# Ambulatory Activities of Individuals with Lower Limb Amputation

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## Objective

Ambulatory individuals walk straight, turn right and left, ascend and descend stairs, and ascend and descend ramps, but the distribution of steps is unknown

## Methods

- A portable instrument to record leg motions was mounted on or inside the prosthesis
- Participants walked a course in a hospital to both train and validate a machine learning algorithm
- Participants were then free to do their usual activities while data was collected over 1-2 days

## Results

97.5% overall classification accuracy of machine learning algorithm

- 82.8% of all steps were straight
- 9.0% were turning
- 3.6% on ramps
- 4.8% on stairs

CLiMB
Center for Limb Loss and MoBility


Participants

- All provided informed consent
- N=10 male, mass: 86.2±3.6 kg, height: 1.80±0.03 m, age: 48.7±17.0 years, etiology: 8 trauma, 2 diabetes

| Activity Classification | Steps (Mean±SD) | Percentage of total steps |
|---|---|---|
| Straight | 3671 ± 1756 | 82.8% |
| Turn right | 191 ± 111 | 4.3% |
| Turn left | 197 ± 97 | 4.7% |
| Stair up | 97 ± 50 | 2.3% |
| Stair down | 113 ± 72 | 2.5% |
| Ramp up | 68 ± 32 | 1.6% |
| Ramp down | 87 ± 52 | 2.0% |
| **Total** | **4422 ± 2095** | **100%** |
| Turn prosthetic leg inside | 184 ± 97 | 4.1% |
| Turn intact leg inside | 203 ± 109 | 4.8% |

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