„Social Interactions of Artificial Ventilated Patients in Intensive Care – an Example of a Monitoring System"

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Short Resume

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Introduction

- Demographic change leads to an increasing number of older people [1]

- Rising probability for the need of care of aging people [1]

- 6.6 out of 100,000 people in Europe are mechanically ventilated at home [1]

- 2.59 million people in need of long-term care were treated outpatient in 2017 in Germany [2]
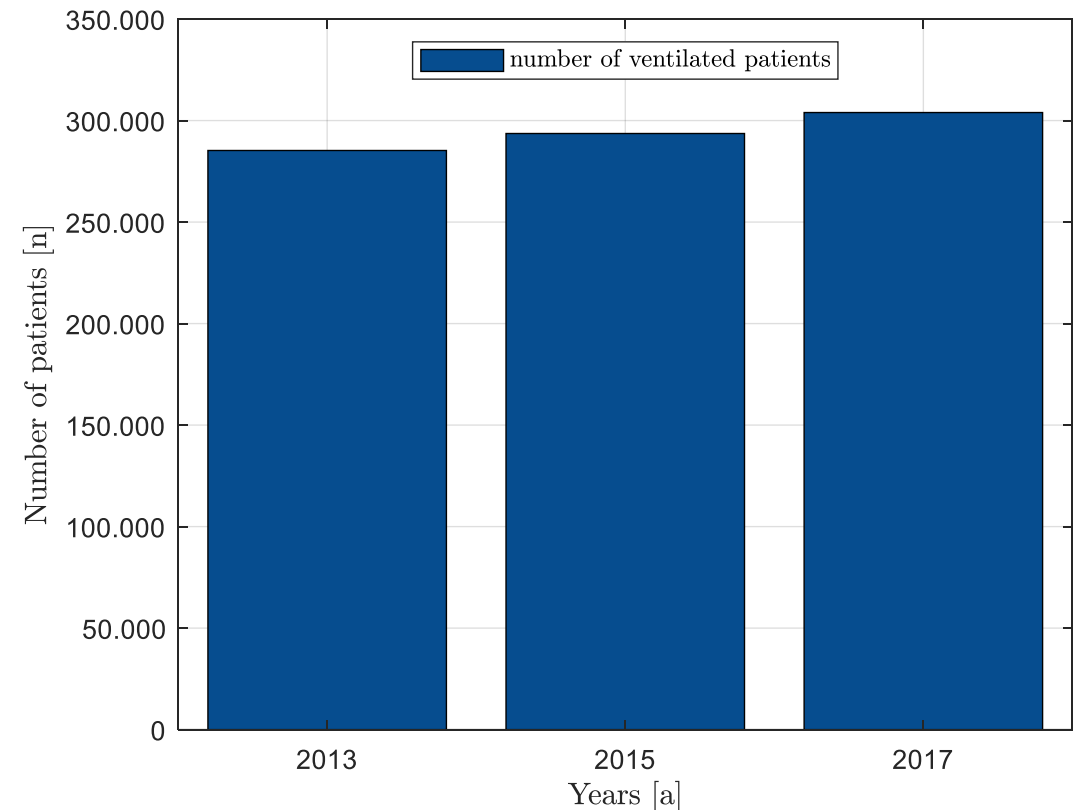
Number of severely handicapped ventilated patients in Germany [3]

Introduction

- Few studies evaluated the quality of life of ventilated patients [4], [5]

- No studies dealt with the social life of the respiratory patients, but with the safety of patients [6], [7]

- Most mechanically ventilated patients spend most of their time in bed [7]

- Connection of social interaction and nursing procedures are described as a strong link [8]

- Uncertainty of the embeddedness of intensively cared patients in the family context [9]

Artificial invasive ventilation via tracheostomy tube [10]

