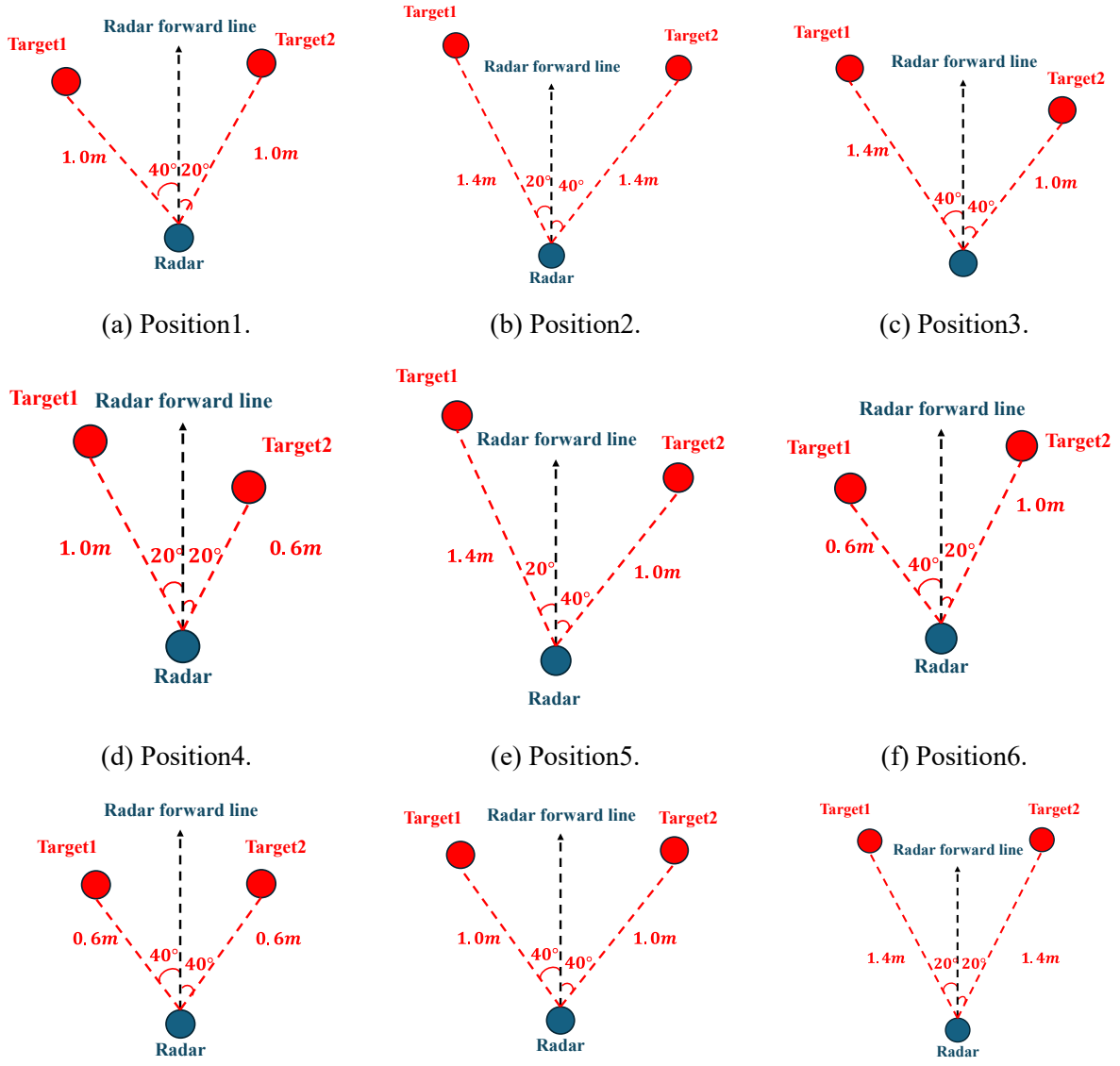
The proposed dataset captures dual-subject respiration and heartbeat data using a 60GHz FMCW radar (TI's IWR6843ISK radar board and the DCA1000EVM real-time data acquisition board [1][2]) , with the data stored in .bin format. To provide validation data, the human subjects were equipped with an electrocardiogram (ECG) front-end during the radar monitoring [3][4], enabling the collection of actual respiration and heartbeat waveforms in .csv format. These validation data can be processed to derive the true number of respirations and heartbeats during the radar monitoring, facilitating the verification of the accuracy of various radar-based vital sign monitoring algorithms. The proposed dataset serves as a valuable resource for research in FMCW radar applications, including human localization, signal separation, and vital signs monitoring, supporting the development of more advanced and accurate algorithms.



