mmWave-3DPCHM-1.0：A 3D Point Cloud Dataset for Human Actions Using Millimeter-Wave Radar_User Guide

This dataset is a 3D point cloud dataset of human actions collected using millimeter-wave radar (referred to as mmWave-3DPCHM-1.0). It includes point cloud data obtained through processing by two types of millimeter-wave radar sensors. The two data collection devices used are TI's IWR1443-ISK and Vayyar's vBlu RF imaging module. The dataset comprises raw point cloud data from the millimeter-wave radar, preprocessed point cloud data, point cloud processing code, and images and videos of various predefined actions.

The data collection setting is a conference room, as shown in Figure 1. The data collection process involved using a computer, a stand, and millimeter-wave radar, as illustrated in Figure 2. The radar was mounted on a wall at a height of 1.75 meters above the ground. Volunteers performed specified actions within a rectangular area. The horizontal distance from the radar to this rectangular area was 1.2 meters, and the dimensions of the area were 2 meters in length and width, as depicted in Figure 3.Seven volunteers participated in the dataset collection, performing 12 types of human actions, including 3 static actions (falling, sitting still, and standing) and 9 dynamic actions (punching, jumping, waving left hand, leaning forward to the left, opening arms, waving right hand, leaning forward to the right, squatting, and walking). Three sets of data were collected for each action, with each set lasting 3 minutes. During data collection, the volunteers continuously performed the specified actions. The data is saved in Excel files, with the specific format shown in Figure 4.To facilitate researchers' use, we applied preprocessing steps such as multi-frame fusion and clustering to the data collected by TI's millimeter-wave radar. The processing code and results are stored in the corresponding folders, as detailed in Table 1.

Citation format:

[1]靳标, 孙康圣, 吴昊, 等. 基于毫米波雷达三维点云的人体动作识别数据集与方法[J]. 雷达学报(中英文), 2025, 14(1): 73–89. doi: 10.12000/JR24195

JIN Biao, SUN Kangsheng, WU Hao, et al. 3D point cloud from millimeter-wave radar for human action recognition: dataset and method[J]. Journal of Radars, 2025, 14(1): 73–89. doi: 10.12000/JR24195

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Figure 1: Testing Scenario

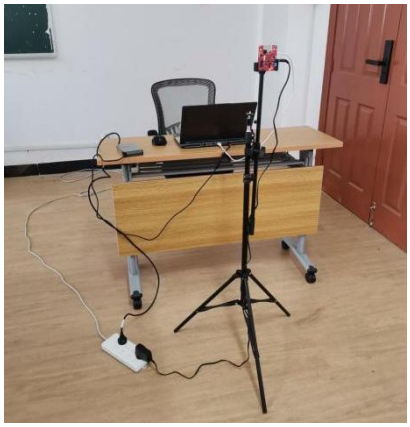

Figure 2: Testing Equipment

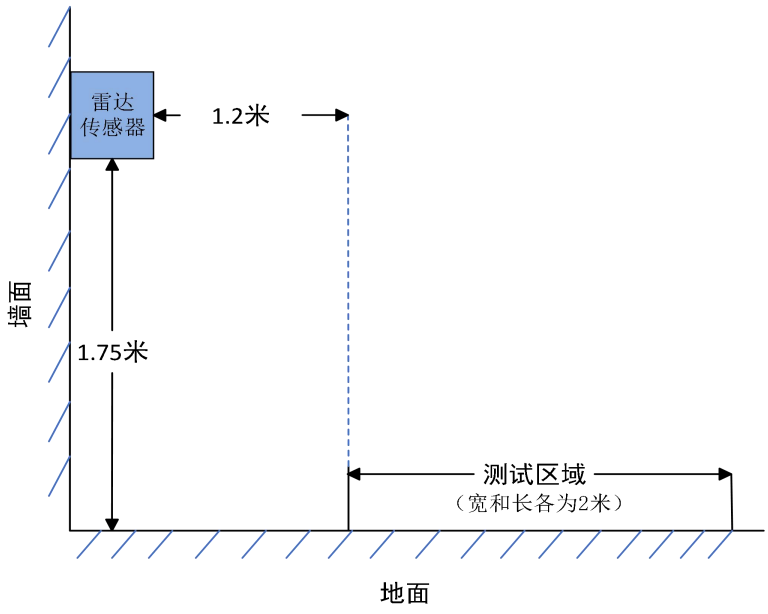

Figure 3: Activity Range of Participants

frame	point num	x	y	z	intensity
0	0	2.951172	-1.32227	2.080078	18.92095
0	1	2.75	0.943359	1.673828	21.17271
1	0	2.951172	-1.32227	2.082031	19.0309
1	1	0.636719	0.460938	0.943359	10.79181
2	0	2.951172	-1.32227	2.080078	18.92095
3	0	2.957031	-1.32227	2.072266	18.86491
4	0	2.927734	-1.32227	2.113281	18.92095
5	0	0.613281	0.460938	0.958984	10.41393
6	0	2.927734	-1.32227	2.113281	18.92095
7	0	2.972656	-1.32227	2.048828	19.08485
8	0	2.990234	-1.32227	2.023438	19.0309
9	0	0.601563	0.966797	0.123047	13.22219
10	0	0.558594	0.460938	0.990234	11.13943
10	1	2.972656	-1.32227	2.048828	18.97627
11	0	2.929688	-1.32227	2.111328	19.0309
12	0	0	0	0	0
13	0	2.951172	-1.32227	2.082031	19.0309
14	0	2.962891	-1.32227	2.0625	19.0309

Figure 4: Data Format

Table 1: Data Usage Instructions

Filename	Subfolder	File Description
TI Radar Dataset	Raw Point Cloud Dataset	Raw point cloud data from TI radar
	Static Point Cloud Removal (No Fusion Clustering)	Removal of static interference from TI radar raw point cloud data
	Static Point Cloud Removal + Fusion Clustering	Removal of static interference from TI radar raw point cloud data, followed by fusion clustering
Vayyar Radar Dataset	Raw Point Cloud Dataset	Raw point cloud data from Vayyar radar
	Static Point Cloud Removal (No Fusion Clustering)	Removal of static interference from Vayyar radar raw point cloud data
Dataset Introduction	Scene, Action Images, and Videos	Images and videos of human actions
	Dataset Usage Instructions	Instructions on how to use the dataset
Preprocessing Code	Matlab Data Processing Code	Relevant processing code