Method - Measurement Setup

- RGB-D sensor: Microsoft Kinect v2

- Pos. 1 during process of suction via tracheostomy tube

- Pos. 1 and 2 during process of tracheostomy tube change
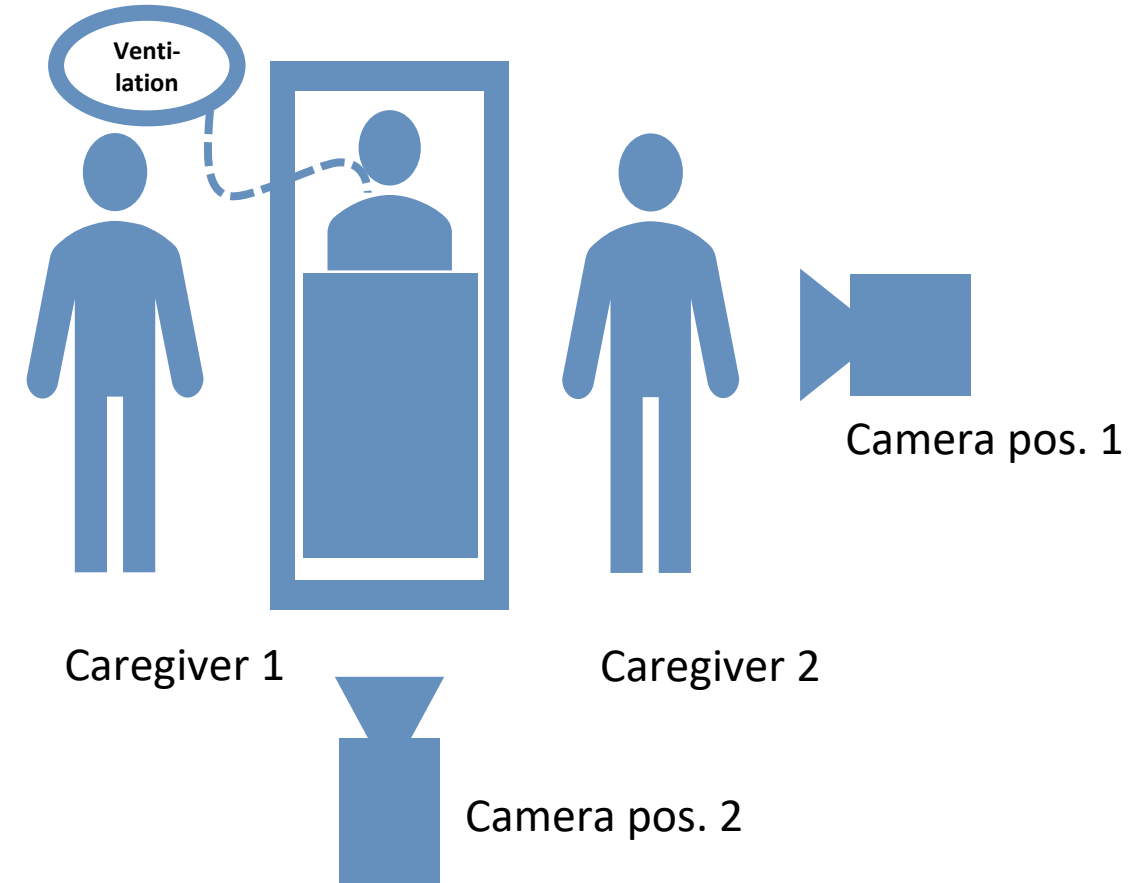
Method - Measurement Setup

- Two professional therapists for artificial ventilation

- Process of suction via a tracheostomy tube and the change of the tracheostomy tube on a training mannequin

