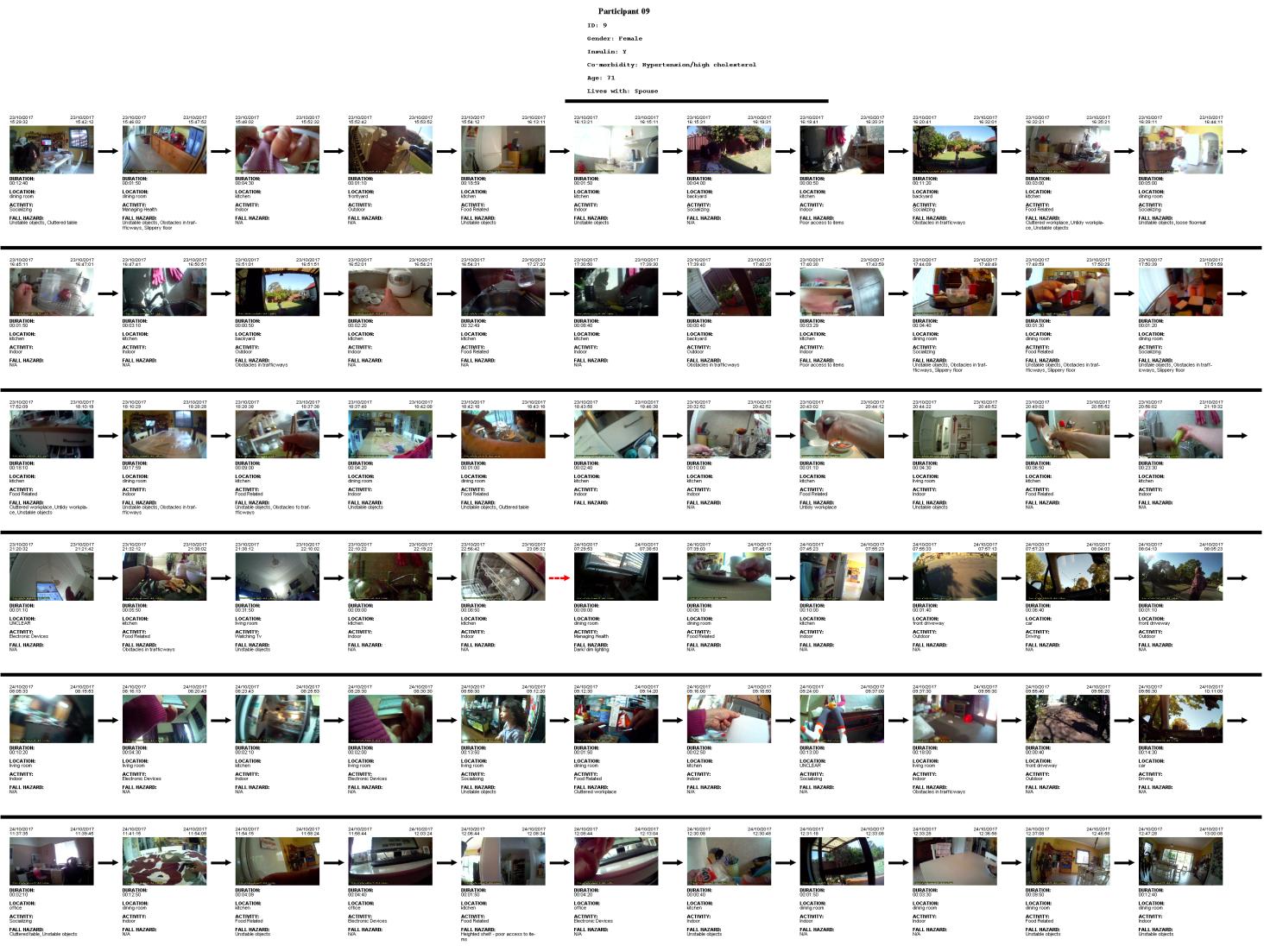


Figure 23: Participant 9 - Visualisation 1

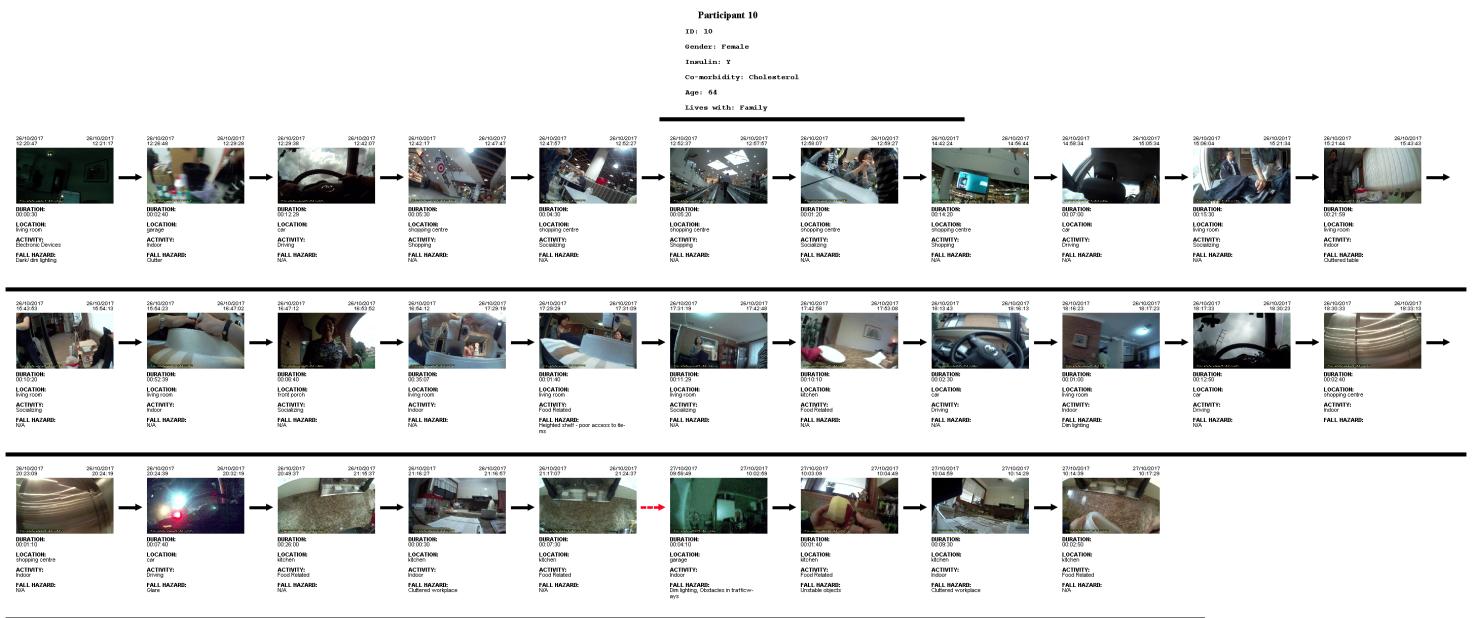


Figure 24: Participant 10 - Visualisation 1

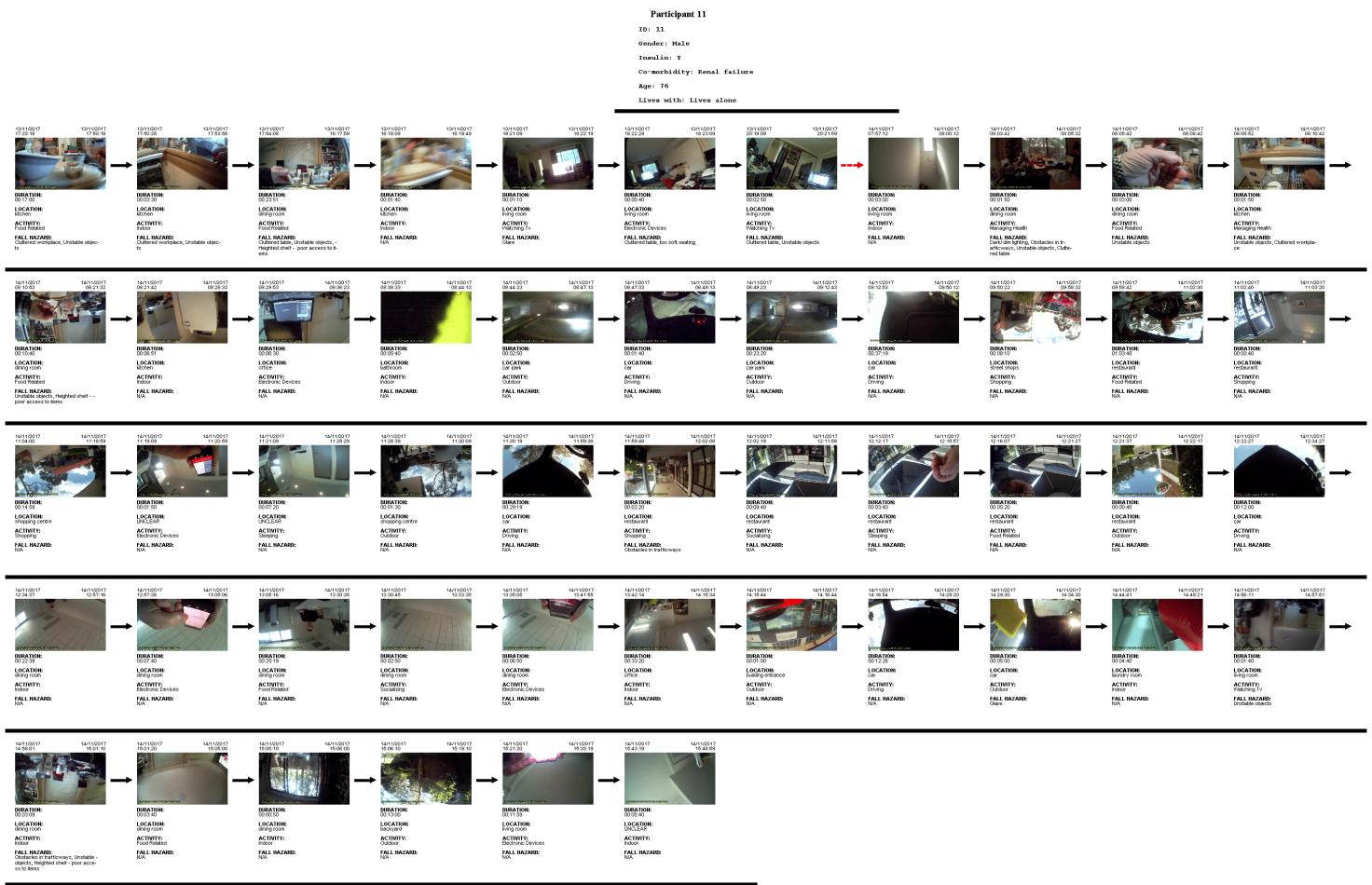


Figure 25: Participant 11 - Visualisation 1

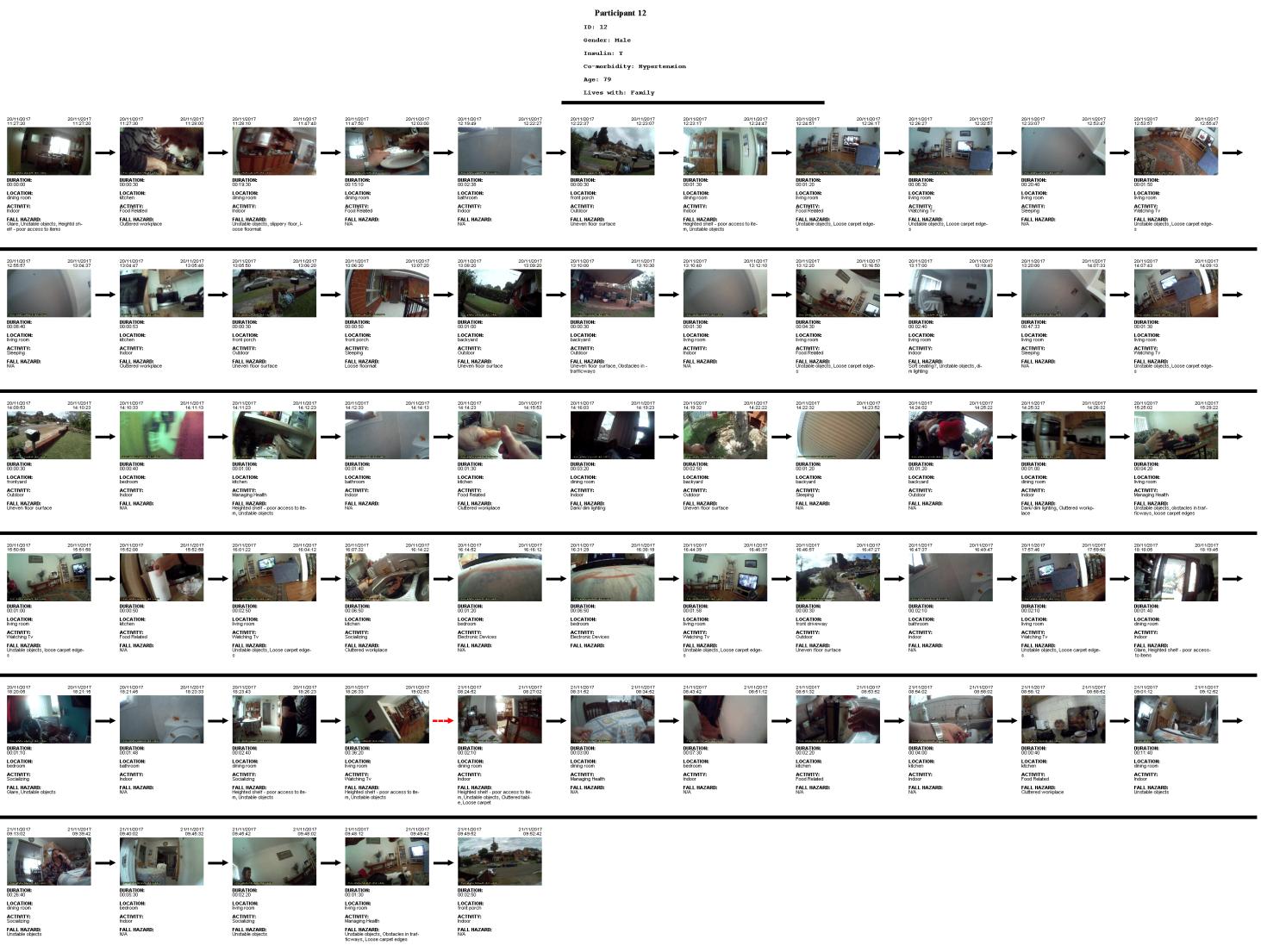


Figure 26: Participant 12 - Visualisation 1

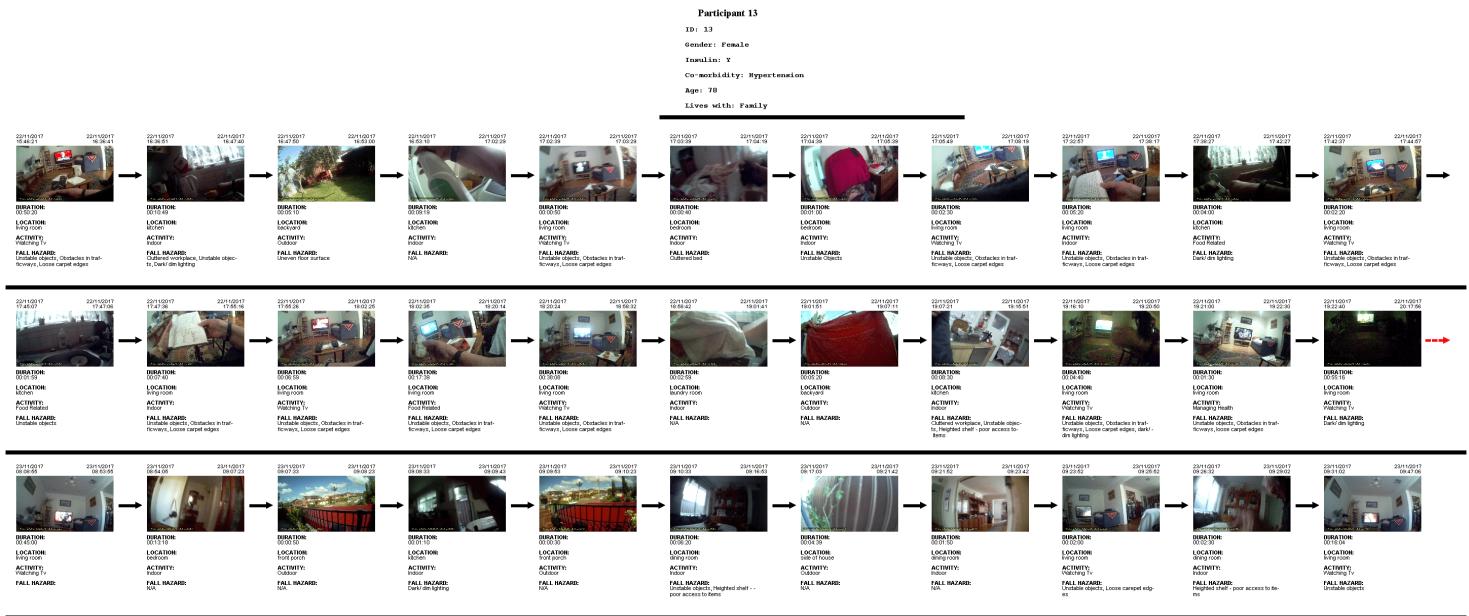


Figure 27: Participant 13 - Visualisation 1



Figure 28: Participant 14 - Visualisation 1

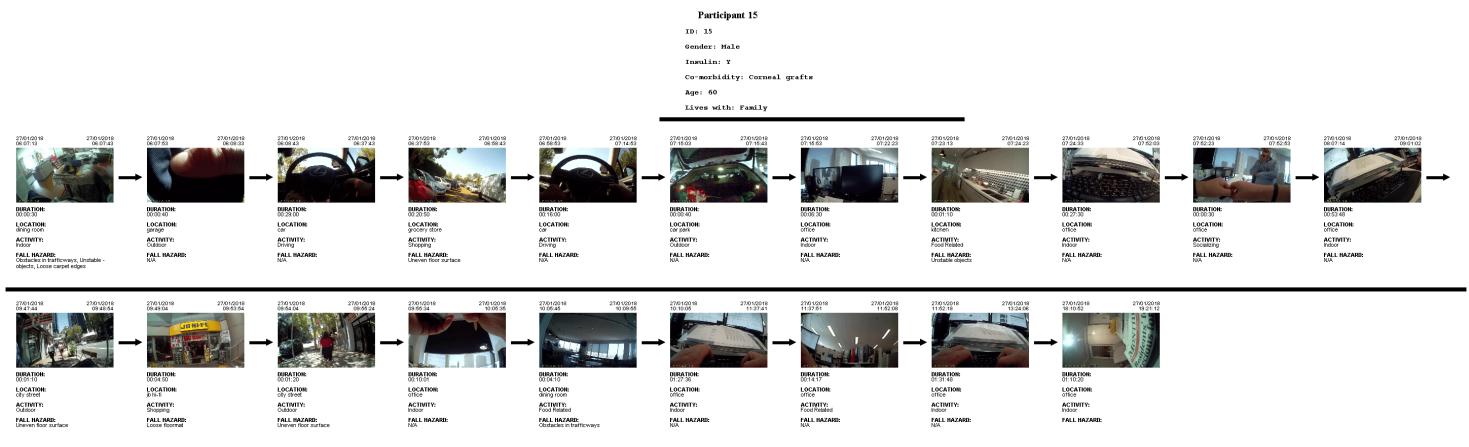


Figure 29: Participant 15 - Visualisation 1



Figure 30: Participant 16 - Visualisation 1

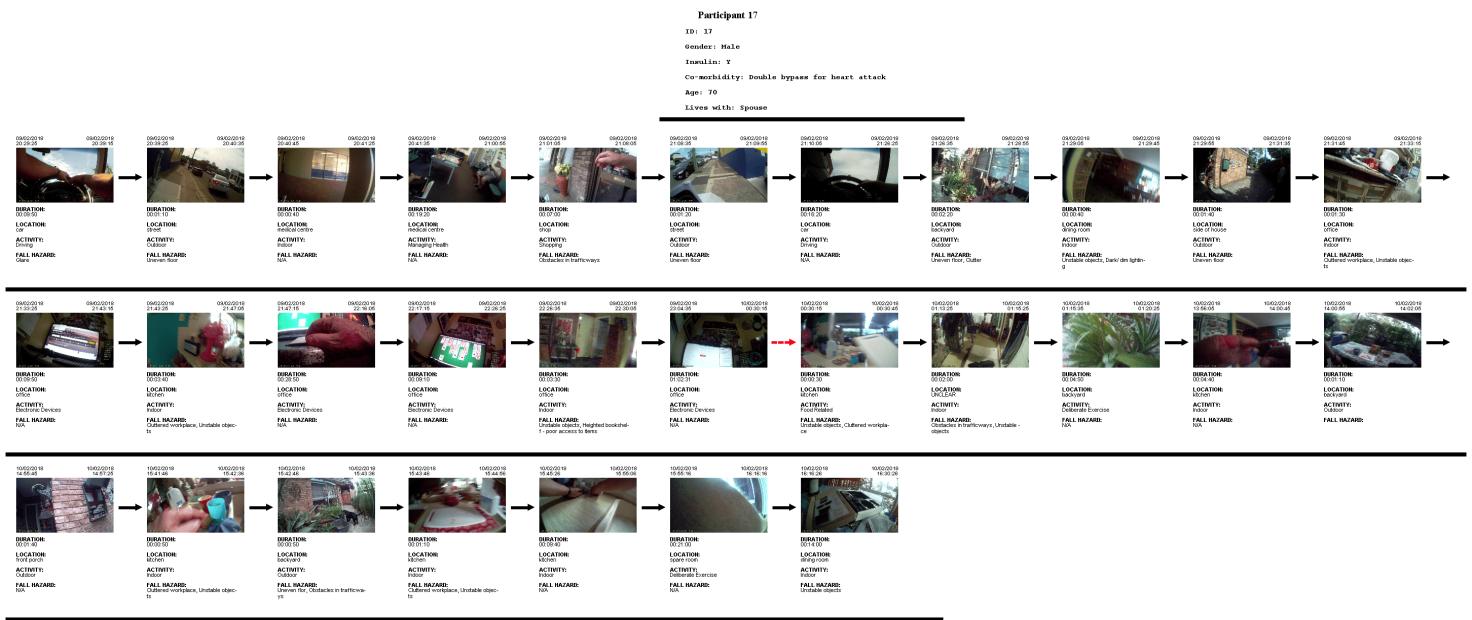


Figure 31: Participant 17 - Visualisation 1

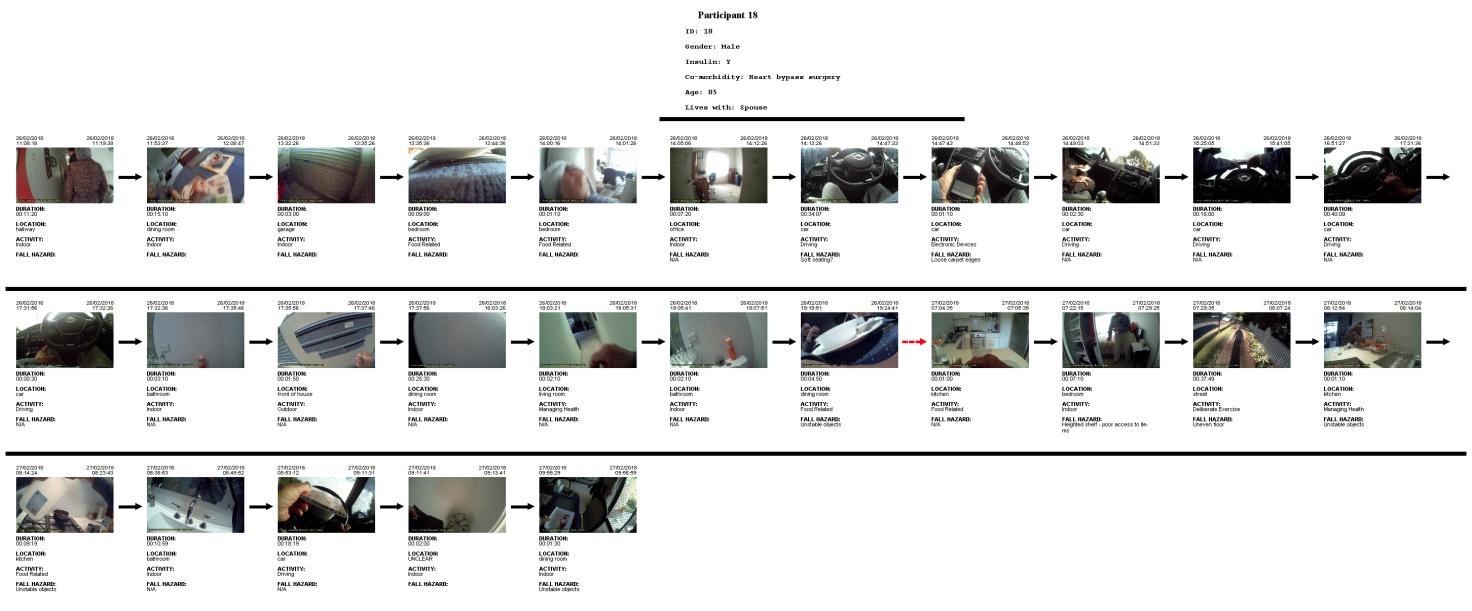


Figure 32: Participant 18 - Visualisation 1

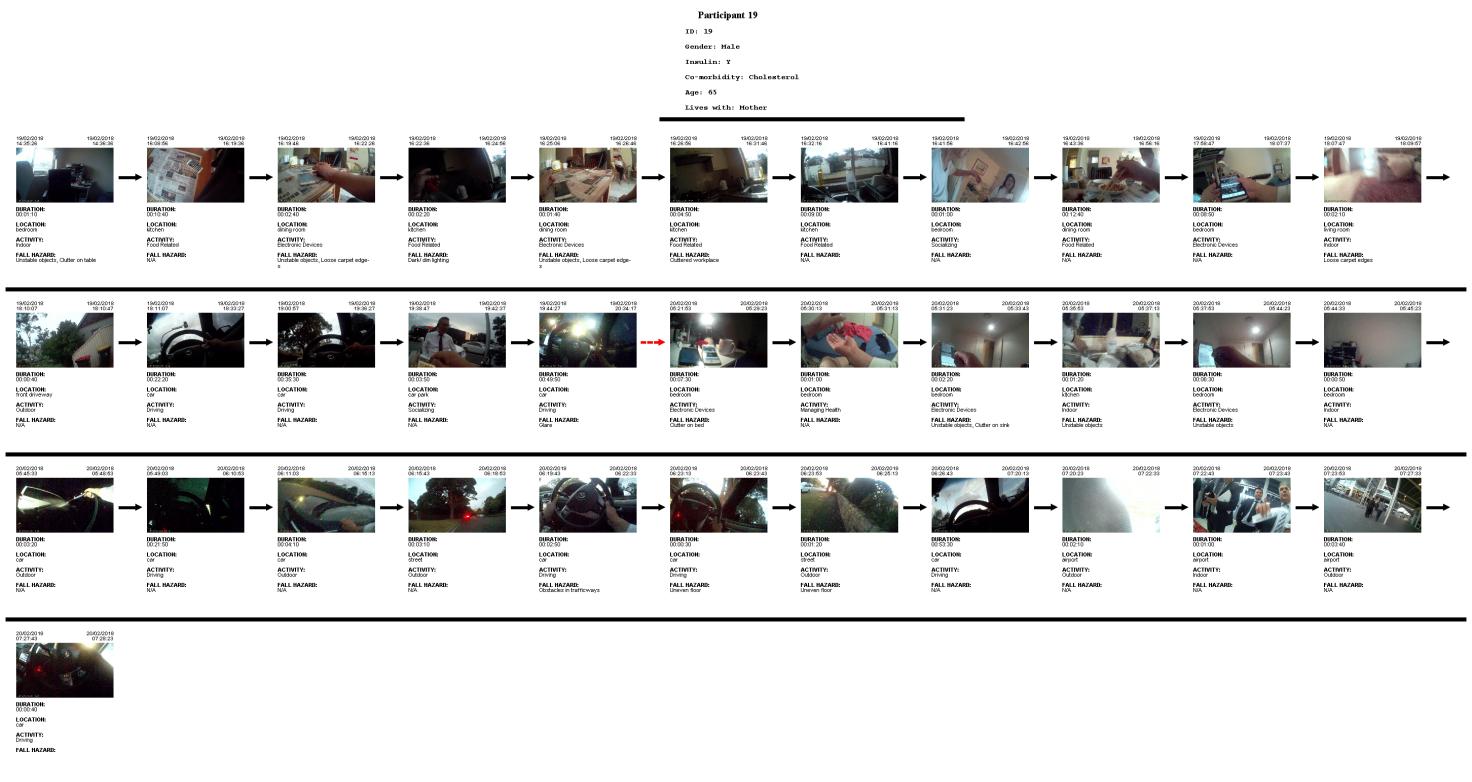


Figure 33: Participant 19 - Visualisation 1

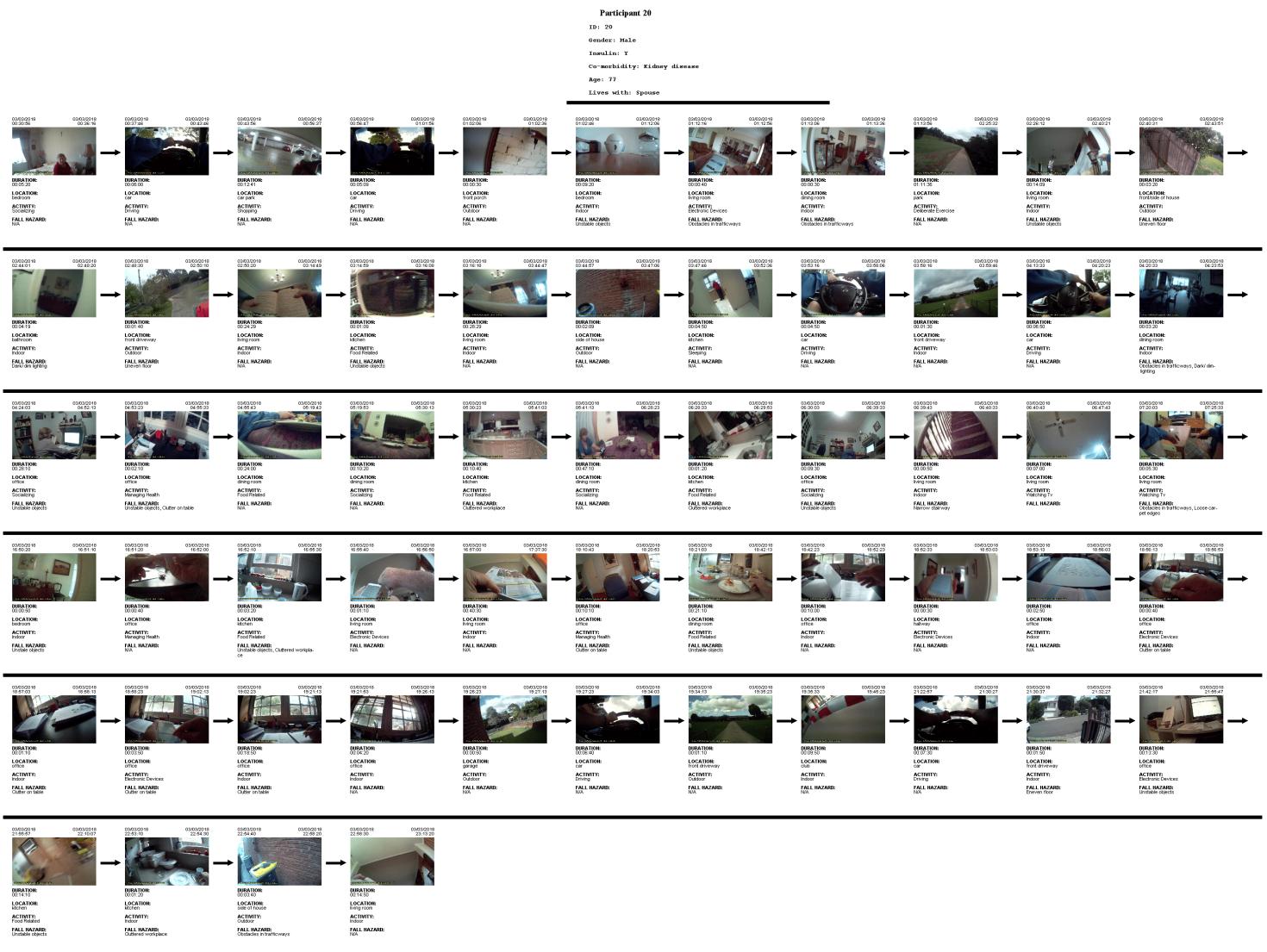


Figure 34: Participant 20 - Visualisation 1

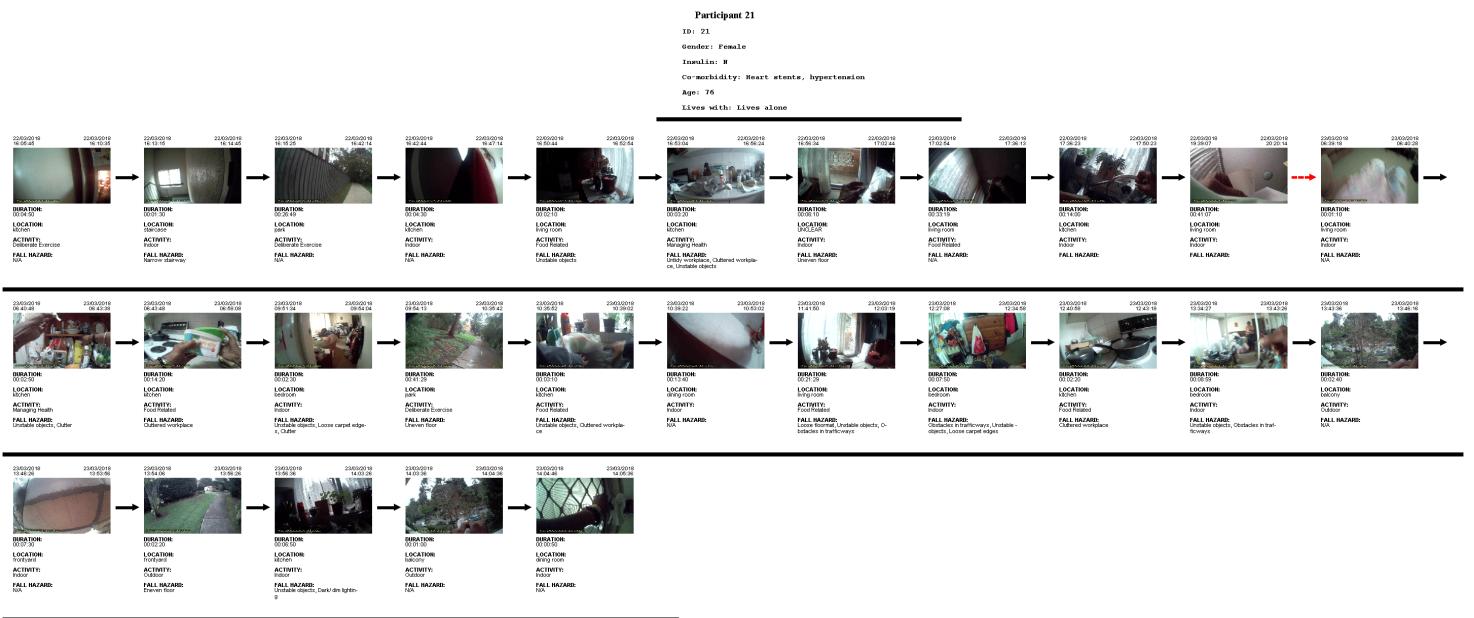


Figure 35: Participant 21 - Visualisation 1

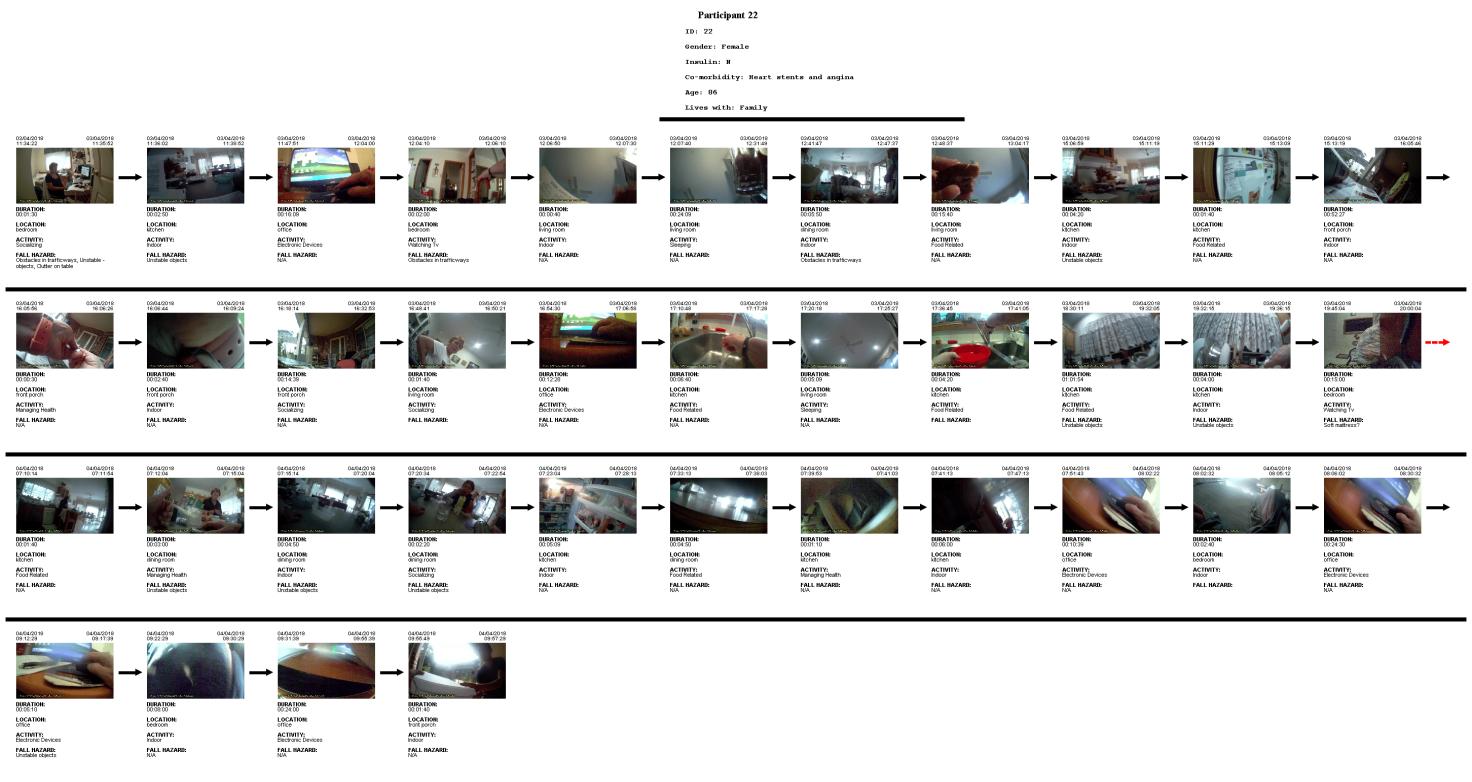


Figure 36: Participant 22 - Visualisation 1

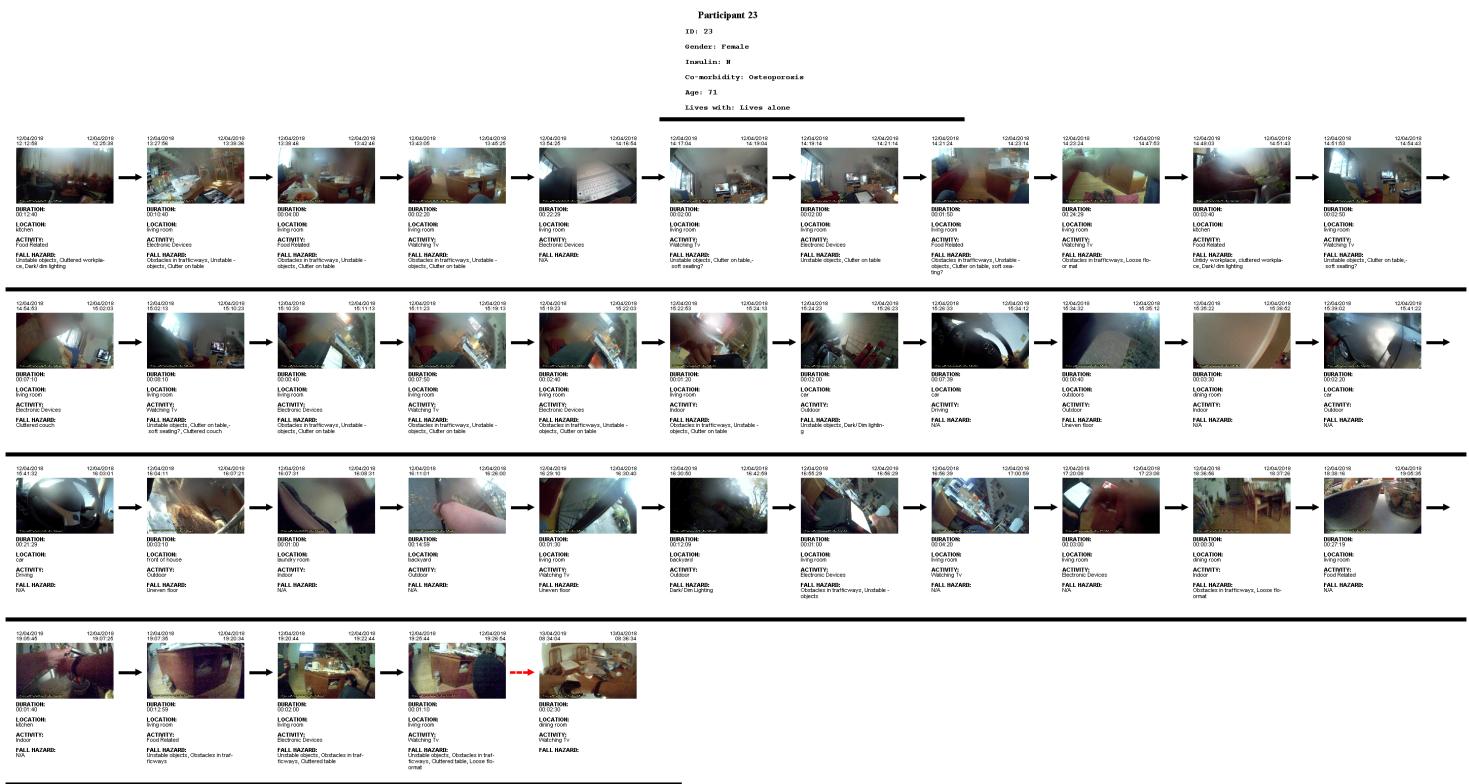


Figure 37: Participant 23 - Visualisation 1

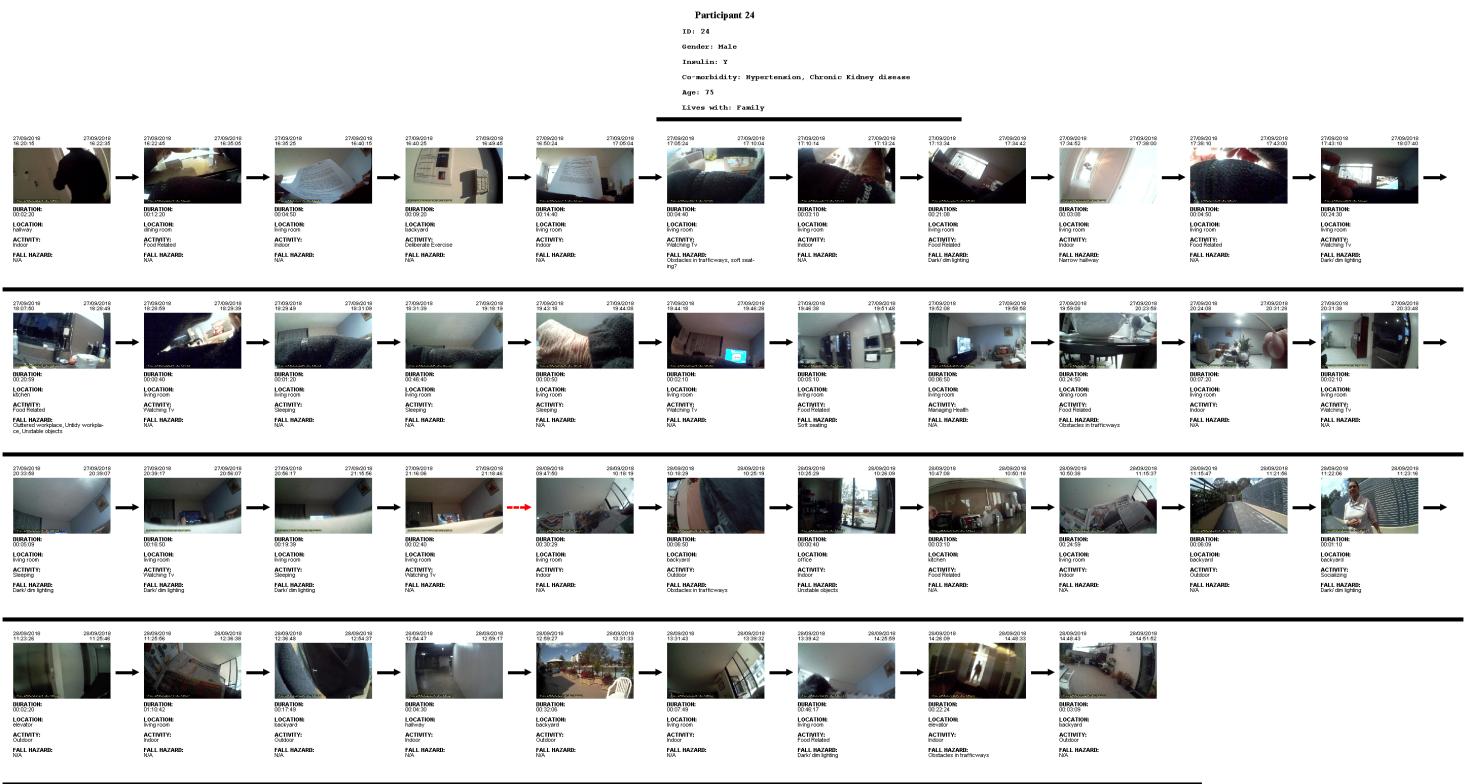


Figure 38: Participant 24 - Visualisation 1



Figure 39: Participant 25 - Visualisation 1



Figure 40: Participant 26 - Visualisation 1

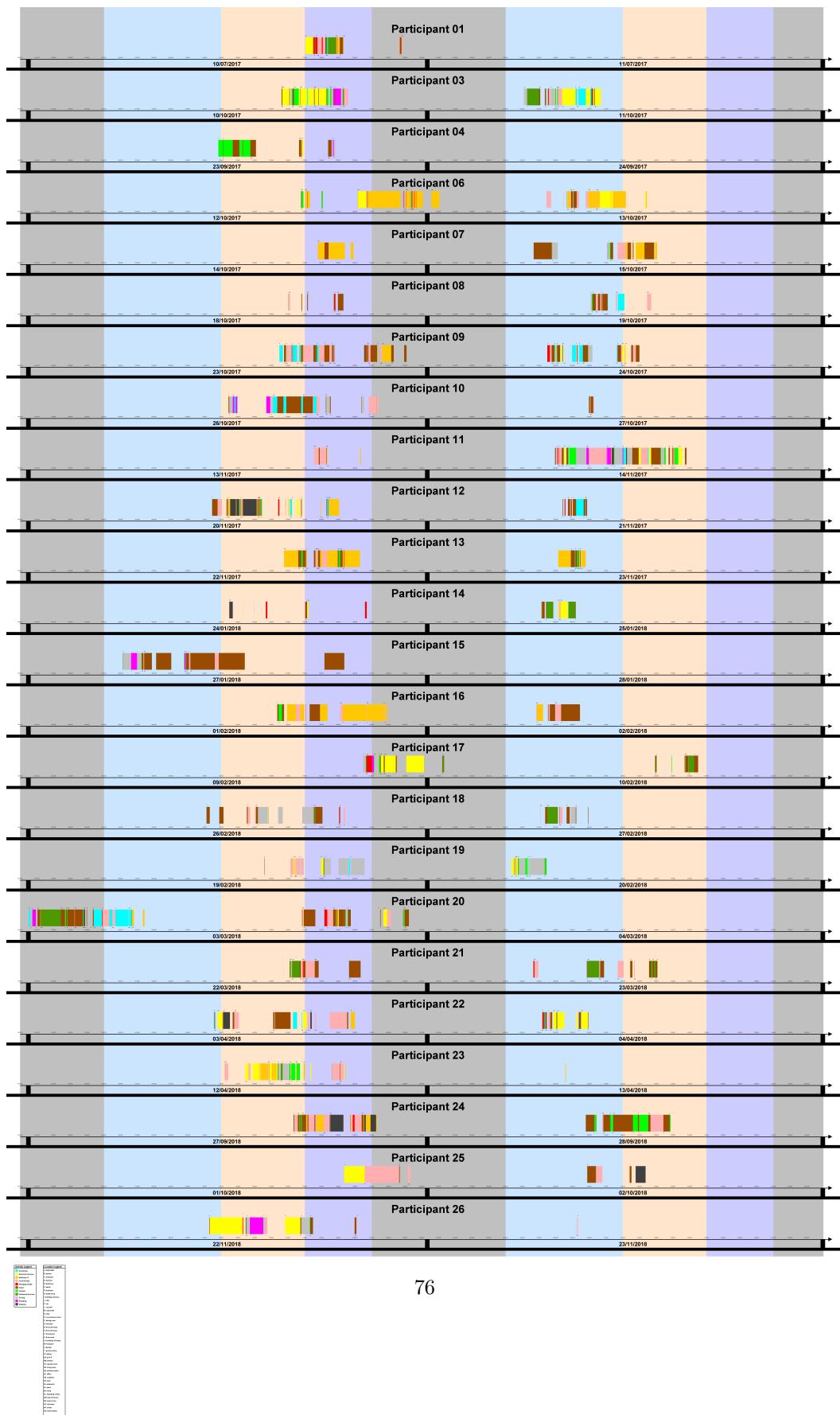


Figure 41: Visualisation 2 - All Participants

Participant ID	Activity Class	Start Date / Time	End Date / Time	Duration	Representative Image File Name	Location	Fall Hazard
1	Electronic Devices	10/07/2017 - 17:02:29	10/07/2017 - 17:30:39	0:28:00	PSS-20170710-170844UTC+1000_050.jpg	bedroom	N/A
1	Managing Health	10/07/2017 - 17:30:39	10/07/2017 - 17:34:49	0:04:10	PSS-20170710-172344UTC+1000_045.jpg	bedroom	Obstacles in trafficways (furnishing & objects)
1	Indoor	10/07/2017 - 17:34:59	10/07/2017 - 17:39:18	0:04:19	PSS-20170710-172344UTC+1000_081.jpg	bathroom	N/A
1	Managing Health	10/07/2017 - 17:39:36	10/07/2017 - 17:45:26	0:05:50	PSS-20170710-173921UTC+1000_013.jpg	bedroom	Cluttered side tables, Poor access to commonly used items
1	Food Related	10/07/2017 - 17:45:36	10/07/2017 - 18:01:16	0:15:40	PSS-20170710-173921UTC+1000_085.jpg	living room	Unstable objects/ furniture
1	Managing Health	10/07/2017 - 18:01:26	10/07/2017 - 18:05:06	0:03:40	PSS-20170710-175421UTC+1000_044.jpg	living room	Untidy workplace
