SAPIENZA
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Data Analysis and Visualization of the movements of patients with Fear of Falling

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"When my bird was looking at my computer monitor, i thought 'woah, that bird has no idea what he's looking at'. And yet, what does the bird doo, does he panic? No, he can't really panic, he just does the best he can. Is he able to live in a world where he's so ignorant? Well, he dosen't really have a choice. Yeah, he can kinda live.. usually the bird's okay, even though he dosen't understand the world, and he can kinda learn what's safe and what's dangerous. So uh, that's where I've been living."

- Terry A. Davis

Abstract

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Introduction

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Methodology

3.1 Data collection

3.1.1 Microsoft Kinect

Microsoft Kinect is a line of motion sensing input devices that was first released in 2010. The Kinect sensor consists of a RGB cameras, and infrared projectos and detectors that allow it to measure depth. [1]

3.1.2 Usage

3.2 Data description and processing

In the following sections, we

3.2.1 Filesystem structure

The dataset is structured in a filesystem-like structure, with the root directory being the `Data` directory. The `Data` directory contains two subdirectories, `Patients` and `Questions`. The `Patients` directory contains a subdirectory for each patient, named `Patient-1`, `Patient-2`, etc. Each patient directory contains a subdirectory for each measurement, named `M000`, `M001`, etc. Each measurement directory contains a subdirectory for each recording, named `R000`, `R001`, etc. Each recording directory contains a single file, named `file.csv`, which contains the data for that recording. The `Questions` directory contains a single file, named `Questions.xlsx`, which contains the questions asked to the patients.

In the following example, the patient is named `Patient-1`, which means that the patient ID is `1`. The patient ID is a number between 1 and 7. The dataset contains 7 patients. For simplicity, since all the patients follow the same structure, we will only show the structure of the first patient.

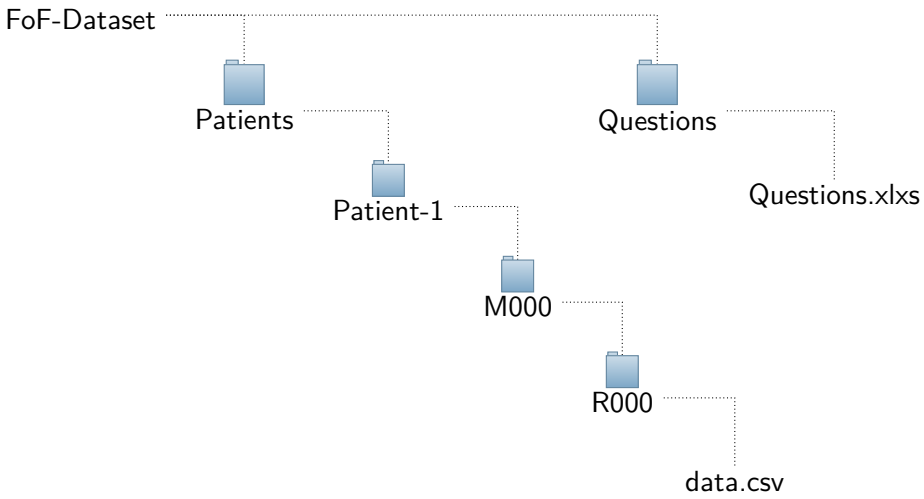

Figure 3.1. Filesystem structure

Participant ID	**Fallers/Non-fallers (5 past years)**	**Number of falls (past 2 years)**	**Was fall accidental?**	**Comments on the falls**	...
Enter participant number	0=NF 1=F	Enter a number if provided. Otherwise, leave blank	0 = No fall 1 = Yes 2 = Not accidental		...
01-300518 (example)	1	1	1	I fell over a kerb. I was in a hurry.	...
...	...	...	...	...	...

Table 3.1. Questions.xlsx file structure example

3.2.2 Patients data

3.2.3 Questions data

3.2.4 Movements description

Each patient is required to perform a total of 9 movements. Each movement can be perfomed once or multiple times depending on the researcher's instructions.

ID	Name	Description
M000	Chair to Chair	Sit on a chair, stand up, walk to another chair, sit down, stand up and walk back to the initial chair and sit down.
M001	Hoop walk	Walk around a hoop.
M002	Cross-reach left	Cross and reach with the left hand.
M003	Cross-reach right	Cross and reach with the right hand.
M004	Right leg stand	Stand on the right leg for an amount of time.
M005	Left leg stand	Stand on the left leg for an amount of time.
M006	Reach forward	Reach forward with one arm.
M007	Reach overhead	Reach overhead with one hand.
M008	Mat walk	Walk over a mat.
M009	Tug walk	TODO.

Table 3.2. Questions.xlsx file structure example

ID is the movement ID that is used in the dataset to identify the movement folder. For example the folder **M000** contains the data for the movement *Chair to Chair*.

Chapter 4

Analysis and Visualization

4.1 TODO

Chapter 5

Discussion

5.1 TODO

Chapter 6

Conclusion

6.1 TODO

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Bibliography

[1] CONTRIBUTORS, W. Title of wikipedia page (Year (if available)). Accessed on Access Date. Available from: `URLofWikipediaPage`.