Flexible Localization Method with Motion Estimation for Underwater Wireless Sensor Networks

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Abstract— **Due to the