- The process of suction via tracheostomy tube was also performed on a proband

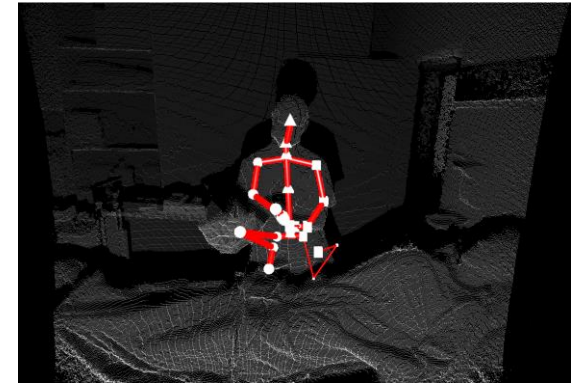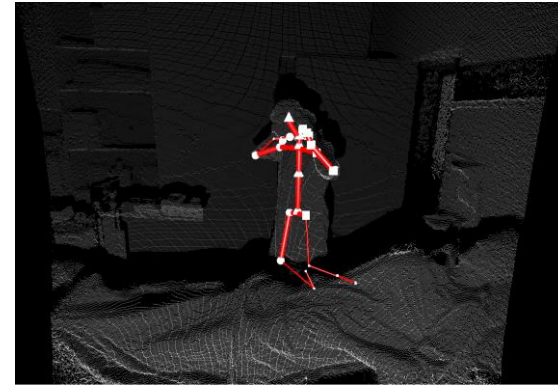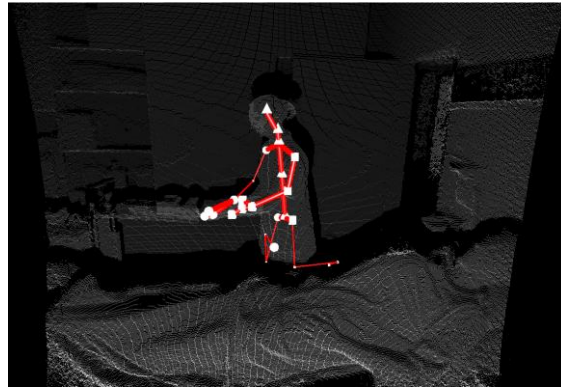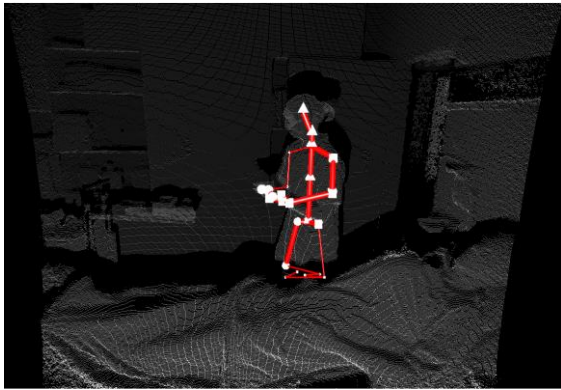| Procedure	