1	Food Related	10/07/2017 - 18:05:16	10/07/2017 - 18:11:36	0:06:20	PSS-20170710-175421UTC+1000_085.jpg	living room	Unstable objects/ furniture
1	Indoor	10/07/2017 - 18:13:46	10/07/2017 - 18:17:16	0:03:30	PSS-20170710-180921UTC+1000_037.jpg	dining room	N/A
1	Deliberate Exercise	10/07/2017 - 18:17:26	10/07/2017 - 18:20:36	0:03:10	PSS-20170710-180921UTC+1000_058.jpg	outdoors	Obstacles in trafficways (furnishing & objects)
1	Socializing	10/07/2017 - 18:20:46	10/07/2017 - 18:23:06	0:02:20	PSS-20170710-180921UTC+1000_069.jpg	outdoors	Irregular ground surfaces, Slippery surfaces, Large lawn
1	Deliberate Exercise	10/07/2017 - 18:23:16	10/07/2017 - 18:51:06	0:27:50	PSS-20170710-182421UTC+1000_077.jpg	outdoors	N/A
1	Indoor	10/07/2017 - 18:51:16	10/07/2017 - 18:52:56	0:01:40	PSS-20170710-183921UTC+1000_077.jpg	living room	Cluttered table, unstable objects
1	Watching Tv	10/07/2017 - 18:53:06	10/07/2017 - 18:56:36	0:03:30	PSS-20170710-183921UTC+1000_083.jpg	living room	Dark/ dim lighting
1	Indoor	10/07/2017 - 18:56:46	10/07/2017 - 18:57:46	0:01:00	PSS-20170710-185421UTC+1000_018.jpg	living room	Clutter
1	Watching Tv	10/07/2017 - 18:58:46	10/07/2017 - 19:05:26	0:06:40	PSS-20170710-185421UTC+1000_029.jpg	living room	Unstable objects/ furniture
1	Indoor	10/07/2017 - 19:05:36	10/07/2017 - 19:17:26	0:11:50	PSS-20170710-185421UTC+1000_088.jpg	bedroom	Cluttered side tables, Poor access to commonly used items
1	Electronic Devices	10/07/2017 - 19:17:36	10/07/2017 - 19:18:16	0:00:40	PSS-20170710-190921UTC+1000_052.jpg	living room	Unstable objects/ furniture
1	Watching Tv	10/07/2017 - 19:18:26	10/07/2017 - 19:19:46	0:01:20	PSS-20170710-190921UTC+1000_059.jpg	living room	Unstable objects/ furniture
1	Food Related	10/07/2017 - 22:36:48	10/07/2017 - 22:37:38	0:00:50	PSS-20170710-222803UTC+1000_055.jpg	living room	Furniture blocking access
1	Food Related	10/07/2017 - 22:38:06	10/07/2017 - 22:40:56	0:02:50	PSS-20170710-223741UTC+1000_017.jpg	living room	Unstable objects/ furniture
1	Indoor	10/07/2017 - 22:41:06	10/07/2017 - 22:47:16	0:06:10	PSS-20170710-223741UTC+1000_047.jpg	dining room	N/A
1	Food Related	10/07/2017 - 22:47:26	10/07/2017 - 22:48:46	0:01:20	PSS-20170710-223741UTC+1000_063.jpg	living room	Unstable objects/ furniture
1	Food Related	10/07/2017 - 22:49:06	10/07/2017 - 22:51:16	0:02:10	PSS-20170710-223741UTC+1000_075.jpg	living room	Unstable objects/ furniture

