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Biomedical Engineering Projects Vacation Experience

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Overview

- Summer Vacation Project
- Vacation Student Experience
- Opportunities with AeHRC

Summer Vacation Project

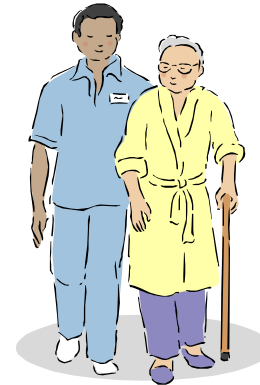
- Background

- Activity Monitoring
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Summer Vacation Project

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 - Daily activity monitoring for older patient (over 65 years) in hospital
 - Single waist-mounted tri-axial accelerometer device
 - Rule-based activity classification algorithm
 - Offline analysis using MATLAB



Summer Vacation Project

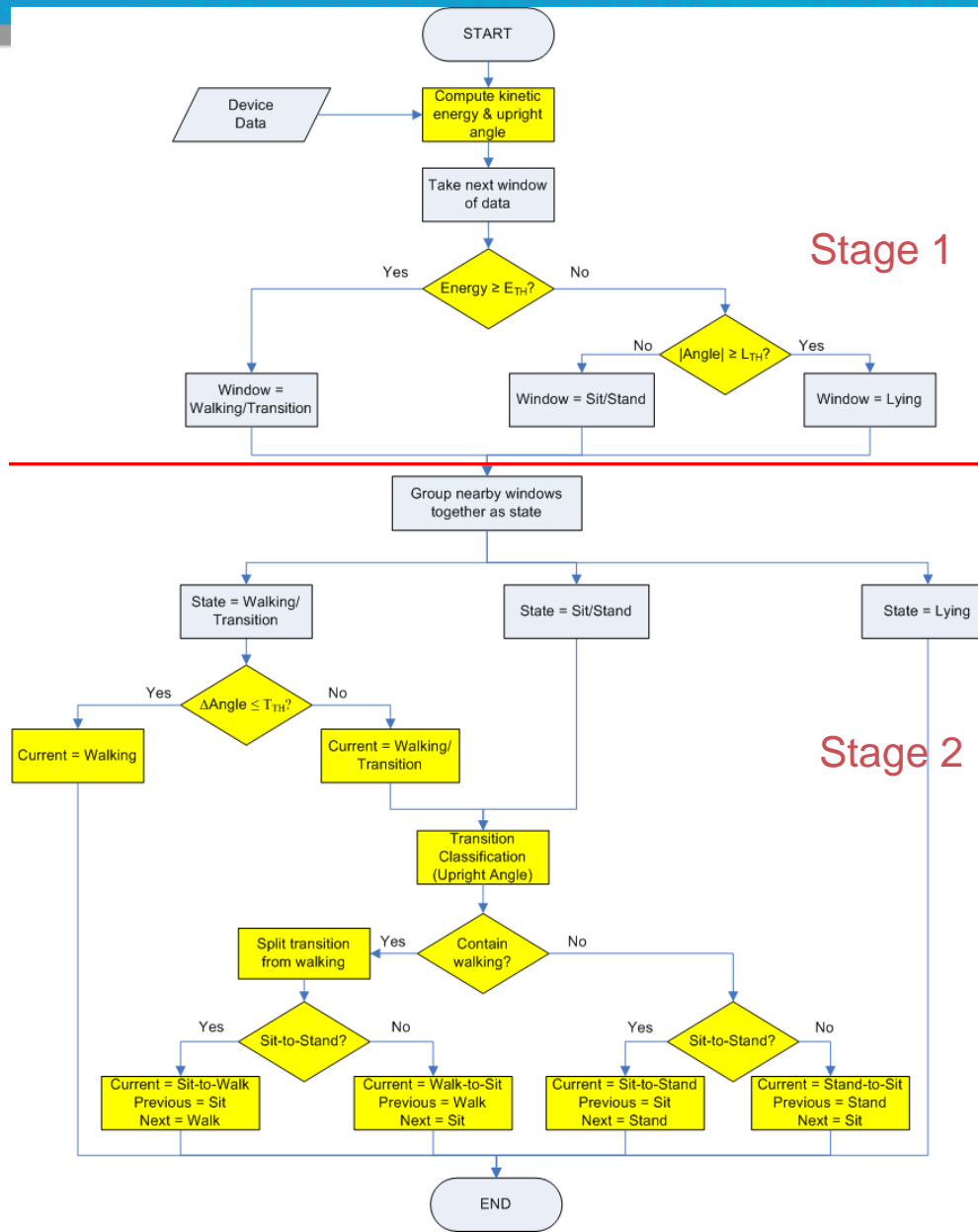
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• Objective

To incorporate physical activity classification algorithm and realize the automatic classification calculation in the mobile phone.