RGB-D pos	Subject	Caregivers	Repetitions
Suction	1	Mannequin	1	7
Suction	1	Proband	1	5
Change	2	Mannequin	1 and 2	5

29 min and 45 seconds of data within 17 videos
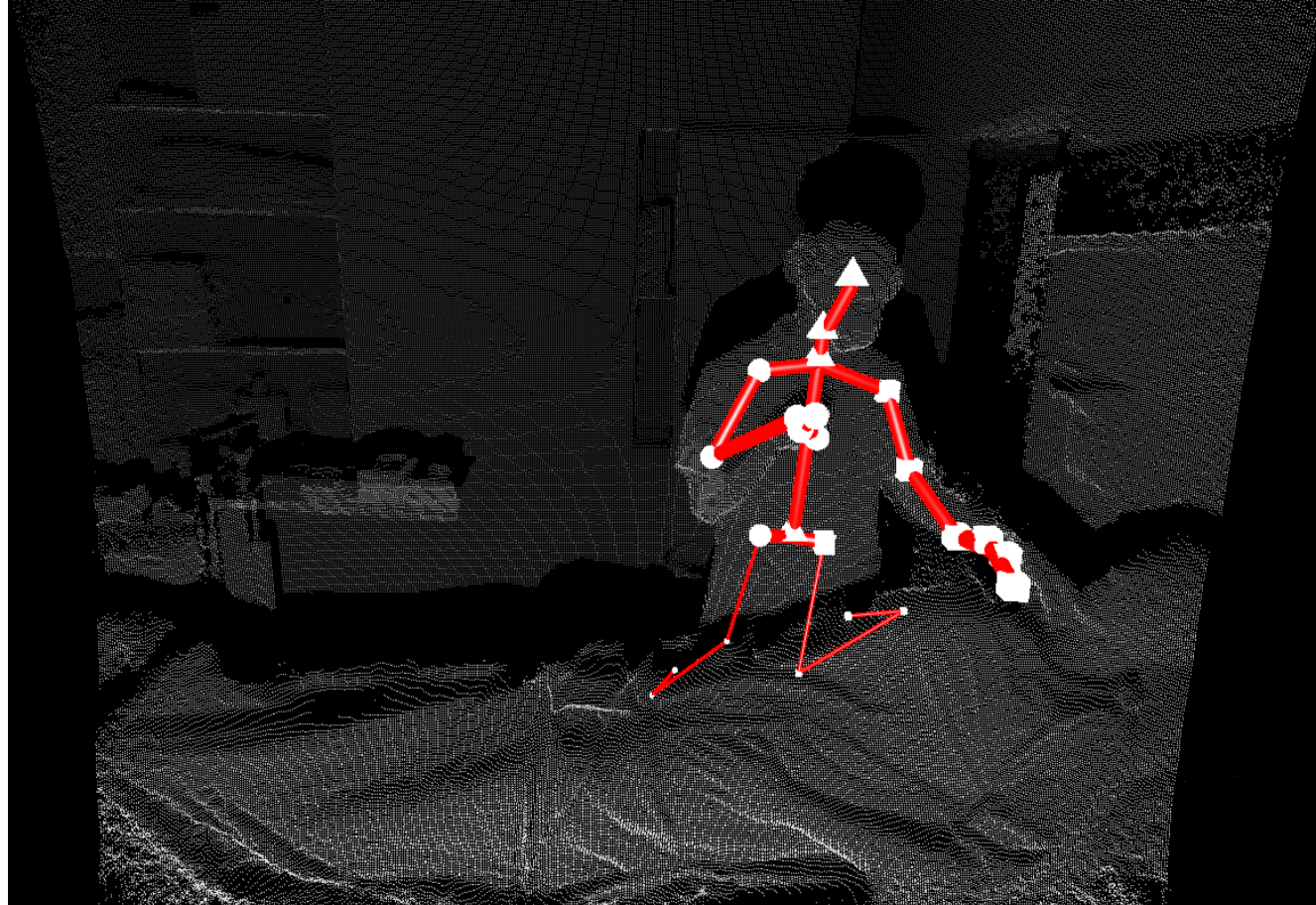
Method - Measurement Setup