Figure 42: Participant 1 Activity Table

Participant ID	Activity Class	Start Date / Time	End Date / Time	Duration	Representative Image File Name	Location	Fall Hazard
3	Electronic Devices	10/10/2017 - 15:36:19	10/10/2017 - 15:37:19	0:01:00	PSS-20171010-153324UTC+1100_021.jpg	office	Glare
3	Indoor	10/10/2017 - 15:37:29	10/10/2017 - 15:40:19	0:02:50	PSS-20171010-153324UTC+1100_033.jpg	kitchen	Loose floormat
3	Electronic Devices	10/10/2017 - 15:40:39	10/10/2017 - 16:02:49	0:22:10	PSS-20171010-154824UTC+1100_024.jpg	office	Clutter on table
3	Indoor	10/10/2017 - 16:04:49	10/10/2017 - 16:06:49	0:02:00	PSS-20171010-160324UTC+1100_015.jpg	office	Clutter, Dim lighting
3	Electronic Devices	10/10/2017 - 16:06:59	10/10/2017 - 16:10:49	0:03:50	PSS-20171010-160324UTC+1100_036.jpg	office	Clutter on table
3	Socializing	10/10/2017 - 16:10:59	10/10/2017 - 16:13:39	0:02:40	PSS-20171010-160324UTC+1100_047.jpg	office	Book shelf - Poor access
3	Indoor	10/10/2017 - 16:15:22	10/10/2017 - 16:21:22	0:06:00	PSS-20171010-161517UTC+1100_020.jpg	kitchen	N/A
3	Outdoor	10/10/2017 - 16:21:32	10/10/2017 - 16:39:02	0:17:30	PSS-20171010-163017UTC+1100_001.jpg	outdoors	Unstable objects/ furniture
3	Electronic Devices	10/10/2017 - 16:39:32	10/10/2017 - 16:44:32	0:05:00	PSS-20171010-163017UTC+1100_071.jpg	office	Clutter on table
3	Indoor	10/10/2017 - 16:44:42	10/10/2017 - 16:45:42	0:01:00	PSS-20171010-163017UTC+1100_090.jpg	kitchen	Untidy workplace
3	Electronic Devices	10/10/2017 - 16:46:32	10/10/2017 - 17:08:11	0:21:39	PSS-20171010-164517UTC+1100_074.jpg	office	Clutter on table
3	Socializing	10/10/2017 - 17:08:21	10/10/2017 - 17:11:01	0:02:40	PSS-20171010-170016UTC+1100_057.jpg	office	Book shelf - Poor access
3	Electronic Devices	10/10/2017 - 17:11:31	10/10/2017 - 17:32:19	0:02:48	PSS-20171010-171916UTC+1100_046.jpg	office	Clutter on table
3	Food Related	10/10/2017 - 17:32:39	10/10/2017 - 17:33:09	0:00:30	PSS-20171010-173014UTC+1100_016.jpg	kitchen	Obstacles in trafficways (objects)
3	Indoor	10/10/2017 - 17:33:39	10/10/2017 - 17:35:29	0:01:50	PSS-20171010-173014UTC+1100_026.jpg	kitchen	Unstable objects, Glare
3	Electronic Devices	10/10/2017 - 17:35:59	10/10/2017 - 17:48:28	0:12:29	PSS-20171010-173014UTC+1100_071.jpg	office	Clutter on table
3	Indoor	10/10/2017 - 17:48:38	10/10/2017 - 17:50:08	0:01:30	PSS-20171010-174513UTC+1100_025.jpg	office	Glare
3	Electronic Devices	10/10/2017 - 17:50:28	10/10/2017 - 18:17:35	0:27:07	PSS-20171010-180011UTC+1100_023.jpg	office	Clutter on table
3	Indoor	10/10/2017 - 18:17:45	10/10/2017 - 18:18:55	0:01:10	PSS-20171010-181510UTC+1100_019.jpg	front room	Unstable objects, Dim lighting
3	Outdoor	10/10/2017 - 18:19:05	10/10/2017 - 18:21:55	0:02:50	PSS-20171010-181510UTC+1100_032.jpg	car park	Unstable objects, Obstacles in trafficways (objects)
3	Indoor	10/10/2017 - 18:22:05	10/10/2017 - 18:22:55	0:00:50	PSS-20171010-181510UTC+1100_044.jpg	car park	N/A
3	Outdoor	10/10/2017 - 18:23:05	10/10/2017 - 18:24:55	0:01:50	PSS-20171010-181510UTC+1100_053.jpg	car park	Glare
3	Electronic Devices	10/10/2017 - 18:29:15	10/10/2017 - 18:30:33	0:01:18	PSS-20171010-181510UTC+1100_089.jpg	office	Clutter on table
3	Outdoor	10/10/2017 - 18:30:43	10/10/2017 - 18:35:53	0:05:10	PSS-20171010-183008UTC+1100_018.jpg	outdoors	Unstable objects, Obstacles in trafficways (objects)
3	Driving	10/10/2017 - 18:36:03	10/10/2017 - 18:41:53	0:05:50	PSS-20171010-183008UTC+1100_054.jpg	car	N/A
3	Shopping	10/10/2017 - 18:42:03	10/10/2017 - 18:47:12	0:05:09	PSS-20171010-183008UTC+1100_074.jpg	car park	N/A
3	Indoor	10/10/2017 - 18:47:22	10/10/2017 - 18:49:42	0:02:20	PSS-20171010-184507UTC+1100_021.jpg	bottle shop	N/A
3	Shopping	10/10/2017 - 18:49:52	10/10/2017 - 19:10:10	0:20:18	PSS-20171010-184507UTC+1100_030.jpg	bottle shop	Obstacles in trafficways (objects)
3	Driving	10/10/2017 - 19:10:20	10/10/2017 - 19:16:29	0:06:09	PSS-20171010-190005UTC+1100_081.jpg	car	N/A
3	Outdoor	10/10/2017 - 19:16:39	10/10/2017 - 19:18:09	0:01:30	PSS-20171010-191504UTC+1100_014.jpg	car park	N/A
3	Indoor	10/10/2017 - 19:18:19	10/10/2017 - 19:20:59	0:02:40	PSS-20171010-191504UTC+1100_028.jpg	kitchen	Untidy workplace
3	Food Related	10/10/2017 - 19:22:09	10/10/2017 - 19:36:07	0:13:58	PSS-20171010-191504UTC+1100_085.jpg	kitchen	N/A
3	Indoor	11/10/2017 - 06:06:46	11/10/2017 - 06:07:16	0:00:30	PSS-20171011-055911UTC+1100_047.jpg	car park	Uneven surfaces near gate
3	Driving	11/10/2017 - 06:07:56	11/10/2017 - 06:16:46	0:08:50	PSS-20171011-055911UTC+1100_080.jpg	car	N/A
3	Deliberate Exercise	11/10/2017 - 06:16:56	11/10/2017 - 06:17:26	0:00:30	PSS-20171011-061411UTC+1100_018.jpg	outdoors	N/A
3	Deliberate Exercise	11/10/2017 - 06:17:56	11/10/2017 - 07:00:37	0:42:41	PSS-20171011-062911UTC+1100_061.jpg	beach	N/A
3	Indoor	11/10/2017 - 07:00:47	11/10/2017 - 07:04:53	0:04:06	PSS-20171011-065912UTC+1100_023.jpg	street	N/A
3	Indoor	11/10/2017 - 07:20:55	11/10/2017 - 07:24:25	0:03:30	PSS-20171011-072050UTC+1100_011.jpg	restaurant	N/A
3	Socializing	11/10/2017 - 07:24:45	11/10/2017 - 07:26:30	0:01:45	PSS-20171011-072050UTC+1100_029.jpg	restaurant	Obstacles in trafficways (furniture)
3	Food Related	11/10/2017 - 07:27:20	11/10/2017 - 07:32:30	0:05:10	PSS-20171011-072555UTC+1100_024.jpg	restaurant	N/A
3	Indoor	11/10/2017 - 07:32:40	11/10/2017 - 07:36:00	0:03:20	PSS-20171011-072555UTC+1100_051.jpg	restaurant	Unstable Objects
3	Food Related	11/10/2017 - 07:36:10	11/10/2017 - 07:41:00	0:04:50	PSS-20171011-072555UTC+1100_073.jpg	restaurant	N/A
3	Driving	11/10/2017 - 07:41:59	11/10/2017 - 07:56:49	0:14:50	PSS-20171011-074054UTC+1100_054.jpg	car	N/A
3	Outdoor	11/10/2017 - 07:56:59	11/10/2017 - 07:57:29	0:00:30	PSS-20171011-075554UTC+1100_008.jpg	car park	N/A
3	Electronic Devices	11/10/2017 - 07:57:39	11/10/2017 - 07:58:09	0:00:30	PSS-20171011-075554UTC+1100_012.jpg	outdoors	N/A
3	Outdoor	11/10/2017 - 07:58:19	11/10/2017 - 08:00:19	0:02:00	PSS-20171011-075554UTC+1100_021.jpg	outdoors	N/A
3	Indoor	11/10/2017 - 08:00:29	11/10/2017 - 08:01:09	0:00:40	PSS-20171011-075554UTC+1100_030.jpg	dining room	N/A
3	Food Related	11/10/2017 - 08:03:49	11/10/2017 - 08:05:29	0:01:40	PSS-20171011-075554UTC+1100_053.jpg	kitchen	N/A
3	Managing Health	11/10/2017 - 08:05:39	11/10/2017 - 08:06:09	0:00:30	PSS-20171011-075554UTC+1100_059.jpg	bathroom	Unstable objects
3	Outdoor	11/10/2017 - 08:06:19	11/10/2017 - 08:08:39	0:02:20	PSS-20171011-075554UTC+1100_070.jpg	outdoors	N/A
3	Food Related	11/10/2017 - 08:08:49	11/10/2017 - 08:22:28	0:13:39	PSS-20171011-081033UTC+1100_025.jpg	dining room	N/A
3	Electronic Devices	11/10/2017 - 08:22:38	11/10/2017 - 09:10:37	0:47:59	PSS-20171011-084852UTC+1100_002.jpg	office	N/A
3	Socializing	11/10/2017 - 09:11:07	11/10/2017 - 09:16:07	0:05:00	PSS-20171011-090352UTC+1100_049.jpg	dining room	Unstable objects
3	Food Related	11/10/2017 - 09:16:17	11/10/2017 - 09:18:17	0:02:00	PSS-20171011-090352UTC+1100_081.jpg	kitchen	Dim lighting
3	Food Related	11/10/2017 - 09:19:06	11/10/2017 - 09:19:46	0:00:40	PSS-20171011-091851UTC+1100_004.jpg	kitchen	Untidy workplace
3	Food Related	11/10/2017 - 09:20:26	11/10/2017 - 09:21:26	0:01:00	PSS-20171011-091851UTC+1100_013.jpg	kitchen	N/A
3	Socializing	11/10/2017 - 09:21:56	11/10/2017 - 09:47:46	0:25:50	PSS-20171011-091851UTC+1100_019.jpg	office	Clutter on table
3	Electronic Devices	11/10/2017 - 09:47:56	11/10/2017 - 10:03:56	0:16:00	PSS-20171011-094851UTC+1100_069.jpg	office	Clutter on table
3	Socializing	11/10/2017 - 10:04:15	11/10/2017 - 10:07:45	0:03:30	PSS-20171011-100350UTC+1100_016.jpg	hallway	N/A
3	Indoor	11/10/2017 - 10:07:55	11/10/2017 - 10:14:25	0:06:30	PSS-20171011-102552UTC+1100_044.jpg	dining room	Obstacles in trafficways (objects)
3	Electronic Devices	11/10/2017 - 10:14:35	11/10/2017 - 10:16:35	0:02:00	PSS-20171011-100500UTC+1100_071.jpg	dining room	N/A
3	Indoor	11/10/2017 - 10:17:35	11/10/2017 - 10:18:05	0:00:30	PSS-20171011-100500UTC+1100_084.jpg	kitchen	N/A
3	Indoor	11/10/2017 - 10:18:15	11/10/2017 - 10:20:05	0:01:50	PSS-20171011-101850UTC+1100_002.jpg	dining room	Obstacles in trafficways (objects)
3	Electronic Devices	11/10/2017 - 10:20:15	11/10/2017 - 10:41:24	0:21:09	PSS-20171011-101850UTC+1100_075.jpg	office	Clutter on table

Figure 43: Participant 3 Activity Table

Participant ID	Activity Class	Start Date / Time	End Date / Time	Duration	Representative Image File Name	Location	Fall Hazard
4	Outdoor	23/09/2017 - 11:50:35	23/09/2017 - 12:05:53	0:15:18	PSS-20170923-115030UTC+1000_047.jpg	backyard	N/A
4	Indoor	23/09/2017 - 12:06:03	23/09/2017 - 12:07:23	0:01:20	PSS-20170923-120528UTC+1000_008.jpg	shed	Clutter on table
4	Outdoor	23/09/2017 - 12:07:33	23/09/2017 - 12:42:00	0:34:27	PSS-20170923-122027UTC+1000_026.jpg	backyard	Obstacles in trafficways (objects)
4	Indoor	23/09/2017 - 12:42:10	23/09/2017 - 13:05:19	0:23:09	PSS-20170923-125024UTC+1000_020.jpg	backyard	Slippery floors
4	Outdoor	23/09/2017 - 13:05:37	23/09/2017 - 13:09:37	0:04:00	PSS-20170923-130522UTC+1000_014.jpg	backyard	Obstructions on pathways
4	Outdoor	23/09/2017 - 13:10:17	23/09/2017 - 13:18:27	0:08:10	PSS-20170923-130522UTC+1000_054.jpg	backyard	Uneven pathways
4	Indoor	23/09/2017 - 13:18:37	23/09/2017 - 13:20:17	0:01:40	PSS-20170923-130522UTC+1000_085.jpg	kitchen	Uneven pathways
4	Outdoor	23/09/2017 - 13:20:36	23/09/2017 - 13:45:24	0:24:48	PSS-20170923-132021UTC+1000_077.jpg	backyard	Uneven pathways, Unstable objects
4	Indoor	23/09/2017 - 13:45:34	23/09/2017 - 14:05:22	0:19:48	PSS-20170923-135017UTC+1000_031.jpg	kitchen	N/A
4	Indoor	23/09/2017 - 16:39:50	23/09/2017 - 16:45:50	0:06:00	PSS-20170923-163945UTC+1000_019.jpg	living room	N/A
4	Indoor	23/09/2017 - 16:46:30	23/09/2017 - 16:49:30	0:03:00	PSS-20170923-163945UTC+1000_050.jpg	hallway	N/A
4	Electronic Devices	23/09/2017 - 16:49:40	23/09/2017 - 16:54:00	0:04:20	PSS-20170923-163945UTC+1000_072.jpg	bedroom	Book shelf-poor access
4	Indoor	23/09/2017 - 18:24:08	23/09/2017 - 18:36:18	0:12:10	PSS-20170923-182403UTC+1000_037.jpg	kitchen	Dark/dim lighting
4	Driving	23/09/2017 - 18:38:18	23/09/2017 - 18:39:08	0:00:50	PSS-20170923-182403UTC+1000_089.jpg	car	N/A
4	Shopping	23/09/2017 - 18:40:58	23/09/2017 - 18:44:18	0:03:20	PSS-20170923-183903UTC+1000_012.jpg	convenience store	N/A
4	Driving	23/09/2017 - 18:46:18	23/09/2017 - 18:49:18	0:03:00	PSS-20170923-183903UTC+1000_054.jpg	car	N/A

Figure 44: Participant 4 Activity Table

Participant ID	Activity Class	Start Date / Time	End Date / Time	Duration	Representative Image File Name	Location	Fall Hazard
6	Indoor	12/10/2017 - 16:46:58	12/10/2017 - 16:48:58	0:02:00	PSS-20171012-164653UTC+1100_007.jpg	kitchen	Cluttered workplace
6	Outdoor	12/10/2017 - 16:49:08	12/10/2017 - 16:55:48	0:06:40	PSS-20171012-164653UTC+1100_034.jpg	front driveway	N/A
6	Watching Tv	12/10/2017 - 17:01:57	12/10/2017 - 17:08:47	0:06:50	PSS-20171012-170152UTC+1100_007.jpg	living room	Clutter on table, Obstacles in trafficways (furnishing & objects), Unstable objects, soft seating?
6	Managing Health	12/10/2017 - 17:08:57	12/10/2017 - 17:10:17	0:01:20	PSS-20171012-170152UTC+1100_045.jpg	living room	Clutter on table, Obstacles in trafficways (furnishing & objects), Unstable objects, soft seating?
6	Watching Tv	12/10/2017 - 17:10:27	12/10/2017 - 17:18:57	0:08:30	PSS-20171012-170152UTC+1100_054.jpg	living room	Clutter on table, Obstacles in trafficways (furnishing & objects), Unstable objects, soft seating?
6	Outdoor	12/10/2017 - 18:00:16	12/10/2017 - 18:03:46	0:03:30	PSS-20171012-174651UTC+1100_091.jpg	front driveway	N/A
6	Indoor	12/10/2017 - 18:03:56	12/10/2017 - 18:04:36	0:00:40	PSS-20171012-180151UTC+1100_015.jpg	bathroom	N/A
6	Watching Tv	12/10/2017 - 20:10:14	12/10/2017 - 20:11:44	0:01:30	PSS-20171012-201009UTC+1100_005.jpg	living room	Clutter on table, Obstacles in trafficways (furnishing & objects), Unstable objects, soft seating?
6	Electronic Devices	12/10/2017 - 20:11:54	12/10/2017 - 20:40:04	0:28:10	PSS-20171012-201009UTC+1100_090.jpg	living room	Clutter on table, Obstacles in trafficways (furnishing & objects), Unstable objects, soft seating?
6	Watching Tv	12/10/2017 - 20:40:24	12/10/2017 - 20:42:14	0:01:50	PSS-20171012-204009UTC+1100_013.jpg	living room	Clutter on table, Obstacles in trafficways (furnishing & objects), Unstable objects, soft seating?
6	Managing Health	12/10/2017 - 20:44:04	12/10/2017 - 20:45:34	0:01:30	PSS-20171012-204009UTC+1100_024.jpg	living room	Clutter on table, Obstacles in trafficways (furnishing & objects), Unstable objects, soft seating?
6	Watching Tv	12/10/2017 - 20:45:44	12/10/2017 - 22:41:15	1:55:31	PSS-20171012-204009UTC+1100_044.jpg	living room	Clutter on table, Obstacles in trafficways (furnishing & objects), Unstable objects, soft seating?
6	Managing Health	12/10/2017 - 22:55:02	12/10/2017 - 22:56:02	0:01:00	PSS-20171012-225357UTC+1100_007.jpg	living room	Clutter on table, Obstacles in trafficways (furnishing & objects), Unstable objects, soft seating?
6	Indoor	12/10/2017 - 22:56:12	12/10/2017 - 22:57:02	0:00:50	PSS-20171012-225357UTC+1100_016.jpg	living room	N/A
6	Food Related	12/10/2017 - 22:57:12	12/10/2017 - 23:02:02	0:04:50	PSS-20171012-225357UTC+1100_034.jpg	kitchen	Untidy workplace
6	Managing Health	12/10/2017 - 23:02:12	12/10/2017 - 23:03:02	0:05:50	PSS-20171012-230857UTC+1100_052.jpg	living room	Clutter on table, Unstable objects
6	Watching Tv	12/10/2017 - 23:03:12	12/10/2017 - 23:18:32	0:15:20	PSS-20171012-230857UTC+1100_008.jpg	living room	Clutter on table, Obstacles in trafficways (furnishing & objects), Unstable objects, soft seating?
6	Outdoor	12/10/2017 - 23:18:42	12/10/2017 - 23:20:52	0:02:10	PSS-20171012-230857UTC+1100_065.jpg	living room	N/A
6	Food Related	12/10/2017 - 23:21:02	12/10/2017 - 23:22:42	0:01:40	PSS-20171012-230857UTC+1100_078.jpg	kitchen	Cluttered workplace
6	Indoor	12/10/2017 - 23:22:42	12/10/2017 - 23:24:42	0:02:00	PSS-20171012-230857UTC+1100_090.jpg	front porch	N/A
6	Managing Health	12/10/2017 - 23:25:32	12/10/2017 - 23:26:52	0:01:20	PSS-20171012-232357UTC+1100_014.jpg	living room	Clutter on table, Obstacles in trafficways (furnishing & objects), Unstable objects, soft seating?
6	Watching Tv	12/10/2017 - 23:27:02	12/10/2017 - 23:32:22	0:05:20	PSS-20171012-232357UTC+1100_030.jpg	living room	Clutter on table, Obstacles in trafficways (furnishing & objects), Unstable objects, soft seating?
6	Managing Health	12/10/2017 - 23:32:32	12/10/2017 - 23:34:22	0:01:50	PSS-20171012-232357UTC+1100_057.jpg	living room	Obstacles in trafficways (furnishing & objects), Too soft seating
6	Watching Tv	12/10/2017 - 23:34:32	12/10/2017 - 23:40:22	0:05:50	PSS-20171012-232357UTC+1100_082.jpg	living room	Clutter on table, Obstacles in trafficways (furnishing & objects), Unstable objects, soft seating?
6	Managing Health	12/10/2017 - 23:40:32	12/10/2017 - 23:41:12	0:04:00	PSS-20171012-233857UTC+1100_012.jpg	living room	Clutter on table, Obstacles in trafficways (furnishing & objects), Unstable objects, soft seating?
6	Watching Tv	12/10/2017 - 23:41:22	13/10/2017 - 00:34:12	0:21:40	PSS-20171012-233857UTC+1100_098.jpg	living room	Clutter on table, Obstacles in trafficways (furnishing & objects), Unstable objects, soft seating?
6	Watching Tv	13/10/2017 - 00:34:22	13/10/2017 - 01:03:02	0:28:40	PSS-20171012-002357UTC+1100_068.jpg	kitchen	Clutter on table, Obstacles in trafficways (furnishing & objects), Unstable objects, soft seating?
6	Food Related	13/10/2017 - 07:26:50	13/10/2017 - 07:43:10	0:16:20	PSS-20171012-072645UTC+1100_050.jpg	kitchen	Cluttered (too many pots and pans) hotplates
6	Food Related	13/10/2017 - 08:26:50	13/10/2017 - 08:28:10	0:01:20	PSS-20171013-082645UTC+1100_005.jpg	kitchen	Cluttered (too many pots and pans) hotplates
6	Indoor	13/10/2017 - 08:39:20	13/10/2017 - 08:40:10	0:00:50	PSS-20171013-082645UTC+1100_078.jpg	kitchen	Unstable objects
6	Watching Tv	13/10/2017 - 08:41:50	13/10/2017 - 08:52:20	0:10:30	PSS-20171013-084145UTC+1100_032.jpg	living room	Clutter on table, Obstacles in trafficways (furnishing & objects), Unstable objects, soft seating?
6	Food Related	13/10/2017 - 08:52:30	13/10/2017 - 08:55:00	0:02:30	PSS-20171013-084145UTC+1100_072.jpg	kitchen	Unstable objects
6	Indoor	13/10/2017 - 08:55:10	13/10/2017 - 09:02:00	0:06:50	PSS-20171013-085645UTC+1100_011.jpg	front driveway	N/A
6	Driving	13/10/2017 - 09:02:10	13/10/2017 - 09:03:30	0:01:20	PSS-20171013-095645UTC+1100_037.jpg	car	N/A
6	Indoor	13/10/2017 - 09:03:50	13/10/2017 - 09:15:20	0:11:30	PSS-20171013-095645UTC+1100_078.jpg	kitchen	Heigheted shelves
6	Food Related	13/10/2017 - 09:15:30	13/10/2017 - 09:24:20	0:08:50	PSS-20171013-091145UTC+1100_049.jpg	kitchen	Obstacles in trafficways (furnishing & objects), Unstable objects
6	Food Related	13/10/2017 - 09:47:14	13/10/2017 - 09:57:04	0:09:50	PSS-20171013-094709UTC+1100_030.jpg	kitchen	Obstacles in trafficways (furnishing & objects), Unstable objects, soft seating?
6	Watching Tv	13/10/2017 - 09:57:14	13/10/2017 - 10:24:23	0:27:09	PSS-20171013-094709UTC+1100_068.jpg	living room	Cluttered workplace, Untidy workplace
6	Food Related	13/10/2017 - 10:24:33	13/10/2017 - 10:26:03	0:01:30	PSS-20171013-101708UTC+1100_049.jpg	kitchen	Obstacles in trafficways (furnishing & objects), Unstable objects
6	Watching Tv	13/10/2017 - 10:26:13	13/10/2017 - 10:38:03	0:11:50	PSS-20171013-103208UTC+1100_016.jpg	living room	Obstacles in trafficways (furnishing & objects), Unstable objects
6	Electronic Devices	13/10/2017 - 10:38:53	13/10/2017 - 11:15:12	0:36:19	PSS-20171013-104707UTC+1100_060.jpg	living room	Obstacles in trafficways (furnishing & objects), Unstable objects
6	Watching Tv	13/10/2017 - 11:15:22	13/10/2017 - 11:16:32	0:01:10	PSS-20171013-110207UTC+1100_083.jpg	living room	Obstacles in trafficways (furnishing & objects), Unstable objects
6	Electronic Devices	13/10/2017 - 11:16:42	13/10/2017 - 11:19:51	0:03:09	PSS-20171013-111706UTC+1100_077.jpg	living room	Obstacles in trafficways (furnishing & objects), Unstable objects
6	Watching Tv	13/10/2017 - 11:20:01	13/10/2017 - 11:21:21	0:01:20	PSS-20171013-111706UTC+1100_022.jpg	living room	Obstacles in trafficways (furnishing & objects), Unstable objects
6	Electronic Devices	13/10/2017 - 11:21:31	13/10/2017 - 11:24:51	0:03:20	PSS-20171013-112706UTC+1100_037.jpg	living room	Obstacles in trafficways (furnishing & objects), Unstable objects
6	Watching Tv	13/10/2017 - 11:25:01	13/10/2017 - 12:10:40	0:45:39	PSS-20171013-114706UTC+1100_004.jpg	living room	Book shelf-poor access, Unstable objects
6	Electronic Devices	13/10/2017 - 13:20:16	13/10/2017 - 13:22:56	0:02:40	PSS-20171013-130931UTC+1100_068.jpg	living room	Obstacles in trafficways (furnishing & objects), Unstable objects, soft seating?
6	Watching Tv	13/10/2017 - 13:23:16	13/10/2017 - 13:26:15	0:02:59	PSS-20171013-130931UTC+1100_091.jpg	living room	Obstacles in trafficways (furnishing & objects), Unstable objects, soft seating?

