

## Pilot-free Image Transmission System of Joint Source Channel Based on Multi-Level Semantic Information

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**Abstract :** In semantic communication, the existing joint Source Channel coding (JSCC) wireless communication system without pilot has unstable transmission performance and can not effectively capture the global information and location information of images. In this paper, a pilot-free image transmission system of joint source channel based on multi-level semantic information (Multi-level JSCC) is proposed. The transmitter of the system is composed of two networks. The feature extraction network is used to extract the high-level semantic features of the image, compress the information transmitted by the image, and improve the bandwidth utilization. Feature retention network is used to preserve low-level semantic features and image details to improve communication quality. The receiver also is composed of two networks. The received high-level semantic features are fused with the low-level semantic features after feature enhancement network in the same dimension, and then the image dimension is restored through feature recovery network, and the image location information is effectively used for image reconstruction. This paper verifies that the proposed multi-level JSCC algorithm can effectively transmit and recover image information in both AWGN channel and Rayleigh fading channel, and the peak signal-to-noise ratio (PSNR) is improved by 1~2dB compared with other algorithms under the same simulation conditions.

**Keywords :** deep learning, JSCC, pilot-free picture transmission, multilevel semantic information, robustness

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