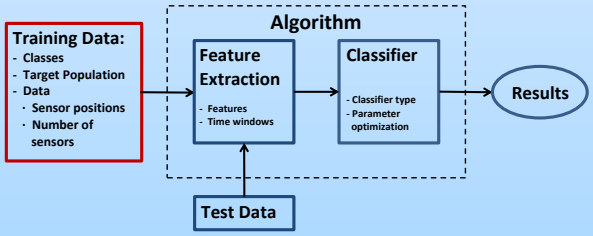
Development and testing of an accelerometer-based positional monitoring system

Sarah Moninger[1], Chandra Throckmorton, PhD[4] , Leighanne Jarvis, BS[1]
Juliessa Pavon, MD, MHS[2, 5], Kevin Caves, ME, ATP, RET[1,2,3]
Duke University
[1]Department of Surgery; Division of Head and Neck Surgery & Communication Sciences
[2]Department of Medicine, [3]Department of Biomedical Engineering
[4]Signal Analysis Solutions
[5]Durham VA Geriatrics (GRECC)

Research Objective

- To collect human data to train a machine learning algorithm to determine body position to help inform care
- To accurately determine laying, reclining, sitting, standing and walking

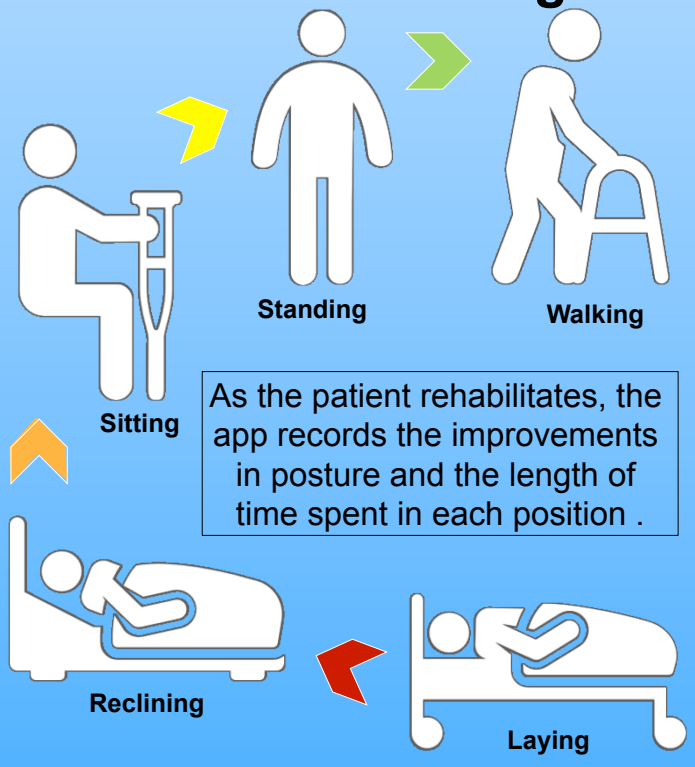


Data Collection & Design

- 15 healthy older adults (55 and older)
- 15 healthy adults (18 – 55 years old)
- Participants wore 2 sensors (Mbient MetaMotionR) on right thigh and right chest under clavicle
- 10 minutes of activity per subject
- Subjects directed through each position, maintaining for 1 minute, twice
- Data was captured remotely by iOS mobile application

MetaMotionR Sensor

Position Tracking



As the patient rehabilitates, the app records the improvements in posture and the length of time spent in each position .

Results of Initial Trials

Geriatric LOSO: 95% correct

Truth \ Response	Laying	Reclining	Sitting	Standing	Walking	
Laying	84.7	14.6	0.7	0	0	[459]
Reclining	3.6	95.1	1.3	0	0	[468]
Sitting	0.2	2.2	96.5	1.1	0	[461]
Standing	0	0	0.2	99.1	0.7	[442]
Walking	0	0	0	0.6	99.4	[475]

Overall accuracy of ML algorithm is 95%

Conclusions

Preliminary studies show data from two worn accelerometers can determine an individual's body position. The algorithm will be used to inform future clinical movement analysis and clinician reporting based on custom trained data.

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For More information or if you have project ideas, contact: leighanne.davis@duke.edu or kevin.caves@duke.edu