Figure 45: Participant 6 Activity Table

Participant ID	Activity Class	Start Date / Time	End Date / Time	Duration	Representative Image File Name	Location	Fall Hazard
7	Watching Tv	14/10/2017 - 17:46:58	14/10/2017 - 18:11:08	0:24:10	PSS-20171014-174443UTC+1100_087.jpg	living room	Unstable objects, Dim lighting
7	Managing Health	14/10/2017 - 18:11:18	14/10/2017 - 18:12:48	0:01:30	PSS-20171014-175943UTC+1100_070.jpg	living room	Unstable objects
7	Indoor	14/10/2017 - 18:12:58	14/10/2017 - 18:25:38	0:12:40	PSS-20171014-181443UTC+1100_027.jpg	living room	Unstable objects
7	Watching Tv	14/10/2017 - 18:25:48	14/10/2017 - 18:26:38	0:00:50	PSS-20171014-181443UTC+1100_069.jpg	living room	N/A
7	Food Related	14/10/2017 - 18:26:48	14/10/2017 - 18:27:38	0:00:50	PSS-20171014-181443UTC+1100_075.jpg	living room	N/A
7	Watching Tv	14/10/2017 - 18:27:48	14/10/2017 - 19:23:18	0:55:30	PSS-20171014-191443UTC+1100_062.jpg	living room	N/A
7	Watching Tv	14/10/2017 - 19:44:48	14/10/2017 - 19:54:38	0:09:50	PSS-20171014-194443UTC+1100_030.jpg	living room	N/A
7	Indoor	15/10/2017 - 06:41:06	15/10/2017 - 07:44:56	1:03:50	PSS-20171015-065601UTC+1100_087.jpg	living room	Obstacles in trafficways (objects)
7	Outdoor	15/10/2017 - 07:45:06	15/10/2017 - 07:45:36	0:00:30	PSS-20171015-074101UTC+1100_026.jpg	backyard	Narrow stairway
7	Indoor	15/10/2017 - 07:46:06	15/10/2017 - 07:46:56	0:00:50	PSS-20171015-074101UTC+1100_033.jpg	garage	N/A
7	Driving	15/10/2017 - 07:47:06	15/10/2017 - 08:07:25	0:20:19	PSS-20171015-074101UTC+1100_076.jpg	car	N/A
7	Shopping	15/10/2017 - 11:03:50	15/10/2017 - 11:04:30	0:00:40	PSS-20171015-105555UTC+1100_052.jpg	car park	N/A
7	Driving	15/10/2017 - 11:05:40	15/10/2017 - 11:10:40	0:05:00	PSS-20171015-105555UTC+1100_075.jpg	car	N/A
7	Outdoor	15/10/2017 - 11:10:59	15/10/2017 - 11:12:19	0:01:20	PSS-20171015-111054UTC+1100_005.jpg	garage	N/A
7	Outdoor	15/10/2017 - 11:13:59	15/10/2017 - 11:15:49	0:01:50	PSS-20171015-111054UTC+1100_024.jpg	garage	N/A
7	Indoor	15/10/2017 - 11:15:59	15/10/2017 - 11:25:59	0:10:00	PSS-20171015-111054UTC+1100_061.jpg	living room	Unstable objects, Obstacles in trafficways (furnishing & objects)
7	Food Related	15/10/2017 - 11:41:58	15/10/2017 - 12:11:37	0:29:39	PSS-20171015-115553UTC+1100_006.jpg	living room	N/A
7	Watching Tv	15/10/2017 - 12:11:47	15/10/2017 - 12:17:47	0:06:00	PSS-20171015-121052UTC+1100_024.jpg	living room	N/A
7	Indoor	15/10/2017 - 12:17:57	15/10/2017 - 12:30:17	0:12:20	PSS-20171015-121052UTC+1100_080.jpg	living room	Unstable objects
7	Watching Tv	15/10/2017 - 12:34:57	15/10/2017 - 12:36:37	0:01:40	PSS-20171015-122552UTC+1100_060.jpg	living room	Unstable objects
7	Indoor	15/10/2017 - 12:36:47	15/10/2017 - 12:39:07	0:02:20	PSS-20171015-122552UTC+1100_073.jpg	dining room	Clutter on table
7	Watching Tv	15/10/2017 - 12:47:06	15/10/2017 - 13:18:05	0:30:59	PSS-20171015-125551UTC+1100_041.jpg	living room	Unstable objects
7	Indoor	15/10/2017 - 13:18:15	15/10/2017 - 13:32:44	0:34:29	PSS-20171015-132550UTC+1100_055.jpg	living room	Unstable objects

Figure 46: Participant 7 Activity Table

Participant ID	Activity Class	Start Date / Time	End Date / Time	Duration	Representative Image File Name	Location	Fall Hazard
8 Indoor		18/10/2017 - 16:02:01	18/10/2017 - 16:02:41	0:00:40	PSS-20171018-160156UTC+1100_003.jpg	kitchen	Dark/ dim lighting
8 Food Related		18/10/2017 - 16:02:51	18/10/2017 - 16:07:31	0:04:40	PSS-20171018-160156UTC+1100_016.jpg	kitchen	Unstable objects
8 Indoor		18/10/2017 - 16:48:21	18/10/2017 - 16:50:41	0:02:20	PSS-20171018-164656UTC+1100_016.jpg	dining room	
8 Indoor		18/10/2017 - 17:09:07	18/10/2017 - 17:11:57	0:02:50	PSS-20171018-170902UTC+1100_009.jpg	living room	
8 Indoor		18/10/2017 - 18:44:36	18/10/2017 - 18:46:06	0:01:30	PSS-20171018-184341UTC+1100_010.jpg	dining room	Unstable objects
8 Managing Health		18/10/2017 - 18:46:16	18/10/2017 - 18:49:16	0:03:00	PSS-20171018-184341UTC+1100_026.jpg	bedroom	Unstable objects
8 Indoor		18/10/2017 - 18:49:26	18/10/2017 - 18:50:26	0:01:00	PSS-20171018-184341UTC+1100_038.jpg	dining room	Heighted book shelf
8 Food Related		18/10/2017 - 18:57:16	18/10/2017 - 18:59:16	0:02:00	PSS-20171018-184341UTC+1100_088.jpg	kitchen	Cluttered workspace
8 Indoor		18/10/2017 - 18:59:26	18/10/2017 - 19:18:46	0:19:20	PSS-20171018-185841UTC+1100_066.jpg	dining room	Heighted book shelf
8 Driving		19/10/2017 - 10:05:00	19/10/2017 - 10:08:50	0:03:50	PSS-20171019-100455UTC+1100_012.jpg	car	Glare
8 Outdoor		19/10/2017 - 10:09:30	19/10/2017 - 10:12:10	0:02:40	PSS-20171019-100455UTC+1100_036.jpg	frontyard	Uneven pathways, Obstacles in trafficways
8 Indoor		19/10/2017 - 10:12:20	19/10/2017 - 10:23:55	0:11:35	PSS-20171019-102240UTC+1100_001.jpg	dining room	Dark/ dim lighting, Unstable objects
8 Food Related		19/10/2017 - 10:24:05	19/10/2017 - 10:30:55	0:06:50	PSS-20171019-102240UTC+1100_029.jpg	kitchen	Cluttered workspace
8 Indoor		19/10/2017 - 10:31:15	19/10/2017 - 10:39:05	0:07:50	PSS-20171019-102240UTC+1100_076.jpg	kitchen	Unstable objects
8 Food Related		19/10/2017 - 10:39:15	19/10/2017 - 10:44:35	0:05:20	PSS-20171019-103740UTC+1100_026.jpg	kitchen	Unstable objects
8 Indoor		19/10/2017 - 10:44:45	19/10/2017 - 10:46:35	0:01:50	PSS-20171019-103740UTC+1100_048.jpg	dining room	Dark/ dim lighting, Obstacles in trafficways
8 Indoor		19/10/2017 - 10:47:25	19/10/2017 - 11:05:54	0:18:29	PSS-20171019-105239UTC+1100_032.jpg	backyard	N/A
8 Socializing		19/10/2017 - 11:06:14	19/10/2017 - 11:06:24	0:01:10	PSS-20171019-105239UTC+1100_084.jpg	backyard	Unstable objects
8 Food Related		19/10/2017 - 11:35:42	19/10/2017 - 11:40:11	0:04:29	PSS-20171019-113736UTC+1100_002.jpg	kitchen	N/A
8 Socializing		19/10/2017 - 11:42:41	19/10/2017 - 12:05:50	0:23:09	PSS-20171019-113736UTC+1100_050.jpg	backyard	N/A
8 Food Related		19/10/2017 - 13:27:58	19/10/2017 - 13:42:18	0:14:20	PSS-20171019-132753UTC+1100_029.jpg	kitchen	Untidy workplace

Figure 47: Participant 8 Activity Table

Participant ID	Activity Class	Start Date / Time	End Date / Time	Duration	Representative Image File Name	Location	Fall Hazard
9 Socializing		23/10/2017 - 15:29:32	23/10/2017 - 15:42:12	0:12:40	PSS-20171023-152707UTC+1100_032.jpg	dining room	Unstable objects, Cluttered table
9 Managing Health		23/10/2017 - 15:46:02	23/10/2017 - 15:47:52	0:01:50	PSS-20171023-154207UTC+1100_024.jpg	dining room	Unstable objects, Obstacles in trafficways, Slippery floor
9 Indoor		23/10/2017 - 15:48:02	23/10/2017 - 15:52:32	0:04:30	PSS-20171023-154207UTC+1100_049.jpg	kitchen	N/A
9 Outdoor		23/10/2017 - 15:52:42	23/10/2017 - 15:53:52	0:01:10	PSS-20171023-154207UTC+1100_067.jpg	frontyard	N/A
9 Food Related		23/10/2017 - 15:54:12	23/10/2017 - 16:13:11	0:18:59	PSS-20171023-155706UTC+1100_040.jpg	kitchen	Unstable objects
9 Indoor		23/10/2017 - 16:13:21	23/10/2017 - 16:15:11	0:01:50	PSS-20171023-161206UTC+1100_013.jpg	kitchen	Unstable objects
9 Socializing		23/10/2017 - 16:15:31	23/10/2017 - 16:19:31	0:04:00	PSS-20171023-161206UTC+1100_025.jpg	backyard	N/A
9 Indoor		23/10/2017 - 16:19:41	23/10/2017 - 16:20:31	0:00:50	PSS-20171023-161206UTC+1100_048.jpg	kitchen	Poor access to items
9 Socializing		23/10/2017 - 16:20:41	23/10/2017 - 16:32:01	0:11:20	PSS-20171023-162706UTC+1100_020.jpg	backyard	Obstacles in trafficways
9 Food Related		23/10/2017 - 16:32:21	23/10/2017 - 16:35:24	0:03:00	PSS-20171023-162706UTC+1100_041.jpg	kitchen	Cluttered workplace, Untidy workplace, Unstable objects
9 Socializing		23/10/2017 - 16:39:11	23/10/2017 - 16:44:11	0:05:00	PSS-20171023-162706UTC+1100_076.jpg	dining room	Unstable objects, loose floormat
9 Indoor		23/10/2017 - 16:45:11	23/10/2017 - 16:47:01	0:01:00	PSS-20171023-164206UTC+1100_024.jpg	kitchen	N/A
9 Indoor		23/10/2017 - 16:47:41	23/10/2017 - 16:50:51	0:03:10	PSS-20171023-164206UTC+1100_043.jpg	kitchen	N/A
9 Outdoor		23/10/2017 - 16:51:01	23/10/2017 - 16:51:51	0:00:50	PSS-20171023-164206UTC+1100_056.jpg	backyard	Obstacles in trafficways
9 Food Related		23/10/2017 - 16:54:31	23/10/2017 - 17:27:20	0:32:49	PSS-20171023-165705UTC+1100_068.jpg	kitchen	N/A
9 Indoor		23/10/2017 - 17:30:50	23/10/2017 - 17:39:30	0:08:40	PSS-20171023-172705UTC+1100_049.jpg	kitchen	N/A
9 Outdoor		23/10/2017 - 17:39:40	23/10/2017 - 17:40:20	0:00:40	PSS-20171023-172705UTC+1100_078.jpg	backyard	Obstacles in trafficways
9 Indoor		23/10/2017 - 17:40:30	23/10/2017 - 17:43:59	0:03:29	PSS-20171023-172705UTC+1100_090.jpg	kitchen	Poor access to items
9 Socializing		23/10/2017 - 17:44:09	23/10/2017 - 17:48:49	0:04:40	PSS-20171023-174204UTC+1100_041.jpg	dining room	Unstable objects, Obstacles in trafficways, Slippery floor
9 Food Related		23/10/2017 - 17:48:59	23/10/2017 - 17:50:29	0:01:30	PSS-20171023-174204UTC+1100_046.jpg	dining room	Unstable objects, Obstacles in trafficways, Slippery floor
9 Socializing		23/10/2017 - 17:50:39	23/10/2017 - 17:51:59	0:01:20	PSS-20171023-174204UTC+1100_093.jpg	dining room	Unstable objects, Obstacles in trafficways, Slippery floor
9 Food Related		23/10/2017 - 17:52:09	23/10/2017 - 18:10:19	0:18:10	PSS-20171023-175704UTC+1100_025.jpg	kitchen	Cluttered workplace, Untidy workplace, Unstable objects
9 Indoor		23/10/2017 - 18:10:29	23/10/2017 - 18:26:28	0:17:59	PSS-20171023-181204UTC+1100_045.jpg	dining room	Unstable objects, Obstacle in trafficways
9 Food Related		23/10/2017 - 18:28:38	23/10/2017 - 18:37:38	0:09:00	PSS-20171023-182703UTC+1100_037.jpg	kitchen	Unstable objects, Obstacle to trafficways
9 Indoor		23/10/2017 - 18:37:48	23/10/2017 - 18:42:08	0:04:20	PSS-20171023-182703UTC+1100_078.jpg	dining room	Unstable objects
9 Food Related		23/10/2017 - 18:42:18	23/10/2017 - 18:43:18	0:01:00	PSS-20171023-184203UTC+1100_005.jpg	dining room	Unstable objects, Cluttered table
9 Indoor		23/10/2017 - 18:43:58	23/10/2017 - 18:46:38	0:02:40	PSS-20171023-184203UTC+1100_020.jpg	kitchen	N/A
9 Indoor		23/10/2017 - 20:32:52	23/10/2017 - 20:42:52	0:10:00	PSS-20171023-203657UTC+1100_005.jpg	kitchen	N/A
9 Food Related		23/10/2017 - 20:43:02	23/10/2017 - 20:44:12	0:01:10	PSS-20171023-216420UTC+1100_040.jpg	kitchen	Untidy workplace
9 Indoor		23/10/2017 - 20:44:22	23/10/2017 - 20:48:52	0:04:30	PSS-20171023-203657UTC+1100_056.jpg	living room	Unstable objects
9 Food Related		23/10/2017 - 20:49:02	23/10/2017 - 20:55:22	0:06:50	PSS-20171023-205157UTC+1100_003.jpg	kitchen	N/A
9 Indoor		23/10/2017 - 20:56:02	23/10/2017 - 21:19:32	0:23:30	PSS-20171023-205157UTC+1100_099.jpg	kitchen	N/A
9 Electronic Devices		23/10/2017 - 21:20:32	23/10/2017 - 21:21:42	0:01:10	PSS-20171023-210557UTC+1100_085.jpg	UNCLEAR	N/A
9 Food Related		23/10/2017 - 21:32:12	23/10/2017 - 21:38:02	0:05:00	PSS-20171023-212157UTC+1100_080.jpg	kitchen	Obstacles in trafficways
9 Watching Tv		23/10/2017 - 21:38:12	23/10/2017 - 22:10:02	0:31:00	PSS-20171023-213657UTC+1100_033.jpg	living room	Unstable objects
9 Indoor		23/10/2017 - 22:10:22	23/10/2017 - 22:19:22	0:09:00	PSS-20171023-220657UTC+1100_048.jpg	kitchen	N/A
9 Indoor		23/10/2017 - 22:56:42	23/10/2017 - 23:05:32	0:08:50	PSS-20171023-225157UTC+1100_055.jpg	kitchen	N/A
9 Managing Health		24/10/2017 - 07:29:53	24/10/2017 - 07:38:53	0:09:00	PSS-20171024-072708UTC+1100_017.jpg	dining room	Dark/ dim lighting
9 Food Related		24/10/2017 - 07:39:03	24/10/2017 - 07:45:13	0:06:10	PSS-20171024-074208UTC+1100_001.jpg	dining room	N/A
9 Indoor		24/10/2017 - 07:45:23	24/10/2017 - 07:55:23	0:10:00	PSS-20171024-074208UTC+1100_028.jpg	kitchen	N/A
9 Outdoor		24/10/2017 - 07:55:33	24/10/2017 - 07:57:13	0:01:40	PSS-20171024-074208UTC+1100_086.jpg	front driveway	N/A
9 Driving		24/10/2017 - 07:57:23	24/10/2017 - 08:04:03	0:06:40	PSS-20171024-075708UTC+1100_046.jpg	car	N/A
9 Outdoor		24/10/2017 - 08:04:13	24/10/2017 - 08:05:23	0:01:10	PSS-20171024-075708UTC+1100_046.jpg	front driveway	N/A
9 Indoor		24/10/2017 - 08:05:33	24/10/2017 - 08:15:53	0:10:20	PSS-20171024-075708UTC+1100_082.jpg	living room	N/A
9 Electronic Devices		24/10/2017 - 08:16:13	24/10/2017 - 08:20:43	0:04:30	PSS-20171024-081208UTC+1100_006.jpg	living room	N/A
9 Indoor		24/10/2017 - 08:23:43	24/10/2017 - 08:25:53	0:02:10	PSS-20171024-081208UTC+1100_076.jpg	kitchen	N/A
9 Electronic Devices		24/10/2017 - 08:28:30	24/10/2017 - 08:30:30	0:02:00	PSS-20171024-082715UTC+1100_014.jpg	living room	N/A
9 Socializing		24/10/2017 - 08:58:30	24/10/2017 - 09:12:20	0:13:50	PSS-20171024-085715UTC+1100_071.jpg	living room	Unstable objects
9 Food Related		24/10/2017 - 09:12:30	24/10/2017 - 09:14:20	0:01:50	PSS-20171024-091215UTC+1100_007.jpg	dining room	Cluttered workplace
9 Indoor		24/10/2017 - 09:16:00	24/10/2017 - 09:18:50	0:02:50	PSS-20171024-091215UTC+1100_031.jpg	kitchen	N/A
9 Socializing		24/10/2017 - 09:24:01	24/10/2017 - 09:37:00	0:13:00	PSS-20171024-092151UTC+1100_055.jpg	UNCLEAR	N/A
9 Indoor		24/10/2017 - 09:37:30	24/10/2017 - 09:55:30	0:18:00	PSS-20171024-094215UTC+1100_005.jpg	living room	Obstacles in trafficways
9 Outdoor		24/10/2017 - 09:55:40	24/10/2017 - 09:56:20	0:00:40	PSS-20171024-094215UTC+1100_083.jpg	front driveway	N/A
9 Driving		24/10/2017 - 09:56:30	24/10/2017 - 10:11:00	0:14:30	PSS-20171024-095150UTC+1100_039.jpg	car	N/A
9 Socializing		24/10/2017 - 11:37:35	24/10/2017 - 11:39:45	0:02:10	PSS-20171024-112630UTC+1100_067.jpg	office	Cluttered table, Unstable objects
9 Indoor		24/10/2017 - 11:41:15	24/10/2017 - 11:54:05	0:12:50	PSS-20171024-114130UTC+1100_058.jpg	dining room	N/A
9 Food Related		24/10/2017 - 11:54:15	24/10/2017 - 11:58:24	0:04:09	PSS-20171024-114130UTC+1100_099.jpg	kitchen	Unstable objects
9 Electronic Devices		24/10/2017 - 11:58:44	24/10/2017 - 12:03:24	0:04:40	PSS-20171024-115629UTC+1100_027.jpg	office	N/A
9 Food Related		24/10/2017 - 12:06:44	24/10/2017 - 12:08:34	0:01:50	PSS-20171024-115629UTC+1100_067.jpg	kitchen	Heighted shelf - poor access to items
9 Electronic Devices		24/10/2017 - 12:08:44	24/10/2017 - 12:13:04	0:04:20	PSS-20171024-115629UTC+1100_085.jpg	office	N/A
9 Indoor		24/10/2017 - 12:30:08	24/10/2017 - 12:30:48	0:00:40	PSS-20171024-123003UTC+1100_003.jpg	kitchen	Unstable objects
9 Indoor		24/10/2017 - 12:31:18	24/10/2017 - 12:33:08	0:01:50	PSS-20171024-123003UTC+1100_013.jpg	dining room	N/A

Participant ID	Activity Class	Start Date / Time	End Date / Time	Duration	Representative Image File Name	Location	Fall Hazard
10	Electronic Devices	26/10/2017 - 12:20:47	26/10/2017 - 12:21:17	0:00:30	PSS-20171026-120832UTC+1100_075.jpg	living room	Dark/ dim lighting
10	Indoor	26/10/2017 - 12:26:48	26/10/2017 - 12:29:28	0:02:40	PSS-20171026-122533UTC+1100_016.jpg	garage	Clutter
10	Driving	26/10/2017 - 12:29:38	26/10/2017 - 12:42:07	0:12:29	PSS-20171026-122533UTC+1100_066.jpg	car	N/A
10	Shopping	26/10/2017 - 12:42:17	26/10/2017 - 12:47:47	0:05:30	PSS-20171026-124032UTC+1100_024.jpg	shopping centre	N/A
10	Socializing	26/10/2017 - 12:47:57	26/10/2017 - 12:52:27	0:04:30	PSS-20171026-124032UTC+1100_047.jpg	shopping centre	N/A
10	Shopping	26/10/2017 - 12:52:37	26/10/2017 - 12:57:57	0:05:20	PSS-20171026-124032UTC+1100_080.jpg	shopping centre	N/A
10	Socializing	26/10/2017 - 12:58:07	26/10/2017 - 12:59:27	0:01:20	PSS-20171026-125532UTC+1100_020.jpg	shopping centre	N/A
10	Shopping	26/10/2017 - 14:42:24	26/10/2017 - 14:56:44	0:14:20	PSS-20171026-144219UTC+1100_095.jpg	shopping centre	N/A
10	Driving	26/10/2017 - 14:58:34	26/10/2017 - 15:05:34	0:07:00	PSS-20171026-145719UTC+1100_029.jpg	car	N/A
10	Socializing	26/10/2017 - 15:06:04	26/10/2017 - 15:21:34	0:15:30	PSS-20171026-145719UTC+1100_088.jpg	living room	N/A
10	Indoor	26/10/2017 - 15:21:44	26/10/2017 - 15:43:43	0:21:59	PSS-20171026-152719UTC+1100_035.jpg	living room	Cluttered table
10	Socializing	26/10/2017 - 15:43:53	26/10/2017 - 15:54:13	0:10:20	PSS-20171026-154218UTC+1100_072.jpg	living room	N/A
10	Indoor	26/10/2017 - 15:54:23	26/10/2017 - 16:47:02	0:52:39	PSS-20171026-161218UTC+1100_045.jpg	living room	N/A
10	Socializing	26/10/2017 - 16:47:12	26/10/2017 - 16:53:52	0:06:40	PSS-20171026-164217UTC+1100_052.jpg	front porch	N/A
10	Indoor	26/10/2017 - 16:54:12	26/10/2017 - 17:29:19	0:35:07	PSS-20171026-165716UTC+1100_088.jpg	living room	N/A
10	Food Related	26/10/2017 - 17:29:29	26/10/2017 - 17:31:09	0:01:40	PSS-20171026-172714UTC+1100_019.jpg	living room	Heighted shelf - poor access to items
10	Socializing	26/10/2017 - 17:31:19	26/10/2017 - 17:42:48	0:11:29	PSS-20171026-172714UTC+1100_062.jpg	living room	N/A
10	Food Related	26/10/2017 - 17:42:58	26/10/2017 - 17:53:08	0:10:10	PSS-20171026-174213UTC+1100_035.jpg	kitchen	N/A
10	Driving	26/10/2017 - 18:13:43	26/10/2017 - 18:16:13	0:02:30	PSS-20171026-181338UTC+1100_009.jpg	car	N/A
10	Indoor	26/10/2017 - 18:16:23	26/10/2017 - 18:17:23	0:01:00	PSS-20171026-181338UTC+1100_020.jpg	living room	Dim lighting
10	Driving	26/10/2017 - 18:17:33	26/10/2017 - 18:30:23	0:12:50	PSS-20171026-181338UTC+1100_052.jpg	car	N/A
10	Indoor	26/10/2017 - 18:30:33	26/10/2017 - 18:33:13	0:02:40	PSS-20171026-182838UTC+1100_020.jpg	shopping centre	N/A
10	Indoor	26/10/2017 - 20:23:09	26/10/2017 - 20:24:19	0:01:10	PSS-20171026-202304UTC+1100_004.jpg	shopping centre	N/A
10	Driving	26/10/2017 - 20:24:39	26/10/2017 - 20:32:19	0:07:40	PSS-20171026-202304UTC+1100_032.jpg	car	Glare
10	Food Related	26/10/2017 - 20:49:37	26/10/2017 - 21:15:37	0:26:00	PSS-20171026-204932UTC+1100_079.jpg	kitchen	N/A
10	Indoor	26/10/2017 - 21:16:27	26/10/2017 - 21:16:57	0:00:30	PSS-20171026-210432UTC+1100_073.jpg	kitchen	Cluttered workplace
10	Food Related	26/10/2017 - 21:17:07	26/10/2017 - 21:24:37	0:07:30	PSS-20171026-211932UTC+1100_007.jpg	kitchen	N/A
10	Indoor	27/10/2017 - 09:56:49	27/10/2017 - 10:02:59	0:04:10	PSS-20171027-095844UTC+1100_013.jpg	garage	Dim lighting, Obstacles in trafficways
10	Food Related	27/10/2017 - 10:03:09	27/10/2017 - 10:04:49	0:01:40	PSS-20171027-095844UTC+1100_032.jpg	kitchen	Unstable objects
10	Indoor	27/10/2017 - 10:04:59	27/10/2017 - 10:14:29	0:09:30	PSS-20171027-095844UTC+1100_067.jpg	kitchen	Cluttered workplace
10	Food Related	27/10/2017 - 10:14:39	27/10/2017 - 10:17:29	0:02:50	PSS-20171027-101344UTC+1100_014.jpg	kitchen	N/A

Figure 49: Participant 10 Activity Table

Participant ID	Activity Class	Start Date / Time	End Date / Time	Duration	Representative Image File Name	Location	Fall Hazard
11	Food Related	13/11/2017 - 17:33:18	13/11/2017 - 17:50:18	0:17:00	PSS-20171113-172653UTC+1100_090.jpg	kitchen	Cluttered workplace, Unstable objects
11	Indoor	13/11/2017 - 17:50:28	13/11/2017 - 17:53:58	0:03:30	PSS-20171113-174153UTC+1100_062.jpg	kitchen	Cluttered workplace, Unstable objects
11	Food Related	13/11/2017 - 17:54:08	13/11/2017 - 18:17:59	0:23:51	PSS-20171113-175653UTC+1100_047.jpg	dining room	Cluttered table, Unstable objects, Heighted shelf - poor access to items
11	Indoor	13/11/2017 - 18:18:09	13/11/2017 - 18:19:49	0:01:40	PSS-20171113-181154UTC+1100_043.jpg	kitchen	N/A
11	Watching Tv	13/11/2017 - 18:21:09	13/11/2017 - 18:22:19	0:01:10	PSS-20171113-181154UTC+1100_059.jpg	living room	Glare
11	Electronic Devices	13/11/2017 - 18:22:29	13/11/2017 - 18:23:09	0:02:40	PSS-20171113-181154UTC+1100_066.jpg	living room	Cluttered table, too soft seating
11	Watching Tv	13/11/2017 - 20:19:09	13/11/2017 - 20:21:59	0:02:50	PSS-20171113-201154UTC+1100_045.jpg	living room	Cluttered table, Unstable objects
11	Indoor	14/11/2017 - 07:57:12	14/11/2017 - 08:00:12	0:03:00	PSS-20171114-075707UTC+1100_010.jpg	living room	N/A
11	Managing Health	14/11/2017 - 08:03:42	14/11/2017 - 08:05:32	0:01:50	PSS-20171114-075707UTC+1100_040.jpg	dining room	Dark/ dim lighting, Obstacles in trafficways, Unstable objects, Cluttered table
11	Food Related	14/11/2017 - 08:05:42	14/11/2017 - 08:08:42	0:03:00	PSS-20171114-082708UTC+1100_061.jpg	dining room	Unstable objects
11	Managing Health	14/11/2017 - 08:08:52	14/11/2017 - 08:10:42	0:01:50	PSS-20171114-075707UTC+1100_071.jpg	kitchen	Unstable objects, Cluttered workplace
11	Food Related	14/11/2017 - 08:10:52	14/11/2017 - 08:21:32	0:10:40	PSS-20171114-081207UTC+1100_024.jpg	dining room	Unstable objects, Heighted shelf - poor access to items
11	Indoor	14/11/2017 - 08:21:42	14/11/2017 - 08:28:33	0:06:51	PSS-20171114-081207UTC+1100_079.jpg	kitchen	N/A
11	Electronic Devices	14/11/2017 - 08:29:53	14/11/2017 - 08:36:23	0:06:30	PSS-20171114-082708UTC+1100_036.jpg	office	N/A
11	Indoor	14/11/2017 - 08:38:33	14/11/2017 - 08:44:13	0:05:40	PSS-20171114-082708UTC+1100_066.jpg	bathroom	N/A
11	Outdoor	14/11/2017 - 08:44:23	14/11/2017 - 08:47:13	0:02:50	PSS-20171114-084208UTC+1100_022.jpg	car park	N/A
11	Driving	14/11/2017 - 08:47:33	14/11/2017 - 08:49:13	0:01:40	PSS-20171114-084208UTC+1100_038.jpg	car	N/A
11	Outdoor	14/11/2017 - 08:49:23	14/11/2017 - 09:12:43	0:23:20	PSS-20171114-085708UTC+1100_024.jpg	car park	N/A
11	Driving	14/11/2017 - 09:12:53	14/11/2017 - 09:50:12	0:37:19	PSS-20171114-092708UTC+1100_031.jpg	car	N/A
11	Shopping	14/11/2017 - 09:50:22	14/11/2017 - 09:58:32	0:08:10	PSS-20171114-094207UTC+1100_053.jpg	street shops	N/A
11	Food Related	14/11/2017 - 09:58:42	14/11/2017 - 11:02:30	1:03:48	PSS-20171114-102706UTC+1100_021.jpg	restaurant	N/A
11	Shopping	14/11/2017 - 11:02:40	14/11/2017 - 11:03:20	0:00:40	PSS-20171114-105705UTC+1100_036.jpg	restaurant	N/A
11	Shopping	14/11/2017 - 11:04:00	14/11/2017 - 11:18:59	0:14:59	PSS-20171114-105705UTC+1100_043.jpg	shopping centre	N/A
11	Electronic Devices	14/11/2017 - 11:19:09	14/11/2017 - 11:20:59	0:01:50	PSS-20171114-111204UTC+1100_060.jpg	UNCLEAR	N/A
11	Sleeping	14/11/2017 - 11:21:09	14/11/2017 - 11:28:29	0:07:20	PSS-20171114-111204UTC+1100_077.jpg	UNCLEAR	N/A
11	Outdoor	14/11/2017 - 11:28:39	14/11/2017 - 11:30:09	0:01:30	PSS-20171114-112704UTC+1100_014.jpg	shopping centre	N/A
11	Driving	14/11/2017 - 11:30:19	14/11/2017 - 11:59:38	0:29:19	PSS-20171114-114203UTC+1100_018.jpg	car	N/A
11	Shopping	14/11/2017 - 11:59:48	14/11/2017 - 12:02:08	0:02:20	PSS-20171114-115703UTC+1100_022.jpg	restaurant	Obstacles in trafficways
11	Socializing	14/11/2017 - 12:02:18	14/11/2017 - 12:11:58	0:09:40	PSS-20171114-115703UTC+1100_057.jpg	restaurant	N/A
11	Sleeping	14/11/2017 - 12:12:17	14/11/2017 - 12:15:57	0:03:40	PSS-20171114-121202UTC+1100_013.jpg	restaurant	N/A
11	Food Related	14/11/2017 - 12:16:07	14/11/2017 - 12:21:27	0:05:20	PSS-20171114-121202UTC+1100_041.jpg	restaurant	N/A
11	Outdoor	14/11/2017 - 12:21:37	14/11/2017 - 12:22:17	0:00:40	PSS-20171114-121202UTC+1100_066.jpg	restaurant	N/A
11	Driving	14/11/2017 - 12:22:27	14/11/2017 - 12:34:27	0:12:00	PSS-20171114-122702UTC+1100_008.jpg	car	N/A
11	Indoor	14/11/2017 - 12:34:37	14/11/2017 - 12:57:16	0:22:39	PSS-20171114-124201UTC+1100_024.jpg	dining room	N/A
11	Electronic Devices	14/11/2017 - 12:57:26	14/11/2017 - 13:05:06	0:07:40	PSS-20171114-125701UTC+1100_026.jpg	dining room	N/A
11	Food Related	14/11/2017 - 13:05:16	14/11/2017 - 13:30:35	0:25:19	PSS-20171114-131201UTC+1100_036.jpg	dining room	N/A
11	Socializing	14/11/2017 - 13:30:45	14/11/2017 - 13:33:35	0:02:50	PSS-20171114-132700UTC+1100_031.jpg	dining room	N/A
11	Electronic Devices	14/11/2017 - 13:35:05	14/11/2017 - 13:41:55	0:06:50	PSS-20171114-132700UTC+1100_069.jpg	dining room	N/A
11	Indoor	14/11/2017 - 13:42:14	14/11/2017 - 14:15:34	0:33:20	PSS-20171114-134929UTC+1100_057.jpg	office	N/A
11	Outdoor	14/11/2017 - 14:15:44	14/11/2017 - 14:16:44	0:01:00	PSS-20171114-140429UTC+1100_071.jpg	building entrance	N/A
11	Driving	14/11/2017 - 14:16:54	14/11/2017 - 14:29:20	0:12:26	PSS-20171114-141925UTC+1100_022.jpg	car	N/A
11	Outdoor	14/11/2017 - 14:29:30	14/11/2017 - 14:34:30	0:05:00	PSS-20171114-141925UTC+1100_076.jpg	car	Glare
11	Indoor	14/11/2017 - 14:44:41	14/11/2017 - 14:49:21	0:04:40	PSS-20171114-144436UTC+1100_015.jpg	laundry room	N/A
11	Watching Tv	14/11/2017 - 14:56:11	14/11/2017 - 14:57:51	0:01:40	PSS-20171114-144436UTC+1100_075.jpg	living room	Unstable objects
11	Indoor	14/11/2017 - 14:58:01	14/11/2017 - 15:01:10	0:03:09	PSS-20171114-145935UTC+1100_001.jpg	dining room	Obstacles in trafficways, Unstable objects, Heighted shelf - poor access to items
11	Indoor	14/11/2017 - 15:05:10	14/11/2017 - 15:06:00	0:00:50	PSS-20171114-145935UTC+1100_036.jpg	dining room	N/A
11	Indoor	14/11/2017 - 15:06:10	14/11/2017 - 15:19:10	0:13:00	PSS-20171114-145935UTC+1100_079.jpg	backyard	N/A
11	Indoor	14/11/2017 - 15:21:20	14/11/2017 - 15:33:19	0:11:59	PSS-20171114-151435UTC+1100_081.jpg	living room	N/A
11	Indoor	14/11/2017 - 15:43:19	14/11/2017 - 15:48:59	0:05:40	PSS-20171114-154434UTC+1100_009.jpg	UNCLEAR	N/A

