Wrist and Tibia/Shoe Mounted IMU Measurement Results for Gait Analysis

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Abstract

This document describes a dataset of measurement results collected using wrist, tibia and shoe mounted inertial sensors. The main purpose of the dataset was to test signal translation algorithms converting signals registered using the wrist-worn sensor e.g. a smartwatch to signals which would be measured with a shoe or tibia - mounted device. The dataset includes tri-axial acceleration and angular velocity registered during several walks.

Index Terms

IMU, gait analysis, neural networks

I. INTRODUCTION

This dataset contains tri-axial acceleration and angular velocity registered during several walks with IMUs worn on a wrist, tibia and mounted on a shoe. The sensor used in the study included one Bosch Sensortec BMI270 Inertial Measurement Unit and gathered data with 50 Hz frequency.

II. FILES

The dataset consists of files corresponding to several walks and Jupyter Notebooks for basic data handling. During each of the walks a different combination of sensors was used. The wrist sensor was always worn, whether the tibia or shoe data were not always available. The details are presented in Table I.

TABLE I
DATASET FILES AND SENSOR AVAILABILITY

file	wrist	tibia	shoe
test1	x	x	x
test2	x	x	
test3	x		x
test4	x		x
test5	x	x	x

III. Measurements description

The exact placement of the sensors and the orientation of IMU axes are presented in Fig. 1.
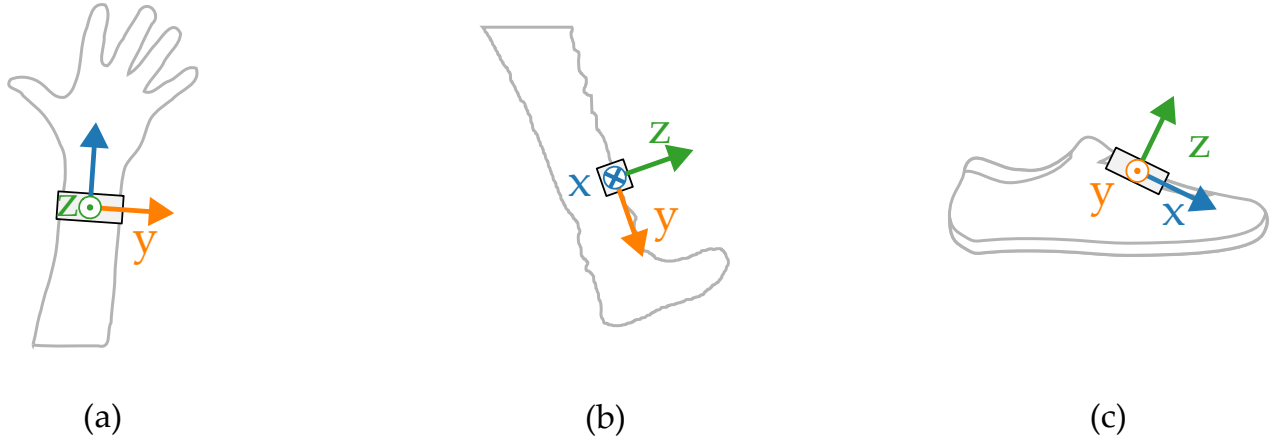

Fig. 1. Sensor placement and orientation of IMU axes on (a) a wrist, (b) tibia, (c) shoe.

IV. Licence and attribution

The dataset is licensed under *Creative Commons Attribution 4.0 International* licence. The actual citation data can be found in the metadata on Zenodo or Readme file on Github.