

Frequency Modulation Continuous Wave Radar Human Fall Detection Based on Time-Varying Range-Doppler Features

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Abstract : The existing two-dimensional micro-Doppler features extraction ignores the correlation information between the spatial and temporal dimension features. For the range-Doppler map, the time dimension is introduced, and a frequency modulation continuous wave (FMCW) radar human fall detection algorithm based on time-varying range-Doppler features is proposed. Firstly, the range-Doppler sequence maps are generated from the echo signals of the continuous motion of the human body collected by the radar. Then the three-dimensional data cube composed of multiple frames of range-Doppler maps is input into the three-dimensional Convolutional Neural Network (3D CNN). The spatial and temporal features of time-varying range-Doppler are extracted by the convolution layer and pool layer at the same time. Finally, the extracted spatial and temporal features are input into the fully connected layer for classification. The experimental results show that the proposed fall detection algorithm has a detection accuracy of 95.66%.

Keywords : FMCW radar, fall detection, 3D CNN, time-varying range-doppler features

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