Figure 50: Participant 11 Activity Table

Participant ID	Activity Class	Start Date / Time	End Date / Time	Duration	Representative Image File Name	Location	Fall Hazard
12	Indoor	20/11/2017 - 11:27:20	20/11/2017 - 11:27:20	0:00:00	PSS-20171120-112035UTC+1100_041.jpg	dining room	Glares, Unstable objects, Heighted shelf - poor access to items
12	Food Related	20/11/2017 - 11:27:30	20/11/2017 - 11:28:00	0:00:30	PSS-20171120-112035UTC+1100_043.jpg	kitchen	Cluttered workplace
12	Indoor	20/11/2017 - 11:28:10	20/11/2017 - 11:47:40	0:19:30	PSS-20171120-113535UTC+1100_052.jpg	dining room	Unstable objects, slippery floor, loose floormat
12	Food Related	20/11/2017 - 11:47:50	20/11/2017 - 12:03:00	0:15:10	PSS-20171120-115035UTC+1100_029.jpg	dining room	N/A
12	Indoor	20/11/2017 - 12:19:49	20/11/2017 - 12:22:27	0:02:38	PSS-20171120-122034UTC+1100_004.jpg	bathroom	N/A
12	Outdoor	20/11/2017 - 12:22:37	20/11/2017 - 12:23:07	0:00:30	PSS-20171120-122152UTC+1100_006.jpg	front porch	Uneven floor surface
12	Indoor	20/11/2017 - 12:23:17	20/11/2017 - 12:24:47	0:01:30	PSS-20171120-122152UTC+1100_013.jpg	dining room	Heighted shelf - poor access to item, Unstable objects
12	Food Related	20/11/2017 - 12:24:57	20/11/2017 - 12:26:17	0:01:20	PSS-20171120-122152UTC+1100_023.jpg	living room	Unstable objects, Loose carpet edges
12	Watching Tv	20/11/2017 - 12:26:27	20/11/2017 - 12:32:57	0:06:30	PSS-20171120-122152UTC+1100_033.jpg	living room	Unstable objects, Loose carpet edges
12	Sleeping	20/11/2017 - 12:33:07	20/11/2017 - 12:53:47	0:20:40	PSS-20171120-123652UTC+1100_040.jpg	living room	N/A
12	Watching Tv	20/11/2017 - 12:53:57	20/11/2017 - 12:55:47	0:01:50	PSS-20171120-125152UTC+1100_024.jpg	living room	Unstable objects, Loose carpet edges
12	Sleeping	20/11/2017 - 12:55:57	20/11/2017 - 13:04:37	0:08:40	PSS-20171120-125152UTC+1100_051.jpg	living room	N/A
12	Indoor	20/11/2017 - 13:04:47	20/11/2017 - 13:05:40	0:00:53	PSS-20171120-130445UTC+1100_003.jpg	kitchen	Cluttered workplace
12	Outdoor	20/11/2017 - 13:05:50	20/11/2017 - 13:06:20	0:00:30	PSS-20171120-130445UTC+1100_008.jpg	front porch	Uneven floor surface
12	Sleeping	20/11/2017 - 13:06:30	20/11/2017 - 13:07:20	0:00:50	PSS-20171120-130445UTC+1100_015.jpg	front porch	Loose floormat
12	Outdoor	20/11/2017 - 13:08:20	20/11/2017 - 13:09:20	0:01:00	PSS-20171120-130445UTC+1100_025.jpg	backyard	Uneven floor surface
12	Outdoor	20/11/2017 - 13:10:00	20/11/2017 - 13:10:30	0:00:30	PSS-20171120-130445UTC+1100_033.jpg	backyard	Uneven floor surface, Obstacles in trafficways
12	Indoor	20/11/2017 - 13:10:40	20/11/2017 - 13:12:10	0:01:30	PSS-20171120-130445UTC+1100_040.jpg	living room	N/A
12	Food Related	20/11/2017 - 13:12:20	20/11/2017 - 13:16:50	0:04:30	PSS-20171120-130445UTC+1100_059.jpg	living room	Unstable objects, Loose carpet edges
12	Indoor	20/11/2017 - 13:17:00	20/11/2017 - 13:19:40	0:02:40	PSS-20171120-130445UTC+1100_082.jpg	living room	Soft seating?, Unstable objects, dim lighting
12	Sleeping	20/11/2017 - 13:20:00	20/11/2017 - 14:07:33	0:47:33	PSS-20171120-133421UTC+1100_057.jpg	living room	N/A
12	Watching Tv	20/11/2017 - 14:07:43	20/11/2017 - 14:09:13	0:01:30	PSS-20171120-140418UTC+1100_025.jpg	living room	Unstable objects, Loose carpet edges
12	Outdoor	20/11/2017 - 14:09:53	20/11/2017 - 14:10:23	0:00:30	PSS-20171120-140418UTC+1100_035.jpg	frontyard	Uneven floor surface
12	Indoor	20/11/2017 - 14:10:33	20/11/2017 - 14:11:13	0:00:40	PSS-20171120-140418UTC+1100_040.jpg	bedroom	N/A
12	Managing Health	20/11/2017 - 14:11:23	20/11/2017 - 14:12:23	0:01:00	PSS-20171120-140418UTC+1100_044.jpg	kitchen	Heighted shelf - poor access to item, Unstable objects
12	Indoor	20/11/2017 - 14:12:33	20/11/2017 - 14:14:13	0:01:40	PSS-20171120-140418UTC+1100_055.jpg	bathroom	N/A
12	Food Related	20/11/2017 - 14:14:23	20/11/2017 - 14:15:53	0:01:30	PSS-20171120-140418UTC+1100_065.jpg	kitchen	Cluttered workplace
12	Indoor	20/11/2017 - 14:16:03	20/11/2017 - 14:19:23	0:03:20	PSS-20171120-140418UTC+1100_081.jpg	dining room	Dark/ dim lighting
12	Outdoor	20/11/2017 - 14:19:32	20/11/2017 - 14:22:22	0:02:50	PSS-20171120-141917UTC+1100_010.jpg	backyard	Uneven floor surface
12	Sleeping	20/11/2017 - 14:22:32	20/11/2017 - 14:23:52	0:01:20	PSS-20171120-141917UTC+1100_024.jpg	backyard	N/A
12	Outdoor	20/11/2017 - 14:24:02	20/11/2017 - 14:25:22	0:01:20	PSS-20171120-141917UTC+1100_033.jpg	backyard	N/A
12	Indoor	20/11/2017 - 14:25:32	20/11/2017 - 14:26:32	0:01:00	PSS-20171120-141917UTC+1100_041.jpg	living room	Dark/ dim lighting, Cluttered workplace
12	Managing Health	20/11/2017 - 15:05:22	20/11/2017 - 15:29:22	0:04:20	PSS-20171120-152457UTC+1100_001.jpg	living room	Unstable objects, obstacles in trafficways, loose carpet edges
12	Watching Tv	20/11/2017 - 15:50:58	20/11/2017 - 15:51:58	0:01:00	PSS-20171120-155043UTC+1100_005.jpg	living room	Unstable objects, loose carpet edges
12	Food Related	20/11/2017 - 15:52:02	20/11/2017 - 15:52:58	0:00:50	PSS-20171120-155043UTC+1100_011.jpg	kitchen	N/A
12	Watching Tv	20/11/2017 - 16:01:22	20/11/2017 - 16:04:12	0:02:50	PSS-20171120-160107UTC+1100_010.jpg	living room	Unstable objects, Loose carpet edges
12	Socializing	20/11/2017 - 16:07:32	20/11/2017 - 16:14:22	0:06:50	PSS-20171120-160107UTC+1100_040.jpg	kitchen	Cluttered workplace
12	Electronic Devices	20/11/2017 - 16:14:52	20/11/2017 - 16:16:12	0:01:20	PSS-20171120-160107UTC+1100_088.jpg	bedroom	N/A
12	Electronic Devices	20/11/2017 - 16:31:29	20/11/2017 - 16:38:19	0:06:50	PSS-20171120-163104UTC+1100_012.jpg	bedroom	Unstable objects, Loose carpet edges
12	Watching Tv	20/11/2017 - 16:44:39	20/11/2017 - 16:45:37	0:01:58	PSS-20171120-163104UTC+1100_088.jpg	living room	Uneven floor surface
12	Outdoor	20/11/2017 - 16:46:57	20/11/2017 - 16:47:27	0:00:30	PSS-20171120-164602UTC+1100_007.jpg	front driveway	N/A
12	Indoor	20/11/2017 - 16:47:37	20/11/2017 - 16:49:47	0:02:10	PSS-20171120-164602UTC+1100_016.jpg	bathroom	Unstable objects, Loose carpet edges
12	Watching Tv	20/11/2017 - 17:57:46	20/11/2017 - 17:59:56	0:02:20	PSS-20171120-175731UTC+1100_008.jpg	living room	Glare, Heighted shelf - poor access to items
12	Indoor	20/11/2017 - 18:18:05	20/11/2017 - 18:19:45	0:01:40	PSS-20171120-181230UTC+1100_039.jpg	dining room	Glare, Unstable objects
12	Socializing	20/11/2017 - 18:20:05	20/11/2017 - 18:21:15	0:01:10	PSS-20171120-181230UTC+1100_050.jpg	bedroom	N/A
12	Indoor	20/11/2017 - 18:21:45	20/11/2017 - 18:23:33	0:01:48	PSS-20171120-181230UTC+1100_062.jpg	bathroom	Heighted shelf - poor access to item, Unstable objects
12	Socializing	20/11/2017 - 18:23:43	20/11/2017 - 18:26:23	0:02:40	PSS-20171120-182308UTC+1100_014.jpg	dining room	Heighted shelf - poor access to item, Unstable objects
12	Watching Tv	20/11/2017 - 18:26:33	20/11/2017 - 19:02:53	0:36:20	PSS-20171120-185308UTC+1100_007.jpg	living room	Heighted shelf - poor access to item, Unstable objects, Cluttered table, Loose carpet
12	Indoor	21/11/2017 - 08:24:52	21/11/2017 - 08:27:02	0:02:10	PSS-20171121-082447UTC+1100_007.jpg	dining room	N/A
12	Managing Health	21/11/2017 - 08:31:52	21/11/2017 - 08:34:52	0:03:00	PSS-20171121-082447UTC+1100_045.jpg	dining room	N/A
12	Indoor	21/11/2017 - 08:43:42	21/11/2017 - 08:51:12	0:07:30	PSS-20171121-083947UTC+1100_046.jpg	bedroom	N/A
12	Food Related	21/11/2017 - 08:51:32	21/11/2017 - 08:53:52	0:02:20	PSS-20171121-083947UTC+1100_078.jpg	kitchen	N/A
12	Indoor	21/11/2017 - 08:54:02	21/11/2017 - 08:58:02	0:04:00	PSS-20171121-085447UTC+1100_007.jpg	kitchen	N/A
12	Food Related	21/11/2017 - 08:58:12	21/11/2017 - 08:58:52	0:00:40	PSS-20171121-085447UTC+1100_023.jpg	kitchen	Cluttered workplace
12	Indoor	21/11/2017 - 09:01:12	21/11/2017 - 09:12:52	0:11:40	PSS-20171121-085447UTC+1100_074.jpg	dining room	Unstable objects
12	Socializing	21/11/2017 - 09:13:02	21/11/2017 - 09:39:42	0:26:40	PSS-20171121-092447UTC+1100_005.jpg	dining room	Unstable objects
12	Indoor	21/11/2017 - 09:40:02	21/11/2017 - 09:45:32	0:05:30	PSS-20171121-09347UTC+1100_018.jpg	bedroom	N/A
12	Socializing	21/11/2017 - 09:45:42	21/11/2017 - 09:48:02	0:02:20	PSS-20171121-09347UTC+1100_044.jpg	living room	Unstable objects
12	Managing Health	21/11/2017 - 09:48:12	21/11/2017 - 09:49:42	0:01:30	PSS-20171121-093947UTC+1100_056.jpg	living room	Unstable objects, Obstacles in trafficways, Loose carpet edges
12	Indoor	21/11/2017 - 09:49:52	21/11/2017 - 09:52:42	0:02:50	PSS-20171121-093947UTC+1100_069.jpg	front porch	N/A

Figure 51: Participant 12 Activity Table

Participant ID	Activity Class	Start Date / Time	End Date / Time	Duration	Representative Image File Name	Location	Fall Hazard
13	Watching Tv	22/11/2017 - 15:46:21	22/11/2017 - 16:36:41	0:50:20	PSS-20171122-154616UTC+1100_002.jpg	living room	Unstable objects, Obstacles in trafficways, Loose carpet edges
13	Indoor	22/11/2017 - 16:36:51	22/11/2017 - 16:47:40	0:10:49	PSS-20171122-163106UTC+1100_068.jpg	kitchen	Cluttered workplace, Unstable objects, Dark/ dim lighting
13	Outdoor	22/11/2017 - 16:47:50	22/11/2017 - 16:53:00	0:05:10	PSS-20171122-164605UTC+1100_026.jpg	backyard	Uneven floor surface
13	Indoor	22/11/2017 - 16:53:10	22/11/2017 - 17:02:29	0:09:19	PSS-20171122-164605UTC+1100_071.jpg	kitchen	N/A
13	Watching Tv	22/11/2017 - 17:02:39	22/11/2017 - 17:03:29	0:00:50	PSS-20171122-170104UTC+1100_012.jpg	living room	Unstable objects, Obstacles in trafficways, Loose carpet edges
13	Indoor	22/11/2017 - 17:03:39	22/11/2017 - 17:04:19	0:00:40	PSS-20171122-170104UTC+1100_018.jpg	bedroom	Cluttered bed
13	Indoor	22/11/2017 - 17:04:39	22/11/2017 - 17:05:39	0:01:00	PSS-20171122-170104UTC+1100_022.jpg	bedroom	Unstable objects
13	Watching Tv	22/11/2017 - 17:05:49	22/11/2017 - 17:08:19	0:02:30	PSS-20171122-170104UTC+1100_036.jpg	living room	Unstable objects, Obstacles in trafficways, Loose carpet edges
13	Indoor	22/11/2017 - 17:32:57	22/11/2017 - 17:38:17	0:05:20	PSS-20171122-173102UTC+1100_028.jpg	living room	Unstable objects, Obstacles in trafficways, Loose carpet edges
13	Food Related	22/11/2017 - 17:38:27	22/11/2017 - 17:42:27	0:04:00	PSS-20171122-173102UTC+1100_057.jpg	kitchen	Dark/ dim lighting
13	Watching Tv	22/11/2017 - 17:42:37	22/11/2017 - 17:44:57	0:02:20	PSS-20171122-173102UTC+1100_077.jpg	living room	Unstable objects, Obstacles in trafficways, Loose carpet edges
13	Food Related	22/11/2017 - 17:45:07	22/11/2017 - 17:47:06	0:01:50	PSS-20171122-174601UTC+1100_001.jpg	kitchen	Unstable objects
13	Indoor	22/11/2017 - 17:47:36	22/11/2017 - 17:55:16	0:07:40	PSS-20171122-174601UTC+1100_033.jpg	living room	Unstable objects, Obstacles in trafficways, Loose carpet edges
13	Watching Tv	22/11/2017 - 17:55:26	22/11/2017 - 18:02:25	0:06:50	PSS-20171122-174601UTC+1100_078.jpg	living room	Unstable objects, Obstacles in trafficways, Loose carpet edges
13	Food Related	22/11/2017 - 18:02:35	22/11/2017 - 18:20:14	0:17:39	PSS-20171122-180100UTC+1100_063.jpg	living room	Unstable objects, Obstacles in trafficways, Loose carpet edges
13	Watching Tv	22/11/2017 - 18:20:24	22/11/2017 - 18:58:32	0:36:08	PSS-20171122-181559UTC+1100_035.jpg	living room	Unstable objects, Obstacles in trafficways, Loose carpet edges
13	Indoor	22/11/2017 - 18:58:42	22/11/2017 - 19:01:41	0:02:59	PSS-20171122-184557UTC+1100_096.jpg	laundry room	N/A
13	Outdoor	22/11/2017 - 19:01:51	22/11/2017 - 19:07:11	0:05:20	PSS-20171122-190056UTC+1100_022.jpg	backyard	Cluttered workplace, Unstable objects, Heighted shelf - poor access to items
13	Indoor	22/11/2017 - 19:07:21	22/11/2017 - 19:15:51	0:08:30	PSS-20171122-190056UTC+1100_064.jpg	kitchen	Unstable objects, Obstacles in trafficways, Loose carpet edges, dim lighting
13	Watching Tv	22/11/2017 - 19:16:10	22/11/2017 - 19:20:50	0:04:40	PSS-20171122-191555UTC+1100_016.jpg	living room	Unstable objects, Obstacles in trafficways, Loose carpet edges
13	Managing Health	22/11/2017 - 19:21:00	22/11/2017 - 19:22:30	0:01:30	PSS-20171122-191555UTC+1100_031.jpg	living room	Unstable objects, Obstacles in trafficways, loose carpet edges
13	Watching Tv	22/11/2017 - 19:22:40	22/11/2017 - 20:17:56	0:55:16	PSS-20171122-194553UTC+1100_027.jpg	living room	Dark/ dim lighting
13	Watching Tv	23/11/2017 - 08:05:55	23/11/2017 - 08:53:55	0:45:00	PSS-20171123-082550UTC+1100_025.jpg	living room	N/A
13	Indoor	23/11/2017 - 08:54:05	23/11/2017 - 09:07:23	0:13:18	PSS-20171123-090418UTC+1100_005.jpg	bedroom	N/A
13	Outdoor	23/11/2017 - 09:07:33	23/11/2017 - 09:08:23	0:00:50	PSS-20171123-090418UTC+1100_022.jpg	front porch	N/A
13	Indoor	23/11/2017 - 09:08:33	23/11/2017 - 09:09:43	0:01:10	PSS-20171123-090418UTC+1100_029.jpg	kitchen	Dark/ dim lighting
13	Outdoor	23/11/2017 - 09:09:53	23/11/2017 - 09:10:23	0:00:30	PSS-20171123-090418UTC+1100_035.jpg	front porch	N/A
13	Indoor	23/11/2017 - 09:10:33	23/11/2017 - 09:16:53	0:06:20	PSS-20171123-090418UTC+1100_057.jpg	dining room	Unstable objects, Heighted shelf - poor access to items
13	Outdoor	23/11/2017 - 09:17:03	23/11/2017 - 09:21:42	0:04:39	PSS-20171123-091917UTC+1100_001.jpg	side of house	N/A
13	Indoor	23/11/2017 - 09:21:52	23/11/2017 - 09:23:42	0:01:50	PSS-20171123-091917UTC+1100_021.jpg	dining room	N/A
13	Watching Tv	23/11/2017 - 09:23:52	23/11/2017 - 09:25:52	0:02:00	PSS-20171123-091917UTC+1100_034.jpg	living room	Unstable objects, Loose carpet edges
13	Indoor	23/11/2017 - 09:26:32	23/11/2017 - 09:29:02	0:02:00	PSS-20171123-091917UTC+1100_051.jpg	dining room	Heighted shelf - poor access to items
13	Watching Tv	23/11/2017 - 09:31:02	23/11/2017 - 09:47:06	0:16:04	PSS-20171123-093417UTC+1100_029.jpg	living room	Unstable objects

Figure 52: Participant 13 Activity Table

Participant ID	Activity Class	Start Date / Time	End Date / Time	Duration	Representative Image File Name	Location	Fall Hazard
14	Sleeping	24/01/2018 - 12:29:51	24/01/2018 - 12:42:01	0:12:10	PSS-20180124-122656UTC+1100_035.jpg	living room	Heighted shelf - Poor access to items
14	Watching Tv	24/01/2018 - 13:20:22	24/01/2018 - 13:20:52	0:00:30	PSS-20180124-132017UTC+1100_002.jpg	living room	Obstacles in trafficways, Unstable objects,
14	Food Related	24/01/2018 - 13:58:15	24/01/2018 - 13:59:05	0:00:50	PSS-20180124-135810UTC+1100_003.jpg	kitchen	Dark/ dim lighting
14	Managing Health	24/01/2018 - 14:40:47	24/01/2018 - 14:46:07	0:05:20	PSS-20180124-144042UTC+1100_001.jpg	living room	Stairs - poor visibility
14	Indoor	24/01/2018 - 17:01:36	24/01/2018 - 17:08:18	0:06:42	PSS-20180124-170633UTC+1100_001.jpg	bedroom	Unstable objects
14	Watching Tv	24/01/2018 - 17:09:20	24/01/2018 - 17:10:00	0:07:00	PSS-20180124-170915UTC+1100_001.jpg	dining room	Obstacles on trafficways
14	Electronic Devices	24/01/2018 - 17:10:10	24/01/2018 - 17:13:40	0:03:30	PSS-20180124-170915UTC+1100_016.jpg	living room	Heighted shelf - Poor access to items
14	Managing Health	24/01/2018 - 20:36:16	24/01/2018 - 20:42:46	0:26:30	PSS-20180124-203131UTC+1100_048.jpg	living room	Obstacles in trafficways, Unstable objects,
14	Indoor	25/01/2018 - 07:09:23	25/01/2018 - 07:11:13	0:01:50	PSS-20180125-070508UTC+1100_031.jpg	living room	Obstacles in trafficways, Dark/ dim lighting
14	Deliberate Exercise	25/01/2018 - 07:11:23	25/01/2018 - 07:14:03	0:02:40	PSS-20180125-070508UTC+1100_046.jpg	living room	N/A
14	Indoor	25/01/2018 - 07:14:13	25/01/2018 - 07:16:33	0:02:20	PSS-20180125-070508UTC+1100_062.jpg	living room	N/A
14	Managing Health	25/01/2018 - 07:16:43	25/01/2018 - 07:20:13	0:03:30	PSS-20180125-070508UTC+1100_089.jpg	living room	Slippery floor, Obstacles in trafficways
14	Deliberate Exercise	25/01/2018 - 07:24:50	25/01/2018 - 07:50:50	0:26:00	PSS-20180125-072435UTC+1100_080.jpg	front driveway	N/A
14	Electronic Devices	25/01/2018 - 08:08:10	25/01/2018 - 08:11:30	0:03:20	PSS-20180125-075435UTC+1100_091.jpg	living room	Heighted shelf - Poor access to items
14	Food Related	25/01/2018 - 08:11:40	25/01/2018 - 08:17:10	0:06:30	PSS-20180125-080935UTC+1100_029.jpg	kitchen	Cluttered workplace, Untidy workplace
14	Electronic Devices	25/01/2018 - 08:17:30	25/01/2018 - 08:43:10	0:25:50	PSS-20180125-082435UTC+1100_021.jpg	living room	N/A
14	Deliberate Exercise	25/01/2018 - 08:45:20	25/01/2018 - 09:09:40	0:24:20	PSS-20180125-085435UTC+1100_014.jpg	living room	Obstacles in trafficways
14	Indoor	25/01/2018 - 09:10:30	25/01/2018 - 09:12:00	0:01:30	PSS-20180125-090935UTC+1100_010.jpg	dining room	Obstacles in trafficways