- Analyzed regarding:

  - Which patterns represent typical nursing procedures?

  - Which patterns represent social interaction?
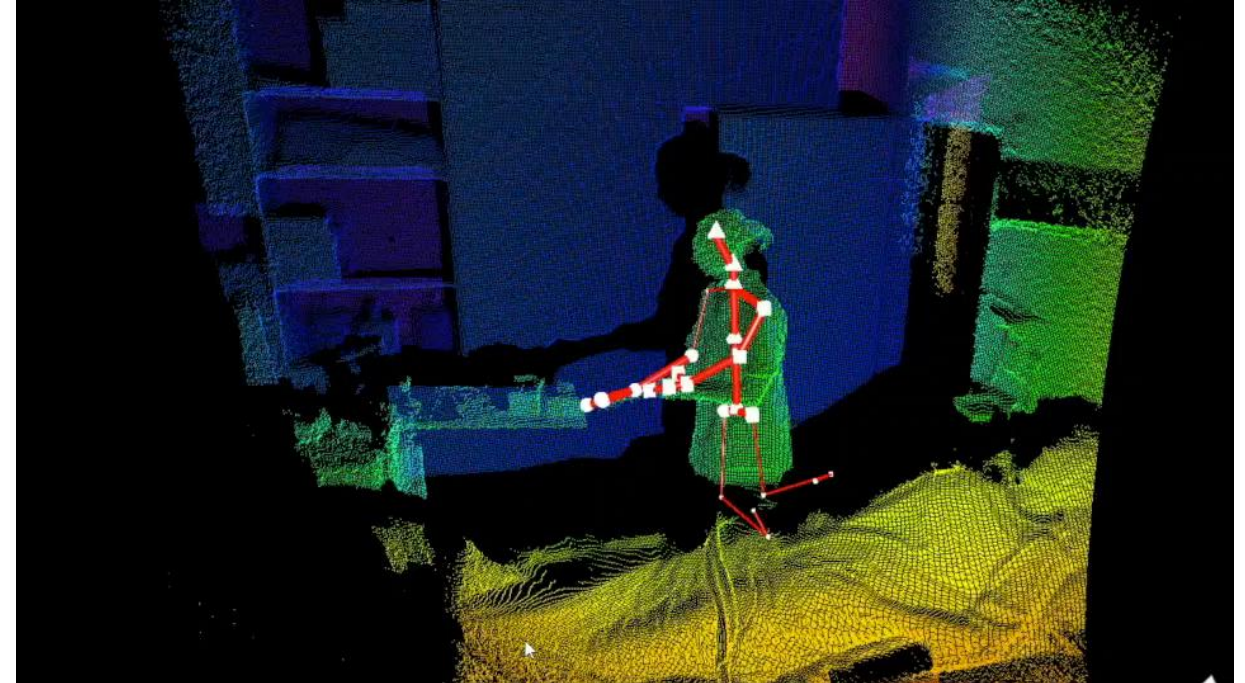
Results – Suction via Tracheostomy Tube
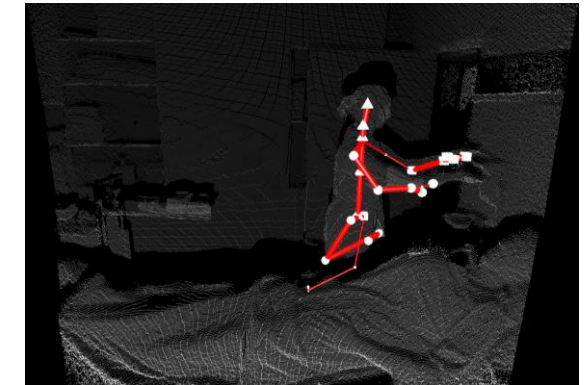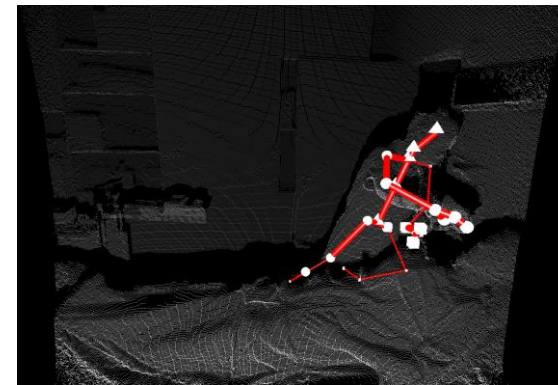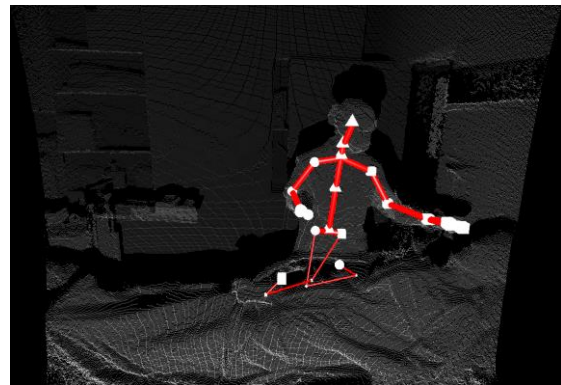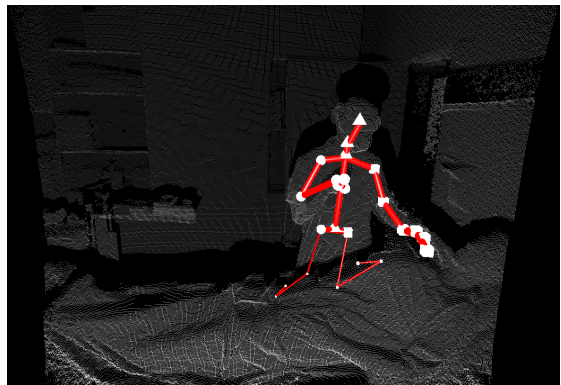
# Example:
Suction via Tracheostomy Tube

Results – Suction via Tracheostomy Tube

- Camera position 1

- Caregiver 1

➢ During hand disinfection caregivers <u>faced</u> the <u>training mannequin</u>, were <u>averted</u> of the <u>proband</u>

➢ Being averted suggest no evidence of social interactions, based on RGB-D data

Type of patient	Orientation		
	Averted	Halfway facing	Facing
Training mannequin	1	1	5
Proband	4	0	1