Activity Classification Algorithm – Flowchart



Application Interface on iPhone

Setting

No Service 12:50 PM

Settings

Weight : Kg

Energy Threshold : gJ

Y Angle Threshold : --

Save Clear

Main Report Setting

Display



Classification Result

No Service 3:46 PM

Activity Record

1. sit	21.5 sec
2. lying	25.0 sec
3. lie2sit	2.0 sec
4. sit	22.5 sec
5. sit2stand	2.0 sec
6. stand	20.0 sec
7. walk	33.0 sec
8. stand	21.0 sec
9. walk	29.0 sec
10. walk2sit	5.5 sec
11. sit	21.0 sec
12. sit2stand	1.5 sec
13. stand	22.0 sec
14. stand2sit	3.0 sec
15. sit	21.0 sec

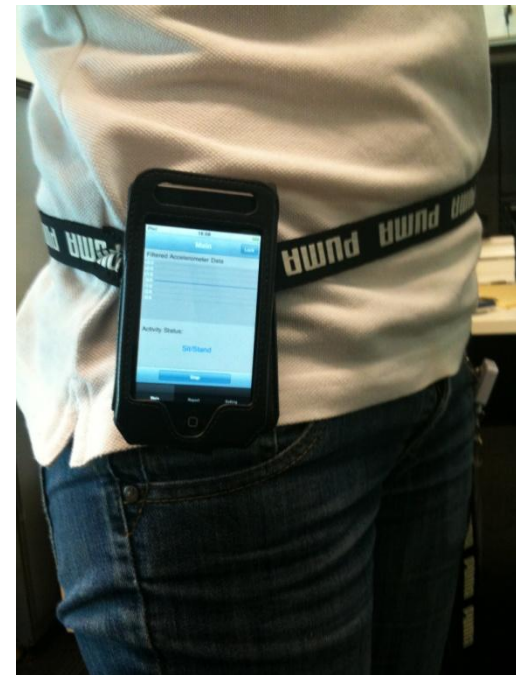
Correct

Main Report Setting

Evaluation

• Trial Design

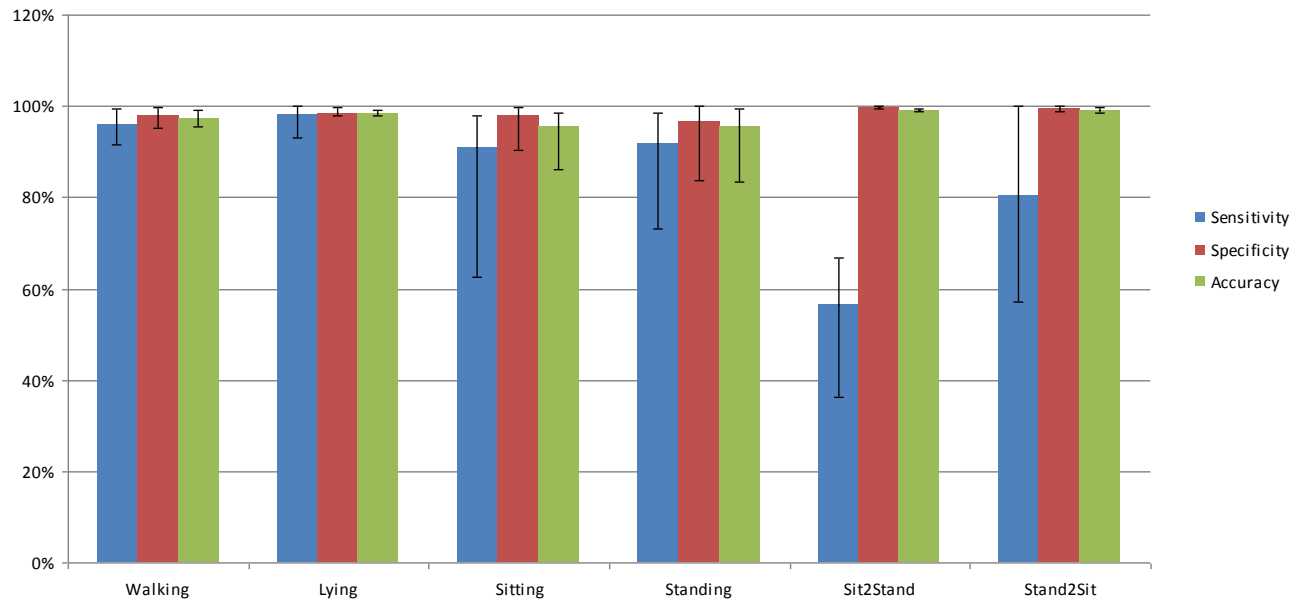
- 8 healthy participants
 - 5 male (age range = 20 - 47)
 - 3 female (age range = 23 - 28)
- Performed a structured activity routine (approx. 6 mins), including:
 - Lying
 - Sitting
 - Standing
 - Walking
 - Transitions
 - sit-to-lie / lie-to-sit
 - sit-to-stand / stand-to-sit
 - sit-to-walk / walk-to-sit
- Direct observation by me recording the start and stop time of each activity



