学术探讨

基于BP神经网络的蜂窝无线定位算法

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摘要　　为了解决最小二乘法需要测量数据的先验信息来构造协方差矩阵的问题，提出了基于BP神经网络的蜂窝无线定位算法。该算法融合了移动基站提供的AOA、TOA和TDOA测量值来实现移动台的定位，利用神经网络较快的学习特性和逼近任意非线性映射的能力，使其适用于复杂的多径环境。同时充分利用了定位的冗余和互补信息有效地减小了非视距传播的影响。对基于BP神经网络的定位系统性能进行了仿真，结果表明，基于BP网络的蜂窝无线定位算法消除了定位模糊和基站非理想分布对定位精度的影响，在复杂的多径环境下能够有效地提高定位精度。

关键词　　最小二乘法　蜂窝系统　神经网络　非视距传播

分类号

Cellular localization algorithm based on BP neural network

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Abstract

  In order to solve the problem how to construct covariance matrix that used prescient information of measurement data in least-square-method，a cellular localization algorithm based on the BP neural network is proposed.The measurement of AOA，TOA and TDOA provided by mobile base station is fused to locate mobile.The fast study and non-linear approach capacity of the neural network is made use of to apply in complicated multipath environment.At the same time，the location redundancy and complementary information is full used to mitigate the effect of Non-Line-Of-Sight（NLOS）propagation.The location performance of BP neural network is simulated.The simulation results indicate that the uncertainty of location and the effect of bad basement position is avoided while the cellular localization algorithm based on the BP neural network is used.It's location accuracy is significantly improved under complicated multipath environment.

Key words　 least-square-method　 cellular system　 neural network　 Non-Line-Of-Sight（NLOS）

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