Introduction

- Continuous monitoring of blood pressure not only provides immediate physiological parameters for patient care and monitoring, but also reveals health risks that might eventually lead to hypertension or arteriosclerosis.
- Measurements using brachial cuff can only be obtained intermittently. Measurements using finger cuff is not suitable for long-term use. Measurements using an invasive arterial catheter expose patients to infection risks.
- Photoplethysmography (PPG) has been considered as a method to estimate blood pressure.
- We designed a model using multiple PPG-derived features to estimate systolic blood pressure (SBP) for healthy people during physical exercise.

Materials and Methods

- N = 19 healthy subjects doing 30-minute cycling exercise
- We initialized the model for each subject at rest.
- We derived 18 features (including 4 proposed features), combined these features using linear regression and quantified their contribution by means of normalized weights.
- We evaluated model performance using leave one subject out cross validation (LOSOVC).

Results

Table 1 Model performance

<table>
<thead>
<tr>
<th>Feature</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bias</td>
<td>-0.04 mmHg</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>14.07 mmHg</td>
</tr>
<tr>
<td>Median intra-subject correlation coefficient</td>
<td>0.85</td>
</tr>
</tbody>
</table>

Conclusions

- The estimated SBP had high correlations with the measured SBP, while the RMSE still warrants further attention.
- The features we proposed such as dp\textsubscript{mean} and sp\textsubscript{var} played important roles as indicated by the larger normalized weights.