Results – Tracheostomy Tube Change
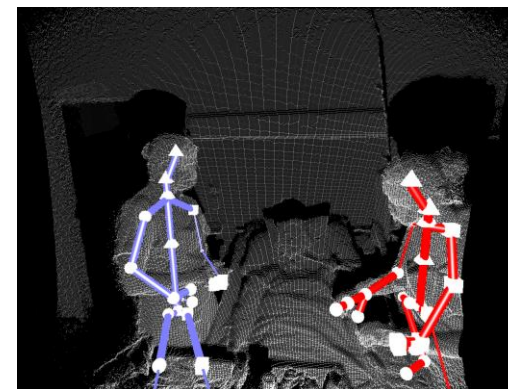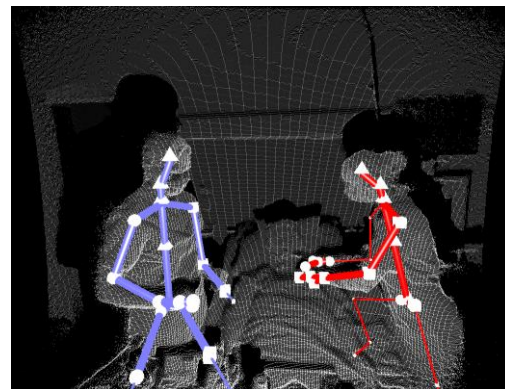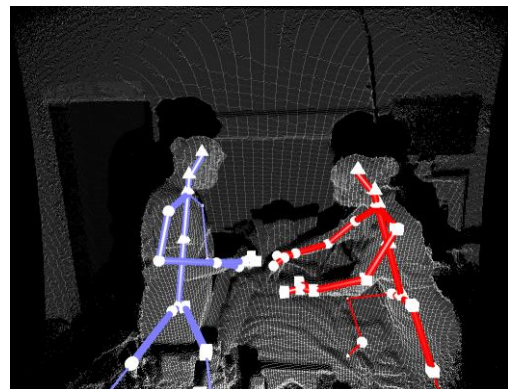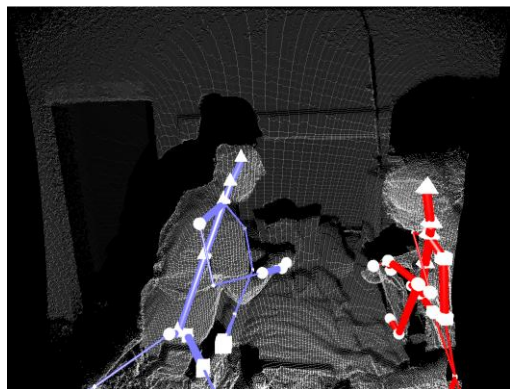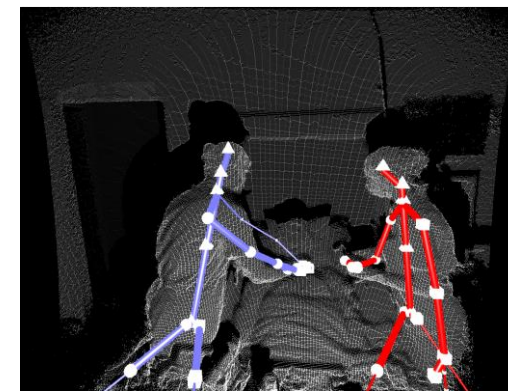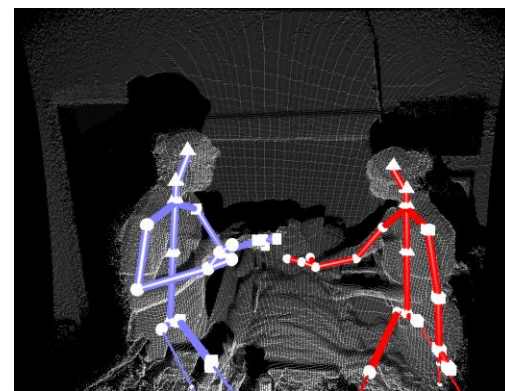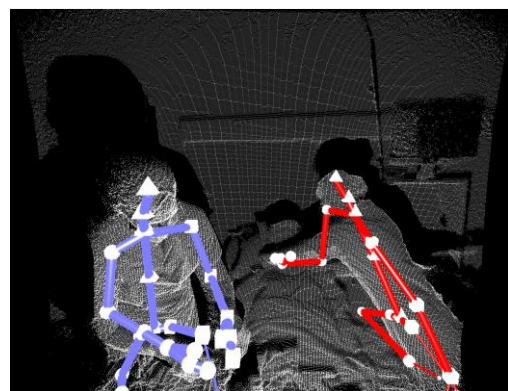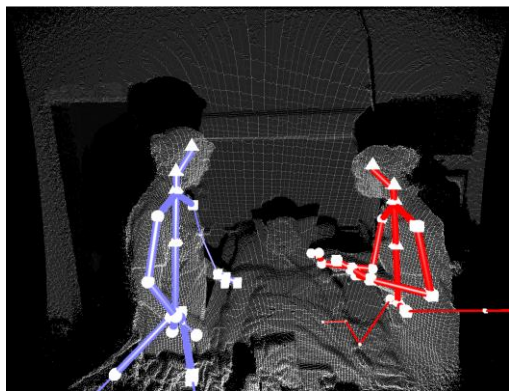
Concept

- *For further observations:*
  - Camera position 2 should be used

  - Real patients should be monitored

  - Sound pressure should be measured

  - Identify possibilities to replace the used RGB-D sensor → IR-array sensor

Concept – Multi Sensor System

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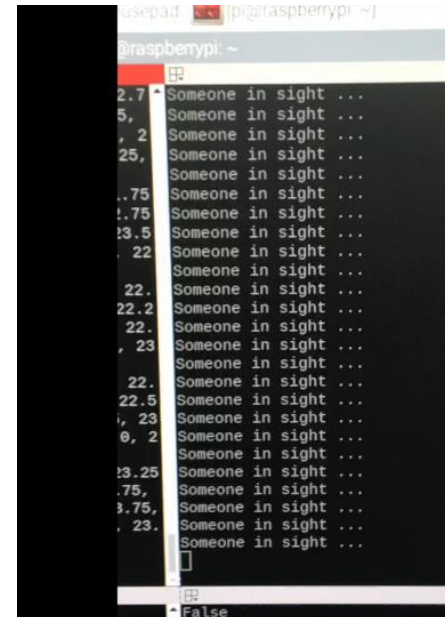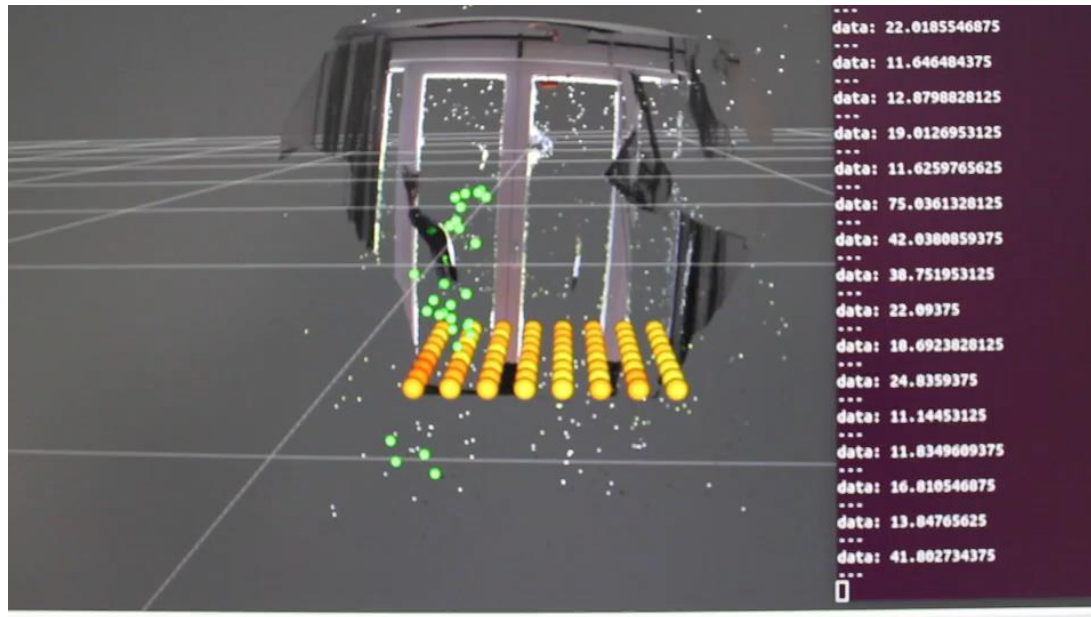
Conclusion
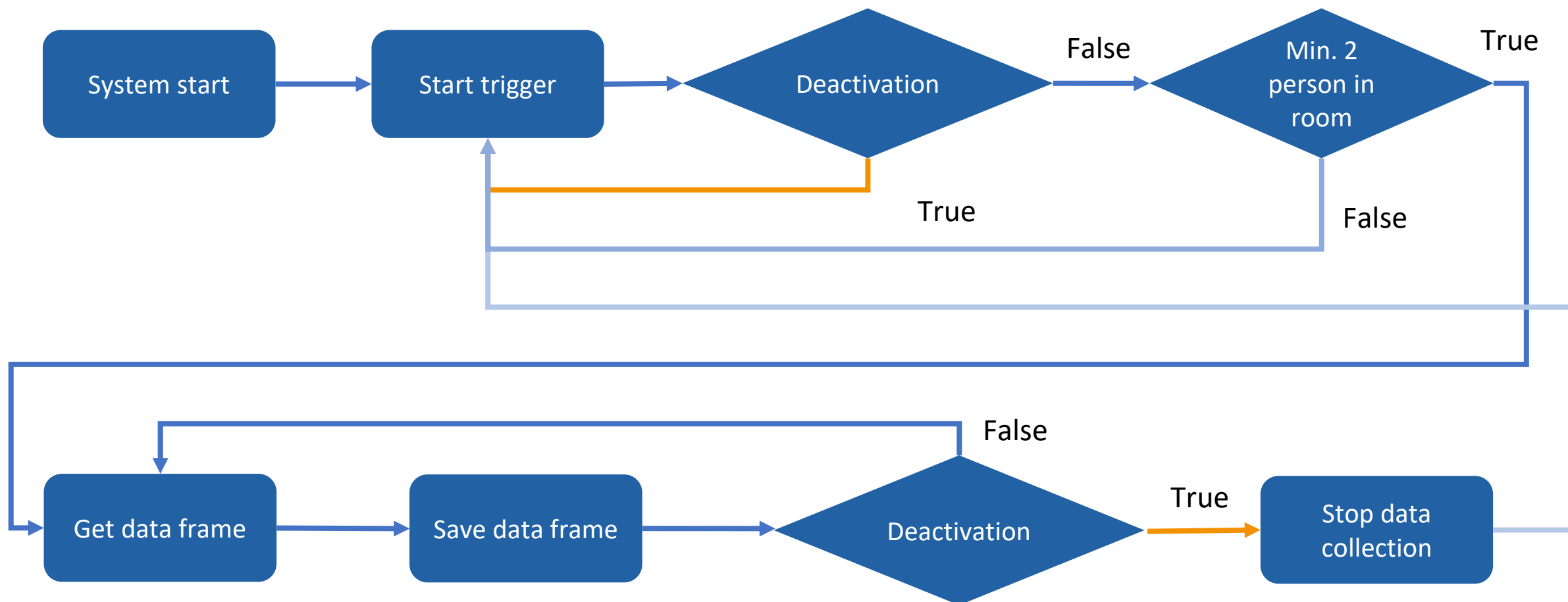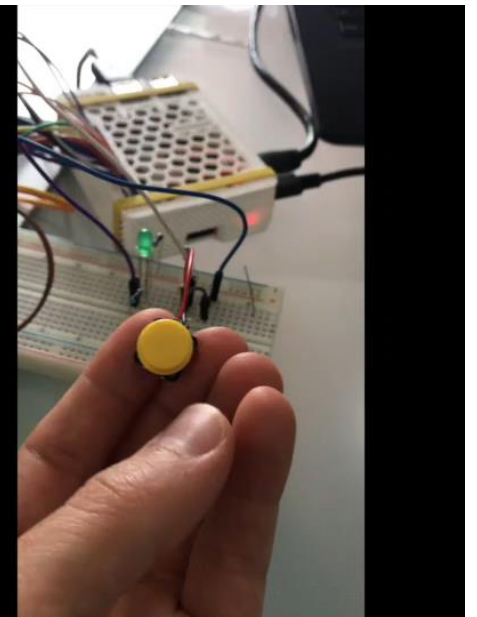
- Demographic change with the increasing number of older people and the higher probability of older people to be in need of care and intensive ambulate care

- Differentiation between handling a training mannequin and a proband

- Novel concept to collect information about social interactions is presented

- Multi sensor system combines RGB-D, IR-array and sound pressure data with the quantity of social interactions in a highly sensitive environment

Reference

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