

The HAR-PMD Dataset

Human Activity Recognition for Pedestrians with Mobility Disabilities

Note: This dataset is available for non-commercial, academic research, and scientific purposes only. All subjects have agreed to the usage of recorded data for scientific purposes. If you want to refer to this dataset in a publication, please use the reference below: [AUTHOR NAMES: REMOVED FOR ANONYMOUS REVIEW](#). 2023. Human Activity Recognition for Pedestrians with Mobility Disabilities. In Proc. ACM Interact. Mob. Wearable Ubiquitous Technol. 0, 0, Article 00 (000 2023), 00 pages.

1 HAR-PMD DATASET

HAR-PMD dataset consists of smartphone and smartwatch sensor data from six pedestrian activities for people with mobility difficulties: still, walking, crutches, walker, manual wheelchairs, and electric wheelchairs. Sixty participants collected smartphone data, and sixty additional participants collected both smartphone and smartwatch data. Each activity was conducted in both indoor and outdoor environments. Thirteen smartphone sensors and five smartwatch sensors were collected. As a result, the dataset consists of 14,400 minutes of data from 120 participants.

For detailed descriptions of activities, environments, sensors, positions, data collection application, and data collection procedure, see Chapter 3 in the paper.

2 DATA FORMAT

2.1 Data Organization

The dataset consists of 120 folders. Each folder contains metadata, smartphone, and smartwatch data if collected. Smartphone and smartwatch data are stored in comma-separated values (CSV) format files.

2.1.1 Metadata

- <user_id>/device.txt – smartphone model of the participant
- <user_id>/os_version.txt – Android OS version of the smartphone

2.1.2 Smartphone

- <user_id>/<device>/<userid>_<activity>_<device>_<environment>_<position>.csv – collected smartphone sensor data
 - <user_id>: 1 – 120
 - <device>: phone
 - <activity>: still, walking, crutches, walker, manual (manual wheelchair), or electric (electric wheelchair)
 - <environment>: indoor or outdoor
 - <position>: hand, pocket, bag, or others

2.1.3 Smartwatch

- <user_id>/<device>/<userid>_<activity>_<device>_<environment>.csv – collected smartwatch sensor data
 - <userid>: 61 – 120
 - <device>: watch

- <activity>: still, walking, crutches, walker, manual (manual wheelchair), or electric (electric wheelchair)
- <environment>: indoor or outdoor

2.2 Data files

2.2.1 Smartphone sensor data

Table 2 describes each column in a smartphone sensor data CSV file. For more detailed descriptions, see Android Developers Sensors Documents¹.

Table 2: Smartphone sensor data description for each column

Columns	Description (unit)
Time	Timestamp (s)
LAccX	Acceleration force excluding gravity along the x-axis (m/s ²)
LAccY	Acceleration force excluding gravity along the y-axis (m/s ²)
LAccZ	Acceleration force excluding gravity along the z-axis (m/s ²)
GyrX	Rate of rotation around the x axis (rad/s)
GyrY	Rate of rotation around the y axis (rad/s)
GyrZ	Rate of rotation around the z axis (rad/s)
MagX	Geomagnetic field strength along the x-axis (μT)
MagY	Geomagnetic field strength along the y-axis (μT)
MagZ	Geomagnetic field strength along the z-axis (μT)
GraX	Force of gravity in the x-axis (m/s ²)
GraY	Force of gravity in the y-axis (m/s ²)
GraZ	Force of gravity in the z-axis (m/s ²)
AccX	Acceleration force including gravity along the x-axis (m/s ²)
AccY	Acceleration force including gravity along the y-axis (m/s ²)
AccZ	Acceleration force including gravity along the z-axis (m/s ²)
Ori_Azimuth	Angle around the z-axis (rad)
Ori_Pitch	Angle around the x-axis (rad)
Ori_Roll	Angle around the y-axis (rad)
RotVec_0	Rotation vector component along the x-axis (unitless)
RotVec_1	Rotation vector component along the y-axis (unitless)
RotVec_2	Rotation vector component along the z-axis (unitless)
RotVec_3	Scalar component of the rotation vector (unitless)
Game_RotVec_0	Rotation vector without using geomagnetic filed component along the x-axis (unitless)
Game_RotVec_1	Rotation vector without using geomagnetic filed component along the y-axis (unitless)
Game_RotVec_2	Rotation vector without using geomagnetic filed component along the z-axis (unitless)
Game_RotVec_3	Scalar component without using geomagnetic filed of the rotation vector (unitless)
Pressure	Ambient air pressure (hPa)
Height	Altitude (m)
Light	Illuminance (lx)
Step	Number of steps (steps)
Proxi	Proximity (cm)

¹ https://developer.android.com/guide/topics/sensors/sensors_overview

2.2.2 Smartwatch sensor data

Table 3 describes each column in a smartwatch sensor data CSV file. For more detailed descriptions, see [Android Developers Sensors Documents](#) .

Table 3: Smartwatch sensor data description for each column

Columns	Data (unit)
Time	Timestamp (s)
LAccX	Acceleration force excluding gravity along the x-axis (m/s ²)
LAccY	Acceleration force excluding gravity along the y-axis (m/s ²)
LAccZ	Acceleration force excluding gravity along the z-axis (m/s ²)
GyrX	Rate of rotation around the x axis (rad/s)
GyrY	Rate of rotation around the y axis (rad/s)
GyrZ	Rate of rotation around the z axis (rad/s)
MagX	Geomagnetic field strength along the x-axis (μT)
MagY	Geomagnetic field strength along the y-axis (μT)
MagZ	Geomagnetic field strength along the z-axis (μT)
GraX	Force of gravity in the x-axis (m/s ²)
GraY	Force of gravity in the y-axis (m/s ²)
GraZ	Force of gravity in the z-axis (m/s ²)
AccX	Acceleration force including gravity along the x-axis (m/s ²)
AccY	Acceleration force including gravity along the y-axis (m/s ²)
AccZ	Acceleration force including gravity along the z-axis (m/s ²)