Figure 53: Participant 14 Activity Table

Participant ID	Activity Class	Start Date / Time	End Date / Time	Duration	Representative Image File Name	Location	Fall Hazard
15	Indoor	27/01/2018 - 06:07:13	27/01/2018 - 06:07:43	0:00:30	PSS-20180127-060708UTC+1100_002.jpg	dining room	Obstacles in trafficways, Unstable objects, Loose carpet edges
15	Outdoor	27/01/2018 - 06:07:43	27/01/2018 - 06:08:33	0:00:40	PSS-20180127-060708UTC+1100_007.jpg	garage	N/A
15	Driving	27/01/2018 - 06:08:43	27/01/2018 - 06:37:43	0:29:00	PSS-20180127-062208UTC+1100_008.jpg	car	N/A
15	Shopping	27/01/2018 - 06:37:53	27/01/2018 - 06:58:43	0:20:50	PSS-20180127-063708UTC+1100_007.jpg	grocery store	Uneven floor surface
15	Driving	27/01/2018 - 06:58:53	27/01/2018 - 07:14:53	0:16:00	PSS-20180127-065208UTC+1100_089.jpg	car	N/A
15	Outdoor	27/01/2018 - 07:15:03	27/01/2018 - 07:15:43	0:00:40	PSS-20180127-070708UTC+1100_049.jpg	car park	N/A
15	Indoor	27/01/2018 - 07:15:53	27/01/2018 - 07:22:23	0:06:30	PSS-20180127-070708UTC+1100_065.jpg	office	N/A
15	Food Related	27/01/2018 - 07:24:33	27/01/2018 - 07:52:03	0:27:30	PSS-20180127-073708UTC+1100_007.jpg	office	Unstable objects
15	Indoor	27/01/2018 - 07:24:43	27/01/2018 - 07:24:53	0:01:00	PSS-20180127-072208UTC+1100_010.jpg	kitchen	N/A
15	Socializing	27/01/2018 - 07:52:23	27/01/2018 - 07:52:53	0:00:30	PSS-20180127-075208UTC+1100_003.jpg	office	N/A
15	Indoor	27/01/2018 - 08:07:14	27/01/2018 - 09:01:02	0:53:48	PSS-20180127-082209UTC+1100_032.jpg	office	N/A
15	Outdoor	27/01/2018 - 09:47:44	27/01/2018 - 09:48:54	0:01:00	PSS-20180127-094739UTC+1100_004.jpg	city street	Uneven floor surface
15	Shopping	27/01/2018 - 09:49:04	27/01/2018 - 09:53:54	0:04:50	PSS-20180127-094739UTC+1100_009.jpg	jb hi-fi	Loose floor mat
15	Outdoor	27/01/2018 - 09:54:04	27/01/2018 - 09:55:24	0:01:20	PSS-20180127-094739UTC+1100_043.jpg	city street	Uneven floor surface
15	Indoor	27/01/2018 - 09:55:34	27/01/2018 - 10:05:35	0:10:01	PSS-20180127-094739UTC+1100_078.jpg	office	N/A
15	Food Related	27/01/2018 - 10:05:45	27/01/2018 - 10:09:55	0:04:10	PSS-20180127-100240UTC+1100_031.jpg	dining room	Obstacles in trafficways
15	Indoor	27/01/2018 - 10:10:05	27/01/2018 - 11:37:41	1:27:36	PSS-20180127-104145UTC+1100_077.jpg	office	N/A
15	Food Related	27/01/2018 - 11:37:51	27/01/2018 - 11:52:08	0:14:17	PSS-20180127-112646UTC+1100_069.jpg	office	N/A
15	Indoor	27/01/2018 - 11:52:18	27/01/2018 - 13:24:06	1:31:48	PSS-20180127-122840UTC+1100_052.jpg	office	N/A
15	Indoor	27/01/2018 - 18:10:52	27/01/2018 - 19:21:12	1:10:20	PSS-20180127-184047UTC+1100_032.jpg	office	N/A

Figure 54: Participant 15 Activity Table

Participant ID	Activity Class	Start Date / Time	End Date / Time	Duration	Representative Image File Name	Location	Fall Hazard
16	Indoor	01/02/2018 - 15:21:55	01/02/2018 - 15:26:35	0:04:40	PSS-20180201-152140UTC+1100_016.jpg	dining room	Obstacles in trafficways, Unstable objects
16	Outdoor	01/02/2018 - 15:26:45	01/02/2018 - 15:38:25	0:11:40	PSS-20180201-152140UTC+1100_066.jpg	backyard	Uneven floor
16	Indoor	01/02/2018 - 15:38:35	01/02/2018 - 15:45:55	0:07:20	PSS-20180201-153640UTC+1100_034.jpg	bedroom	N/A
16	Watching Tv	01/02/2018 - 15:56:35	01/02/2018 - 16:28:35	0:32:00	PSS-20180201-155140UTC+1100_030.jpg	dining room	Obstacles in trafficways, Unstable objects
16	Food Related	01/02/2018 - 16:28:45	01/02/2018 - 16:44:15	0:15:30	PSS-20180201-162140UTC+1100_091.jpg	dining room	Unstable objects
16	Watching Tv	01/02/2018 - 16:44:25	01/02/2018 - 16:58:25	0:14:00	PSS-20180201-163640UTC+1100_065.jpg	dining room	Unstable objects
16	Managing Health	01/02/2018 - 17:03:35	01/02/2018 - 17:04:15	0:00:40	PSS-20180201-165140UTC+1100_074.jpg	kitchen	Obstacles in trafficways, Unstable objects
16	Indoor	01/02/2018 - 17:17:45	01/02/2018 - 17:34:55	0:37:10	PSS-20180201-173640UTC+1100_023.jpg	dining room	Unstable objects
16	Watching Tv	01/02/2018 - 17:55:05	01/02/2018 - 18:21:45	0:26:40	PSS-20180201-175140UTC+1100_067.jpg	dining room	Unstable objects
16	Food Related	01/02/2018 - 19:06:53	01/02/2018 - 19:17:03	0:10:10	PSS-20180201-185918UTC+1100_077.jpg	kitchen	Unstable objects, soft seating?, obstacles in trafficways
16	Watching Tv	01/02/2018 - 19:17:13	01/02/2018 - 20:42:53	1:25:40	PSS-20180201-191418UTC+1100_018.jpg	dining room	Unstable objects, soft seating?, Loose carpet edges, obstacles in trafficways
16	Food Related	01/02/2018 - 20:43:03	01/02/2018 - 20:44:23	0:01:20	PSS-20180201-202918UTC+1100_087.jpg	kitchen	N/A
16	Watching Tv	01/02/2018 - 20:44:24	01/02/2018 - 21:44:14	0:59:50	PSS-20180201-212919UTC+1100_067.jpg	dining room	Unstable objects
16	Food Related	01/02/2018 - 21:44:34	01/02/2018 - 21:47:44	0:03:10	PSS-20180201-214419UTC+1100_011.jpg	UNCLEAR	Unstable objects
16	Watching Tv	01/02/2018 - 21:47:54	01/02/2018 - 21:55:04	0:07:10	PSS-20180201-214419UTC+1100_024.jpg	dining room	Unstable objects
16	Food Related	02/02/2018 - 06:50:10	02/02/2018 - 06:53:20	0:03:10	PSS-20180202-065005UTC+1100_010.jpg	kitchen	Untidy floor
16	Watching Tv	02/02/2018 - 06:53:30	02/02/2018 - 07:14:30	0:21:00	PSS-20180202-065005UTC+1100_021.jpg	dining room	Unstable objects, Obstacles in trafficways
16	Indoor	02/02/2018 - 07:32:17	02/02/2018 - 07:34:17	0:02:00	PSS-20180202-072702UTC+1100_038.jpg	dining room	Unstable objects
16	Food Related	02/02/2018 - 07:34:27	02/02/2018 - 07:36:47	0:04:20	PSS-20180202-072702UTC+1100_056.jpg	dining room	Unstable objects
16	Indoor	02/02/2018 - 07:38:57	02/02/2018 - 07:57:37	0:18:40	PSS-20180202-074202UTC+1100_038.jpg	dining room	Unstable objects
16	Food Related	02/02/2018 - 07:57:47	02/02/2018 - 08:19:18	0:21:31	PSS-20180202-075702UTC+1100_070.jpg	kitchen	Cluttered workplace, Unstable objects
16	Indoor	02/02/2018 - 08:19:28	02/02/2018 - 09:26:08	1:06:40	PSS-20180202-084203UTC+1100_089.jpg	bedroom	N/A

Figure 55: Participant 16 Activity Table

Participant ID	Activity Class	Start Date / Time	End Date / Time	Duration	Representative Image File Name	Location	Fall Hazard
17	Driving	09/02/2018 - 20:29:25	09/02/2018 - 20:39:15	0:09:50	PSS-20180209-203230UTC+1100_011.jpg	car	Glare
17	Outdoor	09/02/2018 - 20:39:25	09/02/2018 - 20:40:35	0:01:10	PSS-20180209-203230UTC+1100_045.jpg	street	Uneven floor
17	Indoor	09/02/2018 - 20:40:45	09/02/2018 - 20:41:25	0:00:40	PSS-20180209-203230UTC+1100_052.jpg	medical centre	N/A
17	Managing Health	09/02/2018 - 20:41:35	09/02/2018 - 21:00:55	0:19:20	PSS-20180209-203230UTC+1100_063.jpg	medical centre	N/A
17	Shopping	09/02/2018 - 21:01:05	09/02/2018 - 21:08:05	0:07:00	PSS-20180209-210230UTC+1100_003.jpg	shop	Obstacles in trafficways
17	Outdoor	09/02/2018 - 21:08:35	09/02/2018 - 21:09:55	0:01:20	PSS-20180209-214419UTC+1100_041.jpg	street	Uneven floor
17	Driving	09/02/2018 - 21:10:05	09/02/2018 - 21:26:25	0:16:20	PSS-20180209-211730UTC+1100_004.jpg	car	N/A
17	Outdoor	09/02/2018 - 21:26:35	09/02/2018 - 21:28:55	0:02:20	PSS-20180209-211730UTC+1100_062.jpg	backyard	Uneven floor, Clutter
17	Indoor	09/02/2018 - 21:29:05	09/02/2018 - 21:29:45	0:00:40	PSS-20180209-211730UTC+1100_072.jpg	dining room	Unstable objects, Dark/ dim lighting
17	Outdoor	09/02/2018 - 21:29:55	09/02/2018 - 21:31:35	0:01:40	PSS-20180209-211730UTC+1100_063.jpg	side of house	Uneven floor
17	Indoor	09/02/2018 - 21:31:45	09/02/2018 - 21:33:15	0:01:30	PSS-20180209-213230UTC+1100_001.jpg	office	Cluttered workplace, Unstable objects
17	Electronic Devices	09/02/2018 - 21:33:25	09/02/2018 - 21:43:15	0:09:50	PSS-20180209-213230UTC+1100_036.jpg	office	N/A
17	Indoor	09/02/2018 - 21:43:45	09/02/2018 - 21:47:05	0:03:40	PSS-20180209-213230UTC+1100_076.jpg	kitchen	Cluttered workplace, Unstable objects
17	Electronic Devices	09/02/2018 - 21:47:15	09/02/2018 - 22:16:05	0:28:50	PSS-20180209-214730UTC+1100_086.jpg	office	N/A
17	Electronic Devices	09/02/2018 - 22:16:25	09/02/2018 - 22:26:25	0:09:10	PSS-20180209-221730UTC+1100_026.jpg	office	N/A
17	Indoor	09/02/2018 - 22:26:35	09/02/2018 - 22:30:05	0:03:30	PSS-20180209-221730UTC+1100_065.jpg	office	Unstable objects, Heighed bookshelf - poor access to items
17	Electronic Devices	09/02/2018 - 23:04:35	10/02/2018 - 00:30:15	1:02:31	PSS-20180209-233230UTC+1100_043.jpg	office	N/A
17	Food Related	10/02/2018 - 00:30:15	10/02/2018 - 00:30:45	0:00:30	PSS-20180210-002550UTC+1100_028.jpg	kitchen	Unstable objects, Cluttered workplace
17	Indoor	10/02/2018 - 01:13:25	10/02/2018 - 01:15:25	0:02:00	PSS-20180210-011500UTC+1100_021.jpg	UNCLEAR	Obstacles in trafficways, Unstable objects
17	Deliberate Exercise	10/02/2018 - 01:15:35	10/02/2018 - 01:20:25	0:04:50	PSS-20180210-011500UTC+1100_043.jpg	backyard	N/A
17	Indoor	10/02/2018 - 13:56:05	10/02/2018 - 14:00:45	0:04:40	PSS-20180210-134520UTC+1100_080.jpg	kitchen	N/A
17	Outdoor	10/02/2018 - 14:00:55	10/02/2018 - 14:02:05	0:01:10	PSS-20180210-140020UTC+1100_007.jpg	backyard	N/A
17	Outdoor	10/02/2018 - 14:55:45	10/02/2018 - 14:57:25	0:01:40	PSS-20180210-144520UTC+1100_068.jpg	front porch	N/A
17	Indoor	10/02/2018 - 15:41:46	10/02/2018 - 15:42:36	0:00:50	PSS-20180210-153021UTC+1100_071.jpg	kitchen	Cluttered workplace, Unstable objects
17	Outdoor	10/02/2018 - 15:42:46	10/02/2018 - 15:43:36	0:00:50	PSS-20180210-153021UTC+1100_077.jpg	backyard	Uneven flor, Obstacles in trafficways
17	Indoor	10/02/2018 - 15:43:46	10/02/2018 - 15:44:56	0:01:10	PSS-20180210-153021UTC+1100_084.jpg	kitchen	Cluttered workplace, Unstable objects
17	Indoor	10/02/2018 - 15:45:26	10/02/2018 - 15:55:06	0:09:40	PSS-20180210-154521UTC+1100_029.jpg	kitchen	N/A
17	Deliberate Exercise	10/02/2018 - 15:55:16	10/02/2018 - 16:16:16	0:21:00	PSS-20180210-154521UTC+1100_078.jpg	spare room	N/A
17	Indoor	10/02/2018 - 16:16:26	10/02/2018 - 16:30:26	0:14:00	PSS-20180210-161521UTC+1100_026.jpg	dining room	Unstable objects

Figure 56: Participant 17 Activity Table

Participant ID	Activity Class	Start Date / Time	End Date / Time	Duration	Representative Image File Name	Location	Fall Hazard
18	Indoor	26/02/2018 - 11:08:18	26/02/2018 - 11:19:38	0:11:20	PSS-20180226-110813UTC+1100_034.jpg	hallway	
18	Indoor	26/02/2018 - 11:53:37	26/02/2018 - 12:08:47	0:15:10	PSS-20180226-115332UTC+1100_051.jpg	dining room	
18	Indoor	26/02/2018 - 13:32:26	26/02/2018 - 13:35:26	0:03:00	PSS-20180226-132911UTC+1100_029.jpg	garage	
18	Food Related	26/02/2018 - 13:35:36	26/02/2018 - 13:44:36	0:09:00	PSS-20180226-132911UTC+1100_066.jpg	bedroom	
18	Food Related	26/02/2018 - 14:00:16	26/02/2018 - 14:01:26	0:01:10	PSS-20180226-135911UTC+1100_010.jpg	bedroom	
18	Indoor	26/02/2018 - 14:05:06	26/02/2018 - 14:12:26	0:07:20	PSS-20180226-144008UTC+1100_062.jpg	office	N/A
18	Driving	26/02/2018 - 14:13:26	26/02/2018 - 14:47:33	0:34:07	PSS-20180226-144009UTC+1100_016.jpg	car	Soft seating?
18	Electronic Devices	26/02/2018 - 14:47:43	26/02/2018 - 14:48:53	0:01:10	PSS-20180226-144408UTC+1100_025.jpg	car	Loose carpet edges
18	Driving	26/02/2018 - 14:49:03	26/02/2018 - 14:51:33	0:02:30	PSS-20180226-144408UTC+1100_038.jpg	car	N/A
18	Driving	26/02/2018 - 15:25:05	26/02/2018 - 15:41:05	0:16:00	PSS-20180226-152500UTC+1100_049.jpg	car	N/A
18	Driving	26/02/2018 - 16:51:27	26/02/2018 - 17:31:36	0:40:09	PSS-20180226-170522UTC+1100_031.jpg	car	N/A
18	Driving	26/02/2018 - 17:31:56	26/02/2018 - 17:32:26	0:00:30	PSS-20180226-172121UTC+1100_065.jpg	car	N/A
18	Indoor	26/02/2018 - 17:32:36	26/02/2018 - 17:35:46	0:03:10	PSS-20180226-173621UTC+1100_003.jpg	front of house	N/A
18	Indoor	26/02/2018 - 17:35:56	26/02/2018 - 18:03:26	0:15:20	PSS-20180226-175121UTC+1100_008.jpg	dining room	N/A
18	Managing Health	26/02/2018 - 19:03:21	26/02/2018 - 19:05:31	0:02:10	PSS-20180226-190316UTC+1100_022.jpg	bathroom	N/A
18	Indoor	26/02/2018 - 19:05:41	26/02/2018 - 19:07:51	0:02:10	PSS-20180226-190316UTC+1100_022.jpg	bathroom	N/A
18	Food Related	26/02/2018 - 19:19:51	26/02/2018 - 19:24:41	0:04:50	PSS-20180226-191916UTC+1100_025.jpg	dining room	Unstable objects
18	Food Related	27/02/2018 - 07:04:35	27/02/2018 - 07:05:35	0:01:00	PSS-20180227-070020UTC+1100_029.jpg	kitchen	N/A
18	Indoor	27/02/2018 - 07:22:15	27/02/2018 - 07:29:25	0:07:10	PSS-20180227-071520UTC+1100_063.jpg	bedroom	Heighted shelf - poor access to items
18	Deliberate Exercise	27/02/2018 - 07:29:35	27/02/2018 - 08:07:24	0:37:49	PSS-20180227-074519UTC+1100_019.jpg	street	Uneven floor
18	Indoor	27/02/2018 - 08:12:54	27/02/2018 - 08:14:04	0:01:10	PSS-20180227-080019UTC+1100_079.jpg	kitchen	Unstable objects
18	Managing Health	27/02/2018 - 08:14:24	27/02/2018 - 08:23:43	0:09:19	PSS-20180227-081518UTC+1100_025.jpg	kitchen	Unstable objects
18	Food Related	27/02/2018 - 08:38:53	27/02/2018 - 08:49:52	0:10:59	PSS-20180227-083018UTC+1100_085.jpg	bathroom	N/A
18	Driving	27/02/2018 - 08:53:12	27/02/2018 - 09:11:31	0:18:19	PSS-20180227-090016UTC+1100_010.jpg	car	N/A
18	Indoor	27/02/2018 - 09:11:41	27/02/2018 - 09:13:41	0:02:00	PSS-20180227-090016UTC+1100_073.jpg	UNCLEAR	
18	Indoor	27/02/2018 - 09:55:29	27/02/2018 - 09:56:59	0:01:30	PSS-20180227-095524UTC+1100_002.jpg	dining room	Unstable objects

Figure 57: Participant 18 Activity Table

Participant ID	Activity Class	Start Date / Time	End Date / Time	Duration	Representative Image File Name	Location	Fall Hazard
19	Indoor	19/02/2018 - 14:35:26	19/02/2018 - 14:36:36	0:01:10	PSS-20180219-143521UTC+1100_004.jpg	bedroom	Unstable objects, Clutter on table
19	Food Related	19/02/2018 - 16:08:56	19/02/2018 - 16:19:36	0:10:40	PSS-20180219-160821UTC+1100_054.jpg	kitchen	N/A
19	Electronic Devices	19/02/2018 - 16:19:46	19/02/2018 - 16:22:26	0:02:40	PSS-20180219-162021UTC+1100_004.jpg	dining room	Unstable objects, Loose carpet edges
19	Food Related	19/02/2018 - 16:22:36	19/02/2018 - 16:24:56	0:02:20	PSS-20180219-162021UTC+1100_021.jpg	kitchen	Dark/ dim lighting
19	Electronic Devices	19/02/2018 - 16:25:06	19/02/2018 - 16:26:46	0:01:40	PSS-20180219-162021UTC+1100_034.jpg	dining room	Unstable objects, Loose carpet edges
19	Food Related	19/02/2018 - 16:26:56	19/02/2018 - 16:31:46	0:04:50	PSS-20180219-162021UTC+1100_043.jpg	kitchen	Cluttered workplace
19	Food Related	19/02/2018 - 16:32:16	19/02/2018 - 16:41:16	0:09:00	PSS-20180219-163521UTC+1100_008.jpg	kitchen	N/A
19	Socializing	19/02/2018 - 16:41:56	19/02/2018 - 16:42:56	0:01:00	PSS-20180219-163521UTC+1100_043.jpg	bedroom	N/A
19	Food Related	19/02/2018 - 16:43:36	19/02/2018 - 16:56:16	0:12:40	PSS-20180219-163521UTC+1100_088.jpg	dining room	N/A
19	Electronic Devices	19/02/2018 - 17:58:36	19/02/2018 - 18:07:37	0:08:50	PSS-20180219-175022UTC+1100_064.jpg	bedroom	N/A
19	Indoor	19/02/2018 - 18:07:47	19/02/2018 - 18:09:57	0:02:10	PSS-20180219-180522UTC+1100_021.jpg	living room	Loose carpet edges
19	Outdoor	19/02/2018 - 18:10:07	19/02/2018 - 18:10:47	0:00:40	PSS-20180219-180522UTC+1100_031.jpg	front driveway	N/A
19	Driving	19/02/2018 - 18:11:07	19/02/2018 - 18:33:27	0:22:20	PSS-20180219-182022UTC+1100_011.jpg	car	N/A
19	Driving	19/02/2018 - 19:00:57	19/02/2018 - 19:36:27	0:35:30	PSS-20180219-190522UTC+1100_081.jpg	car	N/A
19	Socializing	19/02/2018 - 19:38:47	19/02/2018 - 19:42:37	0:03:50	PSS-20180219-193522UTC+1100_022.jpg	car park	N/A
19	Driving	19/02/2018 - 19:44:27	19/02/2018 - 20:34:17	0:49:50	PSS-20180219-200522UTC+1100_024.jpg	car	Glare
19	Electronic Devices	20/02/2018 - 05:21:53	20/02/2018 - 05:29:23	0:07:30	PSS-20180220-052128UTC+1100_025.jpg	bedroom	Clutter on bed
19	Managing Health	20/02/2018 - 05:30:13	20/02/2018 - 05:31:13	0:01:00	PSS-20180220-052128UTC+1100_055.jpg	bedroom	N/A
19	Electronic Devices	20/02/2018 - 05:31:23	20/02/2018 - 05:33:43	0:02:20	PSS-20180220-052128UTC+1100_066.jpg	bedroom	Unstable objects, Clutter on sink
19	Indoor	20/02/2018 - 05:35:53	20/02/2018 - 05:37:13	0:01:20	PSS-20180220-053628UTC+1100_001.jpg	kitchen	Unstable objects
19	Electronic Devices	20/02/2018 - 05:37:53	20/02/2018 - 05:44:23	0:06:30	PSS-20180220-053628UTC+1100_036.jpg	bedroom	Unstable objects
19	Indoor	20/02/2018 - 05:44:33	20/02/2018 - 05:45:23	0:00:50	PSS-20180220-053628UTC+1100_052.jpg	bedroom	N/A
19	Outdoor	20/02/2018 - 05:45:33	20/02/2018 - 05:48:53	0:03:20	PSS-20180220-053628UTC+1100_066.jpg	car	N/A
19	Driving	20/02/2018 - 05:49:03	20/02/2018 - 06:10:53	0:21:50	PSS-20180220-055128UTC+1100_057.jpg	car	N/A
19	Outdoor	20/02/2018 - 06:11:03	20/02/2018 - 06:15:13	0:04:10	PSS-20180220-060628UTC+1100_040.jpg	car	N/A
19	Outdoor	20/02/2018 - 06:15:43	20/02/2018 - 06:18:53	0:03:10	PSS-20180220-060628UTC+1100_065.jpg	street	N/A
19	Driving	20/02/2018 - 06:19:43	20/02/2018 - 06:22:33	0:02:50	PSS-20180220-062128UTC+1100_001.jpg	car	Obstacles in trafficways
19	Driving	20/02/2018 - 06:23:13	20/02/2018 - 06:23:43	0:00:30	PSS-20180220-062128UTC+1100_012.jpg	car	Uneven floor
19	Outdoor	20/02/2018 - 06:23:53	20/02/2018 - 06:25:13	0:01:20	PSS-20180220-062128UTC+1100_019.jpg	street	Uneven floor
19	Driving	20/02/2018 - 06:26:43	20/02/2018 - 07:20:13	0:53:30	PSS-20180220-065128UTC+1100_039.jpg	car	N/A
19	Outdoor	20/02/2018 - 07:20:23	20/02/2018 - 07:22:33	0:02:10	PSS-20180220-072128UTC+1100_001.jpg	airport	N/A
19	Indoor	20/02/2018 - 07:22:43	20/02/2018 - 07:23:43	0:01:00	PSS-20180220-072128UTC+1100_011.jpg	airport	N/A
19	Outdoor	20/02/2018 - 07:23:53	20/02/2018 - 07:27:33	0:03:40	PSS-20180220-072128UTC+1100_026.jpg	airport	N/A
19	Driving	20/02/2018 - 07:27:43	20/02/2018 - 07:28:23	0:00:40	PSS-20180220-072128UTC+1100_040.jpg	car	N/A

