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传感网络及应用专刊

无线 *Ad hoc* 网络和传感网络中基于位置的、可靠的无信标传输路由方法

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摘要
Existing position-based routing algorithms, where packets are forwarded in the geographic direction of the destination, normally require that the forwarding node should know the positions of all neighbors in its transmission range. This information on direct neighbors is gained by observing beacon messages that each node sends out periodically. Several beaconless greedy routing schemes have been proposed recently. However, none of the existing beaconless schemes guarantee the delivery of packets. Moreover, they incur communication overhead by sending excessive control messages or by broadcasting data packets. In this paper, we describe how existing localized position based routing schemes that guarantee delivery can be made beaconless, while preserving the same routes. In our guaranteed delivery beaconless routing scheme, the next hop is selected through the use of control RTS/CTS messages and biased timeouts. In greedy mode, the neighbor closest to destination responds first. In recovery mode, nodes closer to the source will select shorter timeouts, so that other neighbors, overhearing CTS packets, can eliminate their own CTS packets if they realize that their link to the source is not part of Gabriel graph. Nodes also cancel their packets after receiving data message sent by source to the selected neighbor. We analyze the behavior of our scheme on our simulation environment assuming ideal MAC, following GOAFR+ and GFG routing schemes. Our results demonstrate low communication overhead in addition to guaranteed delivery.

关键词 Beaconless routing geometric routing guaranteed delivery sensor networks
分类号

Beaconless Position-based Routing with Guaranteed Delivery for Wireless *Ad hoc* and Sensor Networks

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Abstract
Existing position-based routing algorithms, where packets are forwarded in the geographic direction of the destination, normally require that the forwarding node should know the positions of all neighbors in its transmission range. This information on direct neighbors is gained by observing beacon messages that each node sends out periodically. Several beaconless greedy routing schemes have been proposed recently. However, none of the existing beaconless schemes guarantee the delivery of packets. Moreover, they incur communication overhead by sending excessive control messages or by broadcasting data packets. In this paper, we describe how existing localized position based routing schemes that guarantee delivery can be made beaconless, while preserving the same routes. In our guaranteed delivery beaconless routing scheme, the next hop is selected through the use of control RTS/CTS messages and biased timeouts. In greedy mode, the neighbor closest to destination responds first. In recovery mode, nodes closer to the source will select shorter timeouts, so that other neighbors, overhearing CTS packets, can eliminate their own CTS packets if they realize that their link to the source is not part of Gabriel graph. Nodes also cancel their packets after receiving data message sent by source to the selected neighbor. We analyze the behavior of our scheme on our simulation environment assuming ideal MAC, following GOAFR+ and GFG routing schemes. Our results demonstrate low communication overhead in addition to guaranteed delivery.

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