Result (8 subjects)

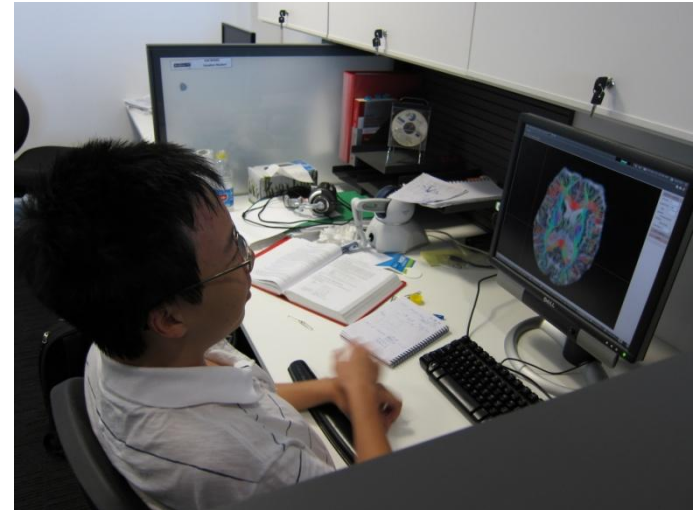
	Time Duration of Each Activity Category					
	Lying	Walking	Sitting	Standing	Sit-to-Stand	Stand-to-Sit
Sensitivity	96.25±3.03%	98.16±2.63%	90.84±12.20%	91.99±9.24%	56.65±11.79%	80.38±15.82%
Specificity	97.87±1.78%	98.69±0.61%	97.95±3.16%	96.58±5.36%	99.71±0.14%	99.45±0.34%
Accuracy	97.43±1.45%	98.63±0.42%	95.45±4.57%	95.56±5.21%	99.21±0.16%	99.22±0.47%

Sensitivity, Specificity, Accuracy for each kind of Activities

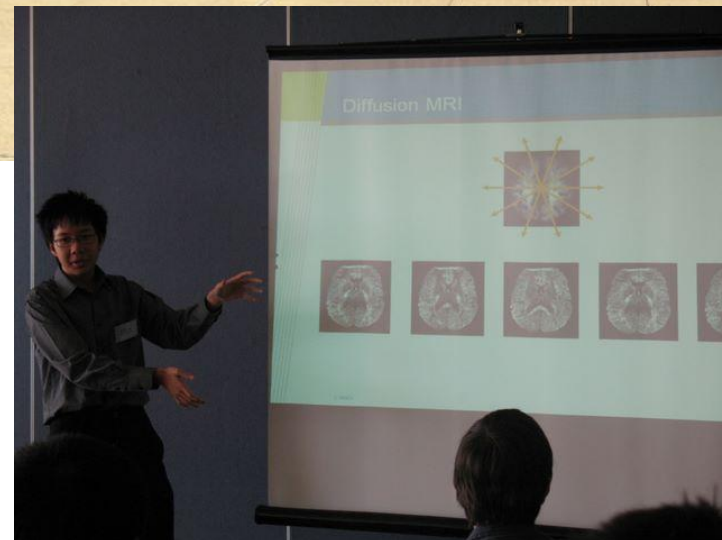


Vacation Student Experience

- Great opportunities
 - Gain valuable research experience
 - Make contacts for the future
 - Earn some money!
- Good work atmosphere
- Various research projects
 - Health Data and Information
 - Biomedical Imaging
 - Telemedicine and Mobile Health



Big Day In : Student Conference



Opportunities with AeHRC

- CSIRO vacation scholarship 2011-2012
 - Application open now!
 - Application close: **31-Aug-2011**
- Honor project
- PhD studentship

PhD Student

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Thank you

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