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
    • Assess the level of physical activity
    • Indicate the degree of functional ability
Summer Vacation Project

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  • Activity Monitoring
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  • Previous Research done by PhD student
    • 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.
Application Interface on iPhone

Setting

Display

Classification Result

Weight: 60 Kg
Energy Threshold: 0.50 gJ
Y Angle Threshold: 36 -- 130

Filtered Accelerometer Data

| Activity Status: | Walking |

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
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)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>Accuracy</th>
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<tbody>
<tr>
<td>Lying</td>
<td>96.25±3.03%</td>
<td>97.87±1.78%</td>
<td>97.43±1.45%</td>
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<tr>
<td>Walking</td>
<td>98.16±2.63%</td>
<td>98.69±0.61%</td>
<td>98.63±0.42%</td>
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<tr>
<td>Sitting</td>
<td>90.84±12.20%</td>
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<td>Standing</td>
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<td>96.58±5.36%</td>
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<tr>
<td>Sit-to-Stand</td>
<td>56.65±11.79%</td>
<td>99.71±0.14%</td>
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<td>Stand-to-Sit</td>
<td>80.38±15.82%</td>
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Time Duration of Each Activity Category

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Sensitivity, Specitivity, 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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