(a) Position1. (b) Position2. (c) Position3.

(d) Position4. (e) Position5. (f) Position6.

(g) Position7. (h) Position8. (i) Position9.

Figure 1 Different positional parameter settings.

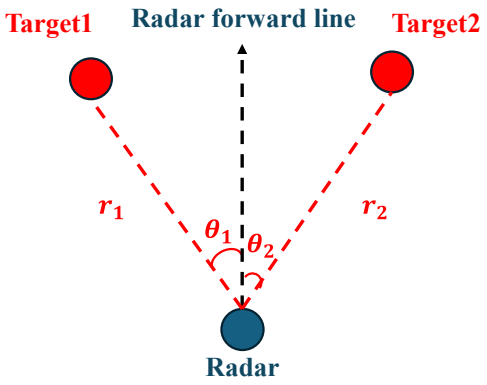


Figure 2 Description of positional parameters

Table 1 The parameters of different positions.

Position Index	θ_1	θ_2	r_1	r_2
Position1	40°	20°	1.0m	1.0m
Position2	20°	40°	1.4m	1.4m
Position3	40°	40°	1.4m	1.0m
Position4	20°	20°	1.0m	0.6m
Position5	20°	40°	1.4m	1.0m
Position6	40°	20°	0.6m	1.0m
Position7	40°	40°	0.6m	0.6m
Position8	40°	40°	1.0m	1.0m
Position9	20°	20°	1.4m	1.4m

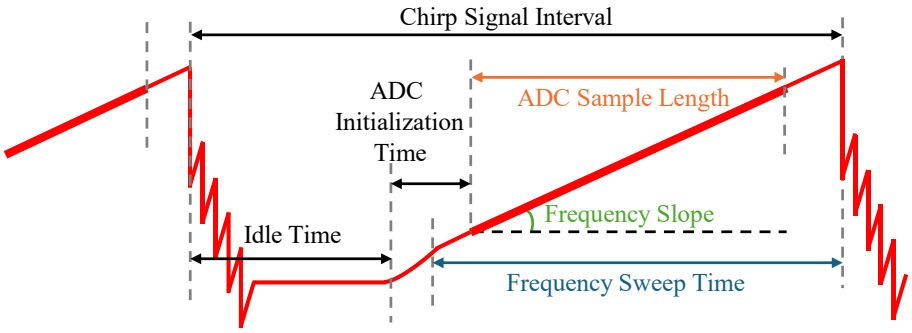


Figure 3 Chirp signal model and parameters for FMCW radar.

The ADC Sample Length represents the number of ADC sampling points. Thus, with a fixed ADC Sample Length and ADC Sampling Rate, the sampling duration is also fixed. Adjusting the Frequency Slope allows for the modification of the radar's modulation bandwidth. The radar parameters for this dataset are configured as shown in Table 2.

Table 2 The parameter setting of the radar.

Parameter	Value
Start frequency/GHz	60
Pulse duration/μs	57
ADC Sample rate/ksps	4000
ADC Samples	200
Frame period/ms	50
Number of frames	1200
Chirp number per frame	1

The Frequency Slope (MHz/μs) of the radar was set to 60, 50, and 40, corresponding to radar modulation bandwidths of 3GHz, 2.5GHz, and 2GHz, respectively. The radar data files are named as “adc_#GHZ_position#_ (#).bin”, where “#GHZ” represents “3GHz”, “2_5GHz”, or “2GHz”, and for each position and bandwidth, six tests were conducted. Therefore, the final file name ends with “_(#).bin”, where “#” ranges from 1 to 6, representing the sequence number of the test. The distribution framework of the radar data is as shown in Figure 7.

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