Figure 58: Participant 19 Activity Table

Participant ID	Activity Class	Start Date / Time	End Date / Time	Duration	Representative Image File Name	Location	Fall Hazard
20	Socializing	03/03/2018 - 00:30:56	03/03/2018 - 00:36:16	0:05:20	PSS-20180303-003031UTC+1100_003.jpg	bedroom	N/A
20	Driving	03/03/2018 - 00:37:46	03/03/2018 - 00:43:46	0:06:00	PSS-20180303-003031UTC+1100_062.jpg	car	N/A
20	Shopping	03/03/2018 - 00:43:56	03/03/2018 - 00:56:37	0:12:41	PSS-20180303-003031UTC+1100_081.jpg	car park	N/A
20	Driving	03/03/2018 - 00:56:47	03/03/2018 - 01:01:56	0:05:09	PSS-20180303-004532UTC+1100_084.jpg	car	N/A
20	Outdoor	03/03/2018 - 01:02:06	03/03/2018 - 01:02:36	0:00:30	PSS-20180303-010031UTC+1100_011.jpg	front porch	N/A
20	Indoor	03/03/2018 - 01:02:46	03/03/2018 - 01:12:06	0:09:20	PSS-20180303-010031UTC+1100_042.jpg	bedroom	Unstable objects
20	Electronic Devices	03/03/2018 - 01:12:16	03/03/2018 - 01:12:56	0:00:40	PSS-20180303-010031UTC+1100_073.jpg	living room	Obstacles in trafficways
20	Indoor	03/03/2018 - 01:13:06	03/03/2018 - 01:13:36	0:00:30	PSS-20180303-010031UTC+1100_077.jpg	dining room	Obstacles in trafficways
20	Deliberate Exercise	03/03/2018 - 01:13:56	03/03/2018 - 02:25:32	1:11:36	PSS-20180303-014529UTC+1100_025.jpg	park	N/A
20	Indoor	03/03/2018 - 02:26:12	03/03/2018 - 02:40:21	0:14:09	PSS-20180303-021527UTC+1100_083.jpg	living room	Unstable objects
20	Outdoor	03/03/2018 - 02:40:31	03/03/2018 - 02:43:51	0:03:20	PSS-20180303-023026UTC+1100_071.jpg	front/side of house	Uneven floor
20	Indoor	03/03/2018 - 02:44:01	03/03/2018 - 02:48:20	0:04:19	PSS-20180303-024525UTC+1100_004.jpg	bathroom	Dark/ dim lighting
20	Outdoor	03/03/2018 - 02:48:30	03/03/2018 - 02:50:10	0:01:40	PSS-20180303-024525UTC+1100_024.jpg	front driveway	Uneven floor
20	Indoor	03/03/2018 - 02:50:20	03/03/2018 - 03:14:49	0:24:29	PSS-20180303-030024UTC+1100_043.jpg	living room	N/A
20	Food Related	03/03/2018 - 03:14:59	03/03/2018 - 03:16:08	0:01:09	PSS-20180303-030024UTC+1100_091.jpg	kitchen	Unstable objects
20	Indoor	03/03/2018 - 03:16:18	03/03/2018 - 03:44:47	0:28:29	PSS-20180303-031523UTC+1100_091.jpg	living room	N/A
20	Outdoor	03/03/2018 - 03:44:57	03/03/2018 - 03:47:06	0:02:09	PSS-20180303-034521UTC+1100_004.jpg	side of house	N/A
20	Steeping	03/03/2018 - 03:47:46	03/03/2018 - 03:52:36	0:04:50	PSS-20180303-034521UTC+1100_031.jpg	kitchen	N/A
20	Driving	03/03/2018 - 03:53:16	03/03/2018 - 03:58:06	0:04:50	PSS-20180303-034521UTC+1100_063.jpg	car	N/A
20	Indoor	03/03/2018 - 03:58:16	03/03/2018 - 03:59:46	0:01:30	PSS-20180303-034521UTC+1100_082.jpg	front driveway	N/A
20	Driving	03/03/2018 - 04:13:33	03/03/2018 - 04:20:23	0:06:50	PSS-20180303-041328UTC+1100_020.jpg	car	N/A
20	Indoor	03/03/2018 - 04:20:33	03/03/2018 - 04:23:53	0:03:20	PSS-20180303-041280UTC+1100_053.jpg	dining room	Obstacles in trafficways, Dark/ dim lighting
20	Socializing	03/03/2018 - 04:24:03	03/03/2018 - 04:52:13	0:28:10	PSS-20180303-041280UTC+1100_065.jpg	office	Unstable objects
20	Managing Health	03/03/2018 - 04:52:53	03/03/2018 - 04:55:33	0:02:20	PSS-20180303-044528UTC+1100_060.jpg	office	Unstable objects, Clutter on table
20	Food Related	03/03/2018 - 04:55:43	03/03/2018 - 05:19:43	0:24:00	PSS-20180303-045827UTC+1100_038.jpg	dining room	N/A
20	Socializing	03/03/2018 - 05:19:53	03/03/2018 - 05:30:13	0:10:20	PSS-20180303-051738UTC+1100_016.jpg	dining room	N/A
20	Food Related	03/03/2018 - 05:30:23	03/03/2018 - 05:41:03	0:10:40	PSS-20180303-053238UTC+1100_018.jpg	kitchen	Cluttered workplace
20	Socializing	03/03/2018 - 05:41:13	03/03/2018 - 06:28:23	0:47:10	PSS-20180303-053238UTC+1100_053.jpg	dining room	N/A
20	Food Related	03/03/2018 - 06:28:33	03/03/2018 - 06:29:53	0:01:20	PSS-20180303-061738UTC+1100_070.jpg	kitchen	Cluttered workplace
20	Socializing	03/03/2018 - 06:30:03	03/03/2018 - 06:39:33	0:09:30	PSS-20180303-065238UTC+1100_013.jpg	office	Unstable objects
20	Indoor	03/03/2018 - 06:39:43	03/03/2018 - 06:40:33	0:00:50	PSS-20180303-065238UTC+1100_045.jpg	living room	Narrow staircase
20	Watching Tv	03/03/2018 - 06:40:43	03/03/2018 - 06:47:43	0:07:00	PSS-20180303-065238UTC+1100_070.jpg	living room	
20	Watching Tv	03/03/2018 - 07:20:03	03/03/2018 - 07:25:33	0:05:30	PSS-20180303-071738UTC+1100_015.jpg	living room	Obstacles in trafficways, Loose carpet edges
20	Indoor	03/03/2018 - 16:50:20	03/03/2018 - 16:51:10	0:00:50	PSS-20180303-165015UTC+1100_003.jpg	bedroom	Unstable objects
20	Managing Health	03/03/2018 - 16:51:20	03/03/2018 - 16:52:00	0:00:40	PSS-20180303-165015UTC+1100_009.jpg	office	N/A
20	Food Related	03/03/2018 - 16:52:10	03/03/2018 - 16:55:30	0:03:20	PSS-20180303-165015UTC+1100_022.jpg	kitchen	Unstable objects, Cluttered workplace
20	Electronic Devices	03/03/2018 - 16:55:40	03/03/2018 - 16:56:50	0:01:10	PSS-20180303-165015UTC+1100_036.jpg	living room	N/A
20	Indoor	03/03/2018 - 16:57:00	03/03/2018 - 17:37:30	0:40:30	PSS-20180303-170515UTC+1100_073.jpg	living room	N/A
20	Managing Health	03/03/2018 - 18:10:43	03/03/2018 - 18:20:53	0:10:10	PSS-20180303-181018UTC+1100_012.jpg	office	Clutter on table
20	Food Related	03/03/2018 - 18:21:03	03/03/2018 - 18:42:13	0:21:10	PSS-20180303-182118UTC+1100_038.jpg	dining room	Unstable objects
20	Indoor	03/03/2018 - 18:42:23	03/03/2018 - 18:52:23	0:10:00	PSS-20180303-184018UTC+1100_043.jpg	office	N/A
20	Electronic Devices	03/03/2018 - 18:52:33	03/03/2018 - 18:53:03	0:00:30	PSS-20180303-184018UTC+1100_075.jpg	hallway	N/A
20	Indoor	03/03/2018 - 18:53:13	03/03/2018 - 18:56:03	0:02:50	PSS-20180303-184018UTC+1100_087.jpg	office	N/A
20	Electronic Devices	03/03/2018 - 18:56:13	03/03/2018 - 18:56:53	0:00:40	PSS-20180303-185518UTC+1100_008.jpg	office	Clutter on table
20	Indoor	03/03/2018 - 18:57:03	03/03/2018 - 18:58:13	0:01:10	PSS-20180303-185518UTC+1100_014.jpg	office	Clutter on table
20	Electronic Devices	03/03/2018 - 18:58:23	03/03/2018 - 19:02:13	0:03:50	PSS-20180303-185518UTC+1100_030.jpg	office	Clutter on table
20	Indoor	03/03/2018 - 19:02:23	03/03/2018 - 19:21:13	0:18:50	PSS-20180303-191018UTC+1100_009.jpg	office	Clutter on table
20	Indoor	03/03/2018 - 19:21:53	03/03/2018 - 19:26:13	0:04:20	PSS-20180303-191018UTC+1100_083.jpg	office	N/A
20	Outdoor	03/03/2018 - 19:26:23	03/03/2018 - 19:27:13	0:00:50	PSS-20180303-192518UTC+1100_009.jpg	garage	N/A
20	Driving	03/03/2018 - 19:27:23	03/03/2018 - 19:34:03	0:06:40	PSS-20180303-192518UTC+1100_033.jpg	car	N/A
20	Outdoor	03/03/2018 - 19:34:13	03/03/2018 - 19:35:23	0:01:10	PSS-20180303-192518UTC+1100_057.jpg	front driveway	N/A
20	Indoor	03/03/2018 - 19:35:33	03/03/2018 - 19:45:23	0:09:50	PSS-20180303-192518UTC+1100_091.jpg	club	N/A
20	Driving	03/03/2018 - 21:22:57	03/03/2018 - 21:30:27	0:07:30	PSS-20180303-212252UTC+1100_023.jpg	car	N/A
20	Indoor	03/03/2018 - 21:30:37	03/03/2018 - 21:32:27	0:01:50	PSS-20180303-212252UTC+1100_032.jpg	front driveway	Even floor
20	Electronic Devices	03/03/2018 - 21:42:17	03/03/2018 - 21:55:47	0:13:30	PSS-20180303-213752UTC+1100_068.jpg	office	Unstable objects
20	Food Related	03/03/2018 - 21:55:57	03/03/2018 - 22:10:07	0:14:10	PSS-20180303-215252UTC+1100_038.jpg	kitchen	Unstable objects
20	Indoor	03/03/2018 - 22:53:10	03/03/2018 - 22:54:30	0:01:20	PSS-20180303-225305UTC+1100_005.jpg	kitchen	Cluttered workplace
20	Outdoor	03/03/2018 - 22:54:40	03/03/2018 - 22:58:20	0:03:40	PSS-20180303-225305UTC+1100_021.jpg	side of house	Obstacles in trafficways
20	Indoor	03/03/2018 - 22:58:30	03/03/2018 - 23:13:20	0:14:50	PSS-20180303-230805UTC+1100_008.jpg	living room	N/A

Figure 59: Participant 20 Activity Table

Participant ID	Activity Class	Start Date / Time	End Date / Time	Duration	Representative Image File Name	Location	Fall Hazard
21	Deliberate Exercise	22/03/2018 - 16:05:45	22/03/2018 - 16:10:35	0:04:50	PSS-20180322-160540UTC+1100_050.jpg	kitchen	N/A
21	Indoor	22/03/2018 - 16:13:15	22/03/2018 - 16:14:45	0:01:30	PSS-20180322-160540UTC+1100_050.jpg	staircase	Narrow staircase
21	Deliberate Exercise	22/03/2018 - 16:15:25	22/03/2018 - 16:42:14	0:26:49	PSS-20180322-162040UTC+1100_049.jpg	parc	N/A
21	Indoor	22/03/2018 - 16:42:44	22/03/2018 - 16:47:14	0:04:30	PSS-20180322-163539UTC+1100_056.jpg	kitchen	N/A
21	Food Related	22/03/2018 - 16:50:44	22/03/2018 - 16:52:54	0:02:10	PSS-20180322-165039UTC+1100_007.jpg	living room	Unstable objects
21	Managing Health	22/03/2018 - 16:53:04	22/03/2018 - 16:56:24	0:03:20	PSS-20180322-165039UTC+1100_015.jpg	kitchen	Untidy workplace, Cluttered workplace, Unstable objects
21	Indoor	22/03/2018 - 16:56:34	22/03/2018 - 17:02:44	0:06:10	PSS-20180322-165039UTC+1100_054.jpg	UNCLEAR	Even floor
21	Food Related	22/03/2018 - 17:02:44	22/03/2018 - 17:36:13	0:33:19	PSS-20180322-170515UTC+1100_085.jpg	living room	N/A
21	Indoor	22/03/2018 - 17:36:23	22/03/2018 - 17:50:23	0:14:00	PSS-20180322-173338UTC+1100_047.jpg	kitchen	
21	Indoor	22/03/2018 - 19:39:07	22/03/2018 - 20:20:14	0:41:07	PSS-20180322-195010UTC+1100_057.jpg	living room	N/A
21	Indoor	23/03/2018 - 06:39:18	23/03/2018 - 06:40:28	0:01:10	PSS-20180323-063913UTC+1100_004.jpg	living room	N/A
21	Managing Health	23/03/2018 - 06:40:48	23/03/2018 - 06:43:33	0:02:50	PSS-20180323-063913UTC+1100_027.jpg	kitchen	Unstable objects, Clutter
21	Food Related	23/03/2018 - 06:43:48	23/03/2018 - 06:58:08	0:14:20	PSS-20180323-063913UTC+1100_071.jpg	kitchen	Cluttered workplace
21	Indoor	23/03/2018 - 09:51:34	23/03/2018 - 09:54:04	0:02:30	PSS-20180323-093909UTC+1100_082.jpg	bedroom	Unstable objects, Loose carpet edges, Clutter
21	Deliberate Exercise	23/03/2018 - 09:54:13	23/03/2018 - 10:35:42	0:41:29	PSS-20180323-100908UTC+1100_035.jpg	park	Uneven floor
21	Food Related	23/03/2018 - 10:35:52	23/03/2018 - 10:39:02	0:03:10	PSS-20180323-102407UTC+1100_089.jpg	kitchen	Unstable objects, Cluttered workplace
21	Indoor	23/03/2018 - 10:39:22	23/03/2018 - 10:53:02	0:13:40	PSS-20180323-103070UTC+1100_043.jpg	dining room	N/A
21	Food Related	23/03/2018 - 11:41:50	23/03/2018 - 12:03:19	0:21:29	PSS-20180323-113905UTC+1100_083.jpg	living room	Loose floor mat, Unstable objects, Obstacles in trafficways
21	Indoor	23/03/2018 - 12:27:08	23/03/2018 - 12:34:58	0:07:50	PSS-20180323-122403UTC+1100_042.jpg	bedroom	Obstacles in trafficways, Unstable objects, Loose carpet edges
21	Food Related	23/03/2018 - 12:40:58	23/03/2018 - 12:43:18	0:02:20	PSS-20180323-123903UTC+1100_019.jpg	kitchen	Cluttered workplace
21	Indoor	23/03/2018 - 13:34:27	23/03/2018 - 13:43:26	0:08:59	PSS-20180323-132402UTC+1100_099.jpg	bedroom	Unstable objects, Obstacles in trafficways
21	Indoor	23/03/2018 - 13:43:36	23/03/2018 - 13:46:16	0:02:40	PSS-20180323-133901UTC+1100_036.jpg	balcony	N/A
21	Indoor	23/03/2018 - 13:46:26	23/03/2018 - 13:53:56	0:07:30	PSS-20180323-1		

Participant ID	Activity Class	Start Date / Time	End Date / Time	Duration	Representative Image File Name	Location	Fall Hazard
22	Socializing	03/04/2018 - 11:34:22	03/04/2018 - 11:35:52	0:01:30	PSS-20180403-113207UTC+1000_016.jpg	bedroom	Obstacles in trafficways, Unstable objects, Clutter on table
22	Indoor	03/04/2018 - 11:36:02	03/04/2018 - 11:38:52	0:02:50	PSS-20180403-113207UTC+1000_032.jpg	kitchen	Unstable objects
22	Electronic Devices	03/04/2018 - 11:47:51	03/04/2018 - 12:04:00	0:16:09	PSS-20180403-114706UTC+1000_052.jpg	office	N/A
22	Watching Tv	03/04/2018 - 12:04:10	03/04/2018 - 12:06:10	0:02:00	PSS-20180403-120209UTC+1000_013.jpg	bedroom	Obstacles in trafficways
22	Indoor	03/04/2018 - 12:06:50	03/04/2018 - 12:07:30	0:00:40	PSS-20180403-120209UTC+1000_031.jpg	living room	N/A
22	Sleeping	03/04/2018 - 12:07:40	03/04/2018 - 12:31:49	0:24:09	PSS-20180403-121704UTC+1000_016.jpg	living room	N/A
22	Indoor	03/04/2018 - 12:41:47	03/04/2018 - 12:47:37	0:05:50	PSS-20180403-123412UTC+1000_063.jpg	dining room	Obstacles in trafficways
22	Food Related	03/04/2018 - 12:48:37	03/04/2018 - 13:04:17	0:15:40	PSS-20180403-124912UTC+1000_043.jpg	living room	N/A
22	Indoor	03/04/2018 - 13:06:59	03/04/2018 - 15:11:19	0:04:20	PSS-20180403-150634UTC+1000_015.jpg	kitchen	Unstable objects
22	Food Related	03/04/2018 - 15:11:29	03/04/2018 - 15:13:09	0:01:40	PSS-20180403-150634UTC+1000_035.jpg	kitchen	N/A
22	Indoor	03/04/2018 - 15:13:19	03/04/2018 - 16:05:46	0:52:27	PSS-20180403-153632UTC+1000_017.jpg	front porch	N/A
22	Managing Health	03/04/2018 - 16:05:56	03/04/2018 - 16:06:26	0:00:30	PSS-20180403-155131UTC+1000_088.jpg	front porch	N/A
22	Indoor	03/04/2018 - 16:06:44	03/04/2018 - 16:09:24	0:02:40	PSS-20180403-160629UTC+1000_010.jpg	front porch	N/A
22	Socializing	03/04/2018 - 16:18:14	03/04/2018 - 16:32:53	0:14:39	PSS-20180403-160629UTC+1000_071.jpg	front porch	N/A
22	Socializing	03/04/2018 - 16:48:41	03/04/2018 - 16:50:21	0:01:40	PSS-20180403-163626UTC+1000_079.jpg	living room	N/A
22	Electronic Devices	03/04/2018 - 16:54:30	03/04/2018 - 17:06:58	0:12:28	PSS-20180403-165125UTC+1000_060.jpg	office	N/A
22	Food Related	03/04/2018 - 17:10:48	03/04/2018 - 17:17:28	0:06:40	PSS-20180403-170623UTC+1000_046.jpg	kitchen	N/A
22	Sleeping	03/04/2018 - 17:20:18	03/04/2018 - 17:25:27	0:05:09	PSS-20180403-172122UTC+1000_009.jpg	living room	N/A
22	Food Related	03/04/2018 - 17:36:45	03/04/2018 - 17:41:05	0:04:20	PSS-20180403-173620UTC+1000_016.jpg	kitchen	N/A
22	Food Related	03/04/2018 - 18:30:11	03/04/2018 - 19:32:05	1:01:54	PSS-20180403-190611UTC+1000_012.jpg	kitchen	Unstable objects
22	Indoor	03/04/2018 - 19:32:55	03/04/2018 - 19:36:15	0:04:00	PSS-20180403-192110UTC+1000_079.jpg	kitchen	Unstable objects
22	Watching Tv	03/04/2018 - 19:45:04	03/04/2018 - 20:00:04	0:15:00	PSS-20180403-194459UTC+1000_046.jpg	bedroom	Soft mattress?
22	Food Related	04/04/2018 - 07:10:14	04/04/2018 - 07:11:54	0:01:40	PSS-20180404-071009UTC+1000_006.jpg	kitchen	N/A
22	Managing Health	04/04/2018 - 07:12:04	04/04/2018 - 07:15:04	0:03:00	PSS-20180404-071009UTC+1000_016.jpg	dining room	Unstable objects
22	Indoor	04/04/2018 - 07:15:14	04/04/2018 - 07:20:04	0:04:50	PSS-20180404-071009UTC+1000_045.jpg	dining room	Unstable objects
22	Socializing	04/04/2018 - 07:20:34	04/04/2018 - 07:22:54	0:02:20	PSS-20180404-071009UTC+1000_075.jpg	dining room	Unstable objects
22	Indoor	04/04/2018 - 07:23:04	04/04/2018 - 07:28:13	0:05:09	PSS-20180404-072508UTC+1000_002.jpg	kitchen	N/A
22	Food Related	04/04/2018 - 07:33:13	04/04/2018 - 07:38:03	0:04:50	PSS-20180404-072508UTC+1000_063.jpg	dining room	N/A
22	Managing Health	04/04/2018 - 07:39:53	04/04/2018 - 07:41:03	0:01:10	PSS-20180404-072508UTC+1000_089.jpg	kitchen	N/A
22	Indoor	04/04/2018 - 07:41:13	04/04/2018 - 07:47:13	0:06:00	PSS-20180404-074008UTC+1000_025.jpg	kitchen	N/A
22	Electronic Devices	04/04/2018 - 07:51:43	04/04/2018 - 08:02:22	0:24:30	PSS-20180404-075507UTC+1000_052.jpg	office	N/A
22	Indoor	04/04/2018 - 08:02:32	04/04/2018 - 08:05:12	0:02:40	PSS-20180404-075507UTC+1000_053.jpg	bedroom	N/A
22	Electronic Devices	04/04/2018 - 08:06:02	04/04/2018 - 08:30:32	0:24:30	PSS-20180404-081007UTC+1000_052.jpg	office	N/A
22	Electronic Devices	04/04/2018 - 09:12:29	04/04/2018 - 09:17:39	0:05:10	PSS-20180404-091224UTC+1000_016.jpg	office	Unstable objects
22	Indoor	04/04/2018 - 09:22:29	04/04/2018 - 09:30:29	0:08:00	PSS-20180404-091224UTC+1000_085.jpg	bedroom	N/A
22	Electronic Devices	04/04/2018 - 09:31:39	04/04/2018 - 09:55:39	0:24:00	PSS-20180404-092724UTC+1000_048.jpg	office	N/A
22	Indoor	04/04/2018 - 09:55:49	04/04/2018 - 09:57:29	0:01:40	PSS-20180404-094224UTC+1000_086.jpg	front porch	N/A

Figure 61: Participant 22 Activity Table

Participant ID	Activity Class	Start Date / Time	End Date / Time	Duration	Representative Image File Name	Location	Fall Hazard
23	Food Related	12/04/2018 - 12:12:58	12/04/2018 - 12:25:38	0:12:40	PSS-20180412-121253UTC+1000_039.jpg	kitchen	Unstable objects, Cluttered workplace, Dark/ dim lighting
23	Electronic Devices	12/04/2018 - 13:27:56	12/04/2018 - 13:38:36	0:10:40	PSS-20180412-132751UTC+1000_033.jpg	living room	Obstacles in trafficways, Unstable objects, Clutter on table
23	Food Related	12/04/2018 - 13:38:46	12/04/2018 - 13:42:46	0:04:00	PSS-20180412-132751UTC+1000_078.jpg	living room	Obstacles in trafficways, Unstable objects, Clutter on table
23	Watching Tv	12/04/2018 - 13:43:05	12/04/2018 - 13:45:25	0:02:20	PSS-20180412-134250UTC+1000_002.jpg	living room	Obstacles in trafficways, Unstable objects, Clutter on table
23	Electronic Devices	12/04/2018 - 13:54:25	12/04/2018 - 14:16:54	0:22:29	PSS-20180412-135750UTC+1000_048.jpg	living room	N/A
23	Watching Tv	12/04/2018 - 14:17:04	12/04/2018 - 14:19:04	0:02:00	PSS-20180412-141249UTC+1000_032.jpg	living room	Unstable objects, Clutter on table, soft seating?
23	Electronic Devices	12/04/2018 - 14:19:14	12/04/2018 - 14:21:14	0:02:00	PSS-20180412-141249UTC+1000_045.jpg	living room	Unstable objects, Clutter on table
23	Food Related	12/04/2018 - 14:21:24	12/04/2018 - 14:23:14	0:01:50	PSS-20180412-141249UTC+1000_057.jpg	living room	Obstacles in trafficways, Unstable objects, Clutter on table, soft seating?
23	Watching Tv	12/04/2018 - 14:23:24	12/04/2018 - 14:47:53	0:24:29	PSS-20180412-141249UTC+1000_067.jpg	living room	Obstacles in trafficways, Loose floor mat
23	Food Related	12/04/2018 - 14:48:03	12/04/2018 - 14:51:43	0:03:40	PSS-20180412-144248UTC+1000_043.jpg	kitchen	Untidy workplace, cluttered workplace, Dark/ dim lighting
23	Watching Tv	12/04/2018 - 14:51:53	12/04/2018 - 14:54:43	0:02:50	PSS-20180412-144248UTC+1000_058.jpg	living room	Unstable objects, Clutter on table, soft seating?
23	Electronic Devices	12/04/2018 - 14:54:53	12/04/2018 - 15:02:03	0:07:10	PSS-20180412-145748UTC+1000_004.jpg	living room	Cluttered couch
23	Watching Tv	12/04/2018 - 15:02:13	12/04/2018 - 15:10:23	0:08:06	PSS-20180412-145748UTC+1000_051.jpg	living room	Unstable objects, Clutter on table, soft seating?, Cluttered couch
23	Electronic Devices	12/04/2018 - 15:10:33	12/04/2018 - 15:11:13	0:04:40	PSS-20180412-145748UTC+1000_079.jpg	living room	Obstacles in trafficways, Unstable objects, Clutter on table
23	Watching Tv	12/04/2018 - 15:11:23	12/04/2018 - 15:19:23	0:07:50	PSS-20180412-151248UTC+1000_015.jpg	living room	Obstacles in trafficways, Unstable objects, Clutter on table
23	Electronic Devices	12/04/2018 - 15:19:23	12/04/2018 - 15:22:03	0:02:40	PSS-20180412-151248UTC+1000_048.jpg	living room	Obstacles in trafficways, Unstable objects, Clutter on table
23	Indoor	12/04/2018 - 15:22:53	12/04/2018 - 15:24:13	0:01:20	PSS-20180412-151248UTC+1000_065.jpg	living room	Obstacles in trafficways, Unstable objects, Clutter on table
23	Outdoor	12/04/2018 - 15:24:23	12/04/2018 - 15:26:23	0:02:00	PSS-20180412-151248UTC+1000_076.jpg	car	Obstacles in trafficways, Unstable objects, Clutter on table
23	Driving	12/04/2018 - 15:26:33	12/04/2018 - 15:34:12	0:07:39	PSS-20180412-152747UTC+1000_015.jpg	car	N/A
23	Outdoor	12/04/2018 - 15:34:32	12/04/2018 - 15:35:12	0:00:40	PSS-20180412-152747UTC+1000_043.jpg	outdoors	Uneven floor
23	Indoor	12/04/2018 - 15:35:22	12/04/2018 - 15:38:52	0:03:30	PSS-20180412-152747UTC+1000_049.jpg	dining room	N/A
23	Outdoor	12/04/2018 - 15:39:02	12/04/2018 - 15:41:22	0:02:20	PSS-20180412-152747UTC+1000_075.jpg	car	N/A
23	Driving	12/04/2018 - 15:41:32	12/04/2018 - 16:03:01	0:21:29	PSS-20180412-154247UTC+1000_030.jpg	car	N/A
23	Outdoor	12/04/2018 - 16:04:11	12/04/2018 - 16:07:21	0:03:10	PSS-20180412-155746UTC+1000_048.jpg	front of house	Uneven floor
23	Indoor	12/04/2018 - 16:07:31	12/04/2018 - 16:08:31	0:01:00	PSS-20180412-155746UTC+1000_062.jpg	laundry room	N/A
23	Outdoor	12/04/2018 - 16:11:01	12/04/2018 - 16:26:00	0:14:59	PSS-20180412-161245UTC+1000_034.jpg	backyard	N/A
23	Watching Tv	12/04/2018 - 16:29:10	12/04/2018 - 16:30:40	0:01:30	PSS-20180412-162745UTC+1000_012.jpg	living room	Uneven floor
23	Outdoor	12/04/2018 - 16:30:50	12/04/2018 - 16:42:59	0:12:09	PSS-20180412-162745UTC+1000_036.jpg	backyard	Dark/ Dim Lighting
23	Electronic Devices	12/04/2018 - 16:55:29	12/04/2018 - 16:56:29	0:01:00	PSS-20180412-164244UTC+1000_089.jpg	living room	Obstacles in trafficways, Unstable objects
23	Watching Tv	12/04/2018 - 16:56:39	12/04/2018 - 17:00:59	0:04:20	PSS-20180412-165744UTC+1000_004.jpg	living room	N/A
23	Electronic Devices	12/04/2018 - 17:20:08	12/04/2018 - 17:23:08	0:03:00	PSS-20180412-171243UTC+1000_060.jpg	living room	N/A
23	Indoor	12/04/2018 - 18:36:56	12/04/2018 - 18:37:26	0:00:30	PSS-20180412-182741UTC+1000_057.jpg	dining room	Obstacles in trafficways, Loose floormat
23	Food Related	12/04/2018 - 18:38:16	12/04/2018 - 19:05:35	0:27:19	PSS-20180412-184240UTC+1000_056.jpg	living room	N/A
23	Indoor	12/04/2018 - 19:05:45	12/04/2018 - 19:07:25	0:01:40	PSS-20180412-185740UTC+1000_054.jpg	kitchen	N/A
23	Food Related	12/04/2018 - 19:07:35	12/04/2018 - 19:20:34	0:12:59	PSS-20180412-191239UTC+1000_008.jpg	living room	Unstable objects, Obstacles in trafficways
23	Electronic Devices	12/04/2018 - 19:20:44	12/04/2018 - 19:22:44	0:02:00	PSS-20180412-191239UTC+1000_053.jpg	living room	Unstable objects, Obstacles in trafficways, Cluttered table
23	Watching Tv	12/04/2018 - 19:25:44	12/04/2018 - 19:26:54	0:01:10	PSS-20180412-191239UTC+1000_082.jpg	living room	Unstable objects, Obstacles in trafficways, Cluttered table, Loose floormat
23	Watching Tv	13/04/2018 - 08:34:04	13/04/2018 - 08:36:34	0:02:30	PSS-20180413-083359UTC+1000_002.jpg	dining room	

Figure 62: Participant 23 Activity Table

Participant ID	Activity Class	Start Date / Time	End Date / Time	Duration	Representative Image File Name	Location	Fall Hazard
24	Indoor	27/09/2018 - 16:20:15	27/09/2018 - 16:22:35	0:02:20	PSS-20180927-162010UTC+1000_008.jpg	hallway	N/A
24	Food Related	27/09/2018 - 16:22:45	27/09/2018 - 16:35:05	0:12:20	PSS-20180927-162010UTC+1000_033.jpg	dining room	N/A
24	Indoor	27/09/2018 - 16:35:25	27/09/2018 - 16:40:15	0:04:50	PSS-20180927-163510UTC+1000_016.jpg	living room	N/A
24	Deliberate Exercise	27/09/2018 - 16:40:25	27/09/2018 - 16:49:45	0:09:20	PSS-20180927-163510UTC+1000_060.jpg	backyard	N/A
24	Indoor	27/09/2018 - 16:50:24	27/09/2018 - 17:05:04	0:14:40	PSS-20180927-165009UTC+1000_046.jpg	living room	N/A
24	Watching Tv	27/09/2018 - 17:05:24	27/09/2018 - 17:10:04	0:04:40	PSS-20180927-170509UTC+1000_029.jpg	living room	Obstacles in trafficways, soft seating?
24	Indoor	27/09/2018 - 17:10:14	27/09/2018 - 17:13:24	0:03:10	PSS-20180927-170509UTC+1000_040.jpg	living room	N/A
24	Food Related	27/09/2018 - 17:13:34	27/09/2018 - 17:34:42	0:21:08	PSS-20180927-170509UTC+1000_081.jpg	living room	Dark/ dim lighting
24	Indoor	27/09/2018 - 17:34:52	27/09/2018 - 17:38:00	0:03:08	PSS-20180927-173506UTC+1000_005.jpg	living room	Narrow hallway
24	Food Related	27/09/2018 - 17:38:10	27/09/2018 - 17:43:00	0:04:50	PSS-20180927-173655UTC+1000_022.jpg	living room	N/A
24	Watching Tv	27/09/2018 - 17:43:10	27/09/2018 - 18:07:40	0:24:30	PSS-20180927-175155UTC+1000_043.jpg	living room	Dark/ dim lighting
24	Food Related	27/09/2018 - 18:07:50	27/09/2018 - 18:28:49	0:20:59	PSS-20180927-180655UTC+1000_070.jpg	kitchen	Cluttered workplace, Untidy workplace, Unstable objects
24	Watching Tv	27/09/2018 - 18:28:59	27/09/2018 - 18:29:39	0:00:40	PSS-20180927-182154UTC+1000_045.jpg	living room	N/A
24	Sleeping	27/09/2018 - 18:29:49	27/09/2018 - 18:31:09	0:01:20	PSS-20180927-182154UTC+1000_052.jpg	living room	N/A
24	Sleeping	27/09/2018 - 18:31:39	27/09/2018 - 19:18:19	0:46:40	PSS-20180927-185154UTC+1000_020.jpg	living room	N/A
24	Sleeping	27/09/2018 - 19:43:18	27/09/2018 - 19:44:08	0:00:50	PSS-20180927-193653UTC+1000_041.jpg	living room	N/A
24	Watching Tv	27/09/2018 - 19:44:18	27/09/2018 - 19:46:28	0:02:10	PSS-20180927-193653UTC+1000_051.jpg	living room	Soft seating
24	Food Related	27/09/2018 - 19:46:38	27/09/2018 - 19:51:48	0:05:10	PSS-20180927-193653UTC+1000_074.jpg	living room	N/A
24	Managing Health	27/09/2018 - 19:52:08	27/09/2018 - 19:58:58	0:06:50	PSS-20180927-195153UTC+1000_002.jpg	living room	N/A
24	Food Related	27/09/2018 - 19:58:08	27/09/2018 - 20:23:58	0:24:50	PSS-20180927-200653UTC+1000_020.jpg	living room	Obstacles in trafficways
24	Indoor	27/09/2018 - 20:24:48	27/09/2018 - 20:31:28	0:07:20	PSS-20180927-202153UTC+1000_028.jpg	living room	N/A
24	Watching Tv	27/09/2018 - 20:31:38	27/09/2018 - 20:33:48	0:02:10	PSS-20180927-202153UTC+1000_065.jpg	living room	N/A
24	Sleeping	27/09/2018 - 20:33:58	27/09/2018 - 20:39:07	0:05:09	PSS-20180927-202153UTC+1000_089.jpg	living room	Dark/ dim lighting
24	Watching Tv	27/09/2018 - 20:39:17	27/09/2018 - 20:56:07	0:16:50	PSS-20180927-203652UTC+1000_066.jpg	living room	Dark/ dim lighting
24	Sleeping	27/09/2018 - 20:56:17	27/09/2018 - 21:15:56	0:19:39	PSS-20180927-205152UTC+1000_086.jpg	living room	Dark/ dim lighting
24	Watching Tv	27/09/2018 - 21:16:06	27/09/2018 - 21:18:46	0:02:40	PSS-20180927-210651UTC+1000_064.jpg	living room	N/A
24	Indoor	28/09/2018 - 09:47:50	28/09/2018 - 10:18:19	0:30:29	PSS-20180928-094745UTC+1000_090.jpg	living room	N/A
24	Outdoor	28/09/2018 - 10:18:29	28/09/2018 - 10:25:19	0:06:50	PSS-20180928-101744UTC+1000_026.jpg	backyard	Obstacles in trafficways
24	Indoor	28/09/2018 - 10:25:29	28/09/2018 - 10:26:09	0:00:40	PSS-20180928-101744UTC+1000_049.jpg	office	Unstable objects
24	Food Related	28/09/2018 - 10:47:08	28/09/2018 - 10:50:18	0:03:10	PSS-20180928-104743UTC+1000_006.jpg	kitchen	N/A
24	Indoor	28/09/2018 - 10:50:38	28/09/2018 - 11:15:37	0:24:59	PSS-20180928-110242UTC+1000_002.jpg	living room	N/A
24	Outdoor	28/09/2018 - 11:15:47	28/09/2018 - 11:21:56	0:06:09	PSS-20180928-111741UTC+1000_007.jpg	backyard	N/A
24	Socializing	28/09/2018 - 11:22:06	28/09/2018 - 11:23:16	0:01:10	PSS-20180928-111741UTC+1000_030.jpg	backyard	Dark/ dim lighting
24	Outdoor	28/09/2018 - 11:23:26	28/09/2018 - 11:25:46	0:02:20	PSS-20180928-111741UTC+1000_041.jpg	elevator	N/A
24	Indoor	28/09/2018 - 11:25:56	28/09/2018 - 12:36:38	1:10:42	PSS-20180928-114739UTC+1000_078.jpg	living room	N/A
24	Outdoor	28/09/2018 - 12:36:48	28/09/2018 - 12:54:37	0:17:49	PSS-20180928-123333UTC+1000_077.jpg	backyard	N/A
24	Indoor	28/09/2018 - 12:54:47	28/09/2018 - 12:59:17	0:04:30	PSS-20180928-124732UTC+1000_057.jpg	hallway	N/A
24	Outdoor	28/09/2018 - 12:59:27	28/09/2018 - 13:31:33	0:32:06	PSS-20180928-130230UTC+1000_086.jpg	backyard	N/A
24	Indoor	28/09/2018 - 13:31:43	28/09/2018 - 13:39:32	0:07:49	PSS-20180928-133227UTC+1000_019.jpg	living room	N/A
24	Food Related	28/09/2018 - 13:39:42	28/09/2018 - 14:25:59	0:46:17	PSS-20180928-140224UTC+1000_003.jpg	living room	Dark/ dim lighting
24	Indoor	28/09/2018 - 14:26:09	28/09/2018 - 14:48:33	0:22:24	PSS-20180928-143528UTC+1000_040.jpg	elevator	Obstacles in trafficways
24	Outdoor	28/09/2018 - 14:48:43	28/09/2018 - 14:51:52	0:03:09	PSS-20180928-143528UTC+1000_090.jpg	backyard	N/A

Figure 63: Participant 24 Activity Table

Participant ID	Activity Class	Start Date / Time	End Date / Time	Duration	Representative Image File Name	Location	Fall Hazard
25	Electronic Devices	01/10/2018 - 19:21:42	01/10/2018 - 20:34:56	1:13:14	PSS-20181001-195246UTC+1000_077.jpg	bedroom	
25	Food Related	01/10/2018 - 20:35:06	01/10/2018 - 22:38:26	2:03:20	PSS-20181001-212212UTC+1000_073.jpg	dining room	N/A
25	Indoor	01/10/2018 - 22:38:36	01/10/2018 - 22:40:56	0:02:20	PSS-20181001-225511UTC+1000_088.jpg	bedroom	N/A
25	Food Related	01/10/2018 - 23:10:16	01/10/2018 - 23:18:56	0:05:40	PSS-20181001-231011UTC+1000_027.jpg	living room	N/A
25	Indoor	02/10/2018 - 09:53:06	02/10/2018 - 10:24:07	0:30:59	PSS-20181002-100233UTC+1000_039.jpg	bedroom	N/A
25	Food Related	02/10/2018 - 10:24:17	02/10/2018 - 10:46:37	0:22:20	PSS-20181002-103232UTC+1000_017.jpg	bedroom	Soft mattress?
25	Indoor	02/10/2018 - 12:25:02	02/10/2018 - 12:31:42	0:06:40	PSS-20181002-121637UTC+1000_071.jpg	bedroom	Dark/ dim lighting
25	Sleeping	02/10/2018 - 12:46:40	02/10/2018 - 13:20:34	0:33:54	PSS-20181002-124635UTC+1000_004.jpg	bedroom	N/A
25	Sleeping	02/10/2018 - 13:21:14	02/10/2018 - 13:22:24	0:01:10	PSS-20181002-131019UTC+1000_068.jpg	bedroom	Poor access to bed, Soft mattress?, Unstable objects, Dark/ dim lighting

Figure 64: Participant 25 Activity Table

Participant ID	Activity Class	Start Date / Time	End Date / Time	Duration	Representative Image File Name	Location	Fall Hazard
26	Indoor	22/11/2018 - 11:17:53	22/11/2018 - 11:18:43	0:00:50	PSS-20181122-111748UTC+1100_003.jpg	dining room	Dark/ dim lighting
26	Managing Health	22/11/2018 - 11:18:53	22/11/2018 - 11:19:33	0:00:40	PSS-20181122-111748UTC+1100_009.jpg	dining room	Dark/ dim lighting
26	Electronic Devices	22/11/2018 - 11:19:43	22/11/2018 - 13:16:53	1:57:10	PSS-20181122-120448UTC+1100_088.jpg	dining room	N/A
26	Managing Health	22/11/2018 - 13:17:03	22/11/2018 - 13:19:03	0:02:00	PSS-20181122-130248UTC+1100_088.jpg	dining room	N/A
26	Food Related	22/11/2018 - 13:19:13	22/11/2018 - 13:21:33	0:02:20	PSS-20181122-131748UTC+1100_016.jpg	dining room	Unstable objects
26	Indoor	22/11/2018 - 13:26:32	22/11/2018 - 13:31:02	0:02:30	PSS-20181122-132827UTC+1100_008.jpg	living room	N/A
26	Outdoor	22/11/2018 - 13:31:12	22/11/2018 - 13:32:12	0:01:00	PSS-20181122-132827UTC+1100_020.jpg	car	N/A
26	Driving	22/11/2018 - 13:32:22	22/11/2018 - 13:43:02	0:10:40	PSS-20181122-132827UTC+1100_056.jpg	car	N/A
26	Shopping	22/11/2018 - 13:43:12	22/11/2018 - 14:31:20	0:48:08	PSS-20181122-132827UTC+1100_089.jpg	car park	N/A
26	Driving	22/11/2018 - 14:31:40	22/11/2018 - 14:39:00	0:07:20	PSS-20181122-142825UTC+1100_049.jpg	car	N/A
26	Food Related	22/11/2018 - 14:39:10	22/11/2018 - 14:46:09	0:06:59	PSS-20181122-142825UTC+1100_086.jpg	cafe	N/A
26	Electronic Devices	22/11/2018 - 15:50:19	22/11/2018 - 16:44:29	0:54:10	PSS-20181122-160514UTC+1100_051.jpg	dining room	N/A
26	Indoor	22/11/2018 - 16:44:39	22/11/2018 - 16:47:59	0:03:20	PSS-20181122-163514UTC+1100_067.jpg	elevator	N/A
26	Driving	22/11/2018 - 16:48:09	22/11/2018 - 17:17:59	0:29:50	PSS-20181122-165014UTC+1100_073.jpg	car	N/A
26	Outdoor	22/11/2018 - 17:18:09	22/11/2018 - 17:19:39	0:01:30	PSS-20181122-170514UTC+1100_082.jpg	frontyard	Uneven floor
26	Indoor	22/11/2018 - 17:19:49	22/11/2018 - 17:29:33	0:09:44	PSS-20181122-172014UTC+1100_020.jpg	dining room	N/A
26	Indoor	22/11/2018 - 19:59:03	22/11/2018 - 20:05:33	0:06:30	PSS-20181122-195858UTC+1100_020.jpg	living room	N/A
26	Food Related	22/11/2018 - 20:07:23	22/11/2018 - 20:09:03	0:01:40	PSS-20181122-195858UTC+1100_056.jpg	bedroom	Soft mattress?
26	Food Related	23/11/2018 - 09:14:21	23/11/2018 - 09:15:41	0:01:20	PSS-20181123-090726UTC+1100_046.jpg	living room	N/A
26	Food Related	23/11/2018 - 09:17:51	23/11/2018 - 09:20:21	0:02:30	PSS-20181123-090726UTC+1100_074.jpg	dining room	N/A

Figure 65: Participant 26 Activity Table

01 TOTALS:	Socializing	0:02:20
01 TOTALS:	Electronic Devices	0:28:40
01 TOTALS:	Food Related	0:29:10
01 TOTALS:	Managing Health	0:13:40
01 TOTALS:	Indoor	0:28:29
01 TOTALS:	Outdoor	0:00:00
01 TOTALS:	Deliberate Exercise	0:31:00
01 TOTALS:	Driving	0:00:00
01 TOTALS:	Shopping	0:00:00
01 TOTALS:	Sleeping	0:00:00
01 TOTALS:	Watching Tv	0:11:30

Figure 66: Participant 1 Total Activity Duration Table

03 TOTALS:	Socializing	0:41:25
03 TOTALS:	Electronic Devices	3:23:29
03 TOTALS:	Food Related	0:43:27
03 TOTALS:	Managing Health	0:00:30
03 TOTALS:	Indoor	0:42:36
03 TOTALS:	Outdoor	0:33:40
03 TOTALS:	Deliberate Exercise	0:43:11
03 TOTALS:	Driving	0:35:39
03 TOTALS:	Shopping	0:25:27
03 TOTALS:	Sleeping	0:00:00
03 TOTALS:	Watching Tv	0:00:00

Figure 67: Participant 3 Total Activity Duration Table

04 TOTALS:	Socializing	0:00:00
04 TOTALS:	Electronic Devices	0:04:20
04 TOTALS:	Food Related	0:00:00
04 TOTALS:	Managing Health	0:00:00
04 TOTALS:	Indoor	1:07:07
04 TOTALS:	Outdoor	1:26:43
04 TOTALS:	Deliberate Exercise	0:00:00
04 TOTALS:	Driving	0:03:50
04 TOTALS:	Shopping	0:03:20
04 TOTALS:	Sleeping	0:00:00
04 TOTALS:	Watching Tv	0:00:00

Figure 68: Participant 4 Total Activity Duration Table

06 TOTALS:	Socializing	0:00:00
06 TOTALS:	Electronic Devices	1:13:38
06 TOTALS:	Food Related	0:46:50
06 TOTALS:	Managing Health	0:08:30
06 TOTALS:	Indoor	0:24:40
06 TOTALS:	Outdoor	0:12:20
06 TOTALS:	Deliberate Exercise	0:00:00
06 TOTALS:	Driving	0:01:20
06 TOTALS:	Shopping	0:00:00
06 TOTALS:	Sleeping	0:00:00
06 TOTALS:	Watching Tv	5:11:38

Figure 69: Participant 6 Total Activity Duration Table

07 TOTALS:	Socializing	0:00:00
07 TOTALS:	Electronic Devices	0:00:00
07 TOTALS:	Food Related	0:30:29
07 TOTALS:	Managing Health	0:01:30
07 TOTALS:	Indoor	2:16:29
07 TOTALS:	Outdoor	0:03:40
07 TOTALS:	Deliberate Exercise	0:00:00
07 TOTALS:	Driving	0:25:19
07 TOTALS:	Shopping	0:00:40
07 TOTALS:	Sleeping	0:00:00
07 TOTALS:	Watching Tv	2:16:19

Figure 70: Participant 7 Total Activity Duration Table

08 TOTALS:	Socializing	0:24:19
08 TOTALS:	Electronic Devices	0:00:00
08 TOTALS:	Food Related	0:37:39
08 TOTALS:	Managing Health	0:03:00
08 TOTALS:	Indoor	1:07:24
08 TOTALS:	Outdoor	0:02:40
08 TOTALS:	Deliberate Exercise	0:00:00
08 TOTALS:	Driving	0:03:50
08 TOTALS:	Shopping	0:00:00
08 TOTALS:	Sleeping	0:00:00
08 TOTALS:	Watching Tv	0:00:00

Figure 71: Participant 8 Total Activity Duration Table

09 TOTALS:	Socializing	1:08:00
09 TOTALS:	Electronic Devices	0:16:40
09 TOTALS:	Food Related	2:02:07
09 TOTALS:	Managing Health	0:10:50
09 TOTALS:	Indoor	3:02:18
09 TOTALS:	Outdoor	0:06:10
09 TOTALS:	Deliberate Exercise	0:00:00
09 TOTALS:	Driving	0:21:10
09 TOTALS:	Shopping	0:00:00
09 TOTALS:	Sleeping	0:00:00
09 TOTALS:	Watching Tv	0:31:50

Figure 72: Participant 9 Total Activity Duration Table

10 TOTALS:	Socializing	0:49:49
10 TOTALS:	Electronic Devices	0:00:30
10 TOTALS:	Food Related	0:49:50
10 TOTALS:	Managing Health	0:00:00
10 TOTALS:	Indoor	2:11:25
10 TOTALS:	Outdoor	0:00:00
10 TOTALS:	Deliberate Exercise	0:00:00
10 TOTALS:	Driving	0:42:29
10 TOTALS:	Shopping	0:25:10
10 TOTALS:	Sleeping	0:00:00
10 TOTALS:	Watching Tv	0:00:00

Figure 73: Participant 10 Total Activity Duration Table

11 TOTALS:	Socializing	0:12:30
11 TOTALS:	Electronic Devices	0:35:29
11 TOTALS:	Food Related	2:32:38
11 TOTALS:	Managing Health	0:03:40
11 TOTALS:	Indoor	1:30:59
11 TOTALS:	Outdoor	0:47:20
11 TOTALS:	Deliberate Exercise	0:00:00
11 TOTALS:	Driving	1:32:44
11 TOTALS:	Shopping	0:26:09
11 TOTALS:	Sleeping	0:11:00
11 TOTALS:	Watching Tv	0:05:40

Figure 74: Participant 11 Total Activity Duration Table

12 TOTALS:	Socializing	0:39:40
12 TOTALS:	Electronic Devices	0:08:10
12 TOTALS:	Food Related	0:26:50
12 TOTALS:	Managing Health	0:09:50
12 TOTALS:	Indoor	1:14:39
12 TOTALS:	Outdoor	0:07:40
12 TOTALS:	Deliberate Exercise	0:00:00
12 TOTALS:	Driving	0:00:00
12 TOTALS:	Shopping	0:00:00
12 TOTALS:	Sleeping	1:19:03
12 TOTALS:	Watching Tv	0:54:08

Figure 75: Participant 12 Total Activity Duration Table

13 TOTALS:	Socializing	0:00:00
13 TOTALS:	Electronic Devices	0:00:00
13 TOTALS:	Food Related	0:23:38
13 TOTALS:	Managing Health	0:01:30
13 TOTALS:	Indoor	1:11:25
13 TOTALS:	Outdoor	0:16:29
13 TOTALS:	Deliberate Exercise	0:00:00
13 TOTALS:	Driving	0:00:00
13 TOTALS:	Shopping	0:00:00
13 TOTALS:	Sleeping	0:00:00
13 TOTALS:	Watching Tv	3:44:07

Figure 76: Participant 13 Total Activity Duration Table

14 TOTALS:	Socializing	0:00:00
14 TOTALS:	Electronic Devices	0:32:40
14 TOTALS:	Food Related	0:06:20
14 TOTALS:	Managing Health	0:15:20
14 TOTALS:	Indoor	0:12:22
14 TOTALS:	Outdoor	0:00:00
14 TOTALS:	Deliberate Exercise	0:53:00
14 TOTALS:	Driving	0:00:00
14 TOTALS:	Shopping	0:00:00
14 TOTALS:	Sleeping	0:12:10
14 TOTALS:	Watching Tv	0:01:10

Figure 77: Participant 14 Total Activity Duration Table

15 TOTALS:	Socializing	0:00:30
15 TOTALS:	Electronic Devices	0:00:00
15 TOTALS:	Food Related	0:19:37
15 TOTALS:	Managing Health	0:00:00
15 TOTALS:	Indoor	5:48:03
15 TOTALS:	Outdoor	0:03:50
15 TOTALS:	Deliberate Exercise	0:00:00
15 TOTALS:	Driving	0:45:00
15 TOTALS:	Shopping	0:25:40
15 TOTALS:	Sleeping	0:00:00
15 TOTALS:	Watching Tv	0:00:00

Figure 78: Participant 15 Total Activity Duration Table

16 TOTALS:	Socializing	0:00:00
16 TOTALS:	Electronic Devices	0:00:00
16 TOTALS:	Food Related	0:59:11
16 TOTALS:	Managing Health	0:00:40
16 TOTALS:	Indoor	2:16:30
16 TOTALS:	Outdoor	0:11:40
16 TOTALS:	Deliberate Exercise	0:00:00
16 TOTALS:	Driving	0:00:00
16 TOTALS:	Shopping	0:00:00
16 TOTALS:	Sleeping	0:00:00
16 TOTALS:	Watching Tv	4:06:20

Figure 79: Participant 16 Total Activity Duration Table

17 TOTALS:	Socializing	0:00:00
17 TOTALS:	Electronic Devices	1:50:21
17 TOTALS:	Food Related	0:00:30
17 TOTALS:	Managing Health	0:19:20
17 TOTALS:	Indoor	0:42:20
17 TOTALS:	Outdoor	0:10:10
17 TOTALS:	Deliberate Exercise	0:25:50
17 TOTALS:	Driving	0:26:10
17 TOTALS:	Shopping	0:07:00
17 TOTALS:	Sleeping	0:00:00
17 TOTALS:	Watching Tv	0:00:00

Figure 80: Participant 17 Total Activity Duration Table

18 TOTALS:	Socializing	0:00:00
18 TOTALS:	Electronic Devices	0:01:10
18 TOTALS:	Food Related	0:25:19
18 TOTALS:	Managing Health	0:03:20
18 TOTALS:	Indoor	1:29:19
18 TOTALS:	Outdoor	0:01:50
18 TOTALS:	Deliberate Exercise	0:37:49
18 TOTALS:	Driving	1:51:35
18 TOTALS:	Shopping	0:00:00
18 TOTALS:	Sleeping	0:00:00
18 TOTALS:	Watching Tv	0:00:00

Figure 81: Participant 18 Total Activity Duration Table

19 TOTALS:	Socializing	0:04:50
19 TOTALS:	Electronic Devices	0:29:30
19 TOTALS:	Food Related	0:39:30
19 TOTALS:	Managing Health	0:01:00
19 TOTALS:	Indoor	0:06:30
19 TOTALS:	Outdoor	0:18:30
19 TOTALS:	Deliberate Exercise	0:00:00
19 TOTALS:	Driving	3:07:00
19 TOTALS:	Shopping	0:00:00
19 TOTALS:	Sleeping	0:00:00
19 TOTALS:	Watching Tv	0:00:00

Figure 82: Participant 19 Total Activity Duration Table

20 TOTALS:	Socializing	1:40:30
20 TOTALS:	Electronic Devices	0:20:20
20 TOTALS:	Food Related	1:15:49
20 TOTALS:	Managing Health	0:13:00
20 TOTALS:	Indoor	3:13:16
20 TOTALS:	Outdoor	0:13:19
20 TOTALS:	Deliberate Exercise	1:11:36
20 TOTALS:	Driving	0:36:59
20 TOTALS:	Shopping	0:12:41
20 TOTALS:	Sleeping	0:04:50
20 TOTALS:	Watching Tv	0:12:30

Figure 83: Participant 20 Total Activity Duration Table

21 TOTALS:	Socializing	0:00:00
21 TOTALS:	Electronic Devices	0:00:00
21 TOTALS:	Food Related	1:16:48
21 TOTALS:	Managing Health	0:06:10
21 TOTALS:	Indoor	1:56:36
21 TOTALS:	Outdoor	0:06:00
21 TOTALS:	Deliberate Exercise	1:13:08
21 TOTALS:	Driving	0:00:00
21 TOTALS:	Shopping	0:00:00
21 TOTALS:	Sleeping	0:00:00
21 TOTALS:	Watching Tv	0:00:00

Figure 84: Participant 21 Total Activity Duration Table

22 TOTALS:	Socializing	0:20:09
22 TOTALS:	Electronic Devices	1:32:56
22 TOTALS:	Food Related	1:36:44
22 TOTALS:	Managing Health	0:04:40
22 TOTALS:	Indoor	1:41:06
22 TOTALS:	Outdoor	0:00:00
22 TOTALS:	Deliberate Exercise	0:00:00
22 TOTALS:	Driving	0:00:00
22 TOTALS:	Shopping	0:00:00
22 TOTALS:	Sleeping	0:29:18
22 TOTALS:	Watching Tv	0:17:00

Figure 85: Participant 22 Total Activity Duration Table

23 TOTALS:	Socializing	0:00:00
23 TOTALS:	Electronic Devices	0:51:39
23 TOTALS:	Food Related	1:02:28
23 TOTALS:	Managing Health	0:00:00
23 TOTALS:	Indoor	0:08:00
23 TOTALS:	Outdoor	0:35:18
23 TOTALS:	Deliberate Exercise	0:00:00
23 TOTALS:	Driving	0:29:08
23 TOTALS:	Shopping	0:00:00
23 TOTALS:	Sleeping	0:00:00
23 TOTALS:	Watching Tv	0:57:09

Figure 86: Participant 23 Total Activity Duration Table

24 TOTALS:	Socializing	0:01:10
24 TOTALS:	Electronic Devices	0:00:00
24 TOTALS:	Food Related	2:18:44
24 TOTALS:	Managing Health	0:06:50
24 TOTALS:	Indoor	3:17:01
24 TOTALS:	Outdoor	1:08:23
24 TOTALS:	Deliberate Exercise	0:09:20
24 TOTALS:	Driving	0:00:00
24 TOTALS:	Shopping	0:00:00
24 TOTALS:	Sleeping	1:13:38
24 TOTALS:	Watching Tv	0:53:40

Figure 87: Participant 24 Total Activity Duration Table

25 TOTALS:	Socializing	0:00:00
25 TOTALS:	Electronic Devices	1:13:14
25 TOTALS:	Food Related	2:34:20
25 TOTALS:	Managing Health	0:00:00
25 TOTALS:	Indoor	0:39:59
25 TOTALS:	Outdoor	0:00:00
25 TOTALS:	Deliberate Exercise	0:00:00
25 TOTALS:	Driving	0:00:00
25 TOTALS:	Shopping	0:00:00
25 TOTALS:	Sleeping	0:35:04
25 TOTALS:	Watching Tv	0:00:00

Figure 88: Participant 25 Total Activity Duration Table

26 TOTALS:	Socializing	0:00:00
26 TOTALS:	Electronic Devices	2:51:20
26 TOTALS:	Food Related	0:14:49
26 TOTALS:	Managing Health	0:02:40
26 TOTALS:	Indoor	0:22:54
26 TOTALS:	Outdoor	0:02:30
26 TOTALS:	Deliberate Exercise	0:00:00
26 TOTALS:	Driving	0:47:50
26 TOTALS:	Shopping	0:48:08
26 TOTALS:	Sleeping	0:00:00
26 TOTALS:	Watching Tv	0:00:00

Figure 89: Participant 26 Total Activity Duration Table

Legends

Percentage duration spent and time of the day

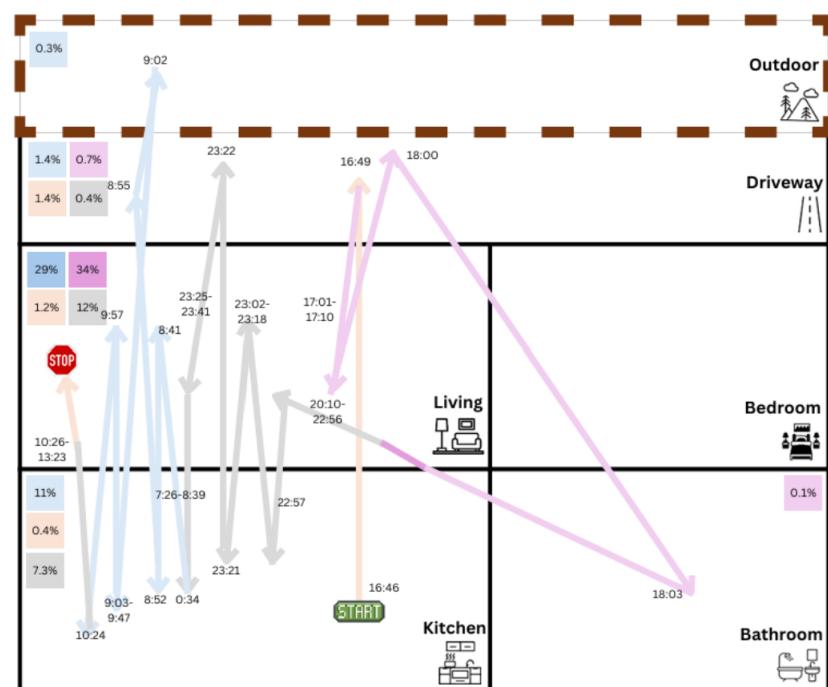
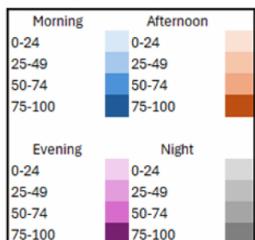


Figure 90: Proposed Visualisation 3 Design

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Git Repository: https://github.com/BenC989/COMP4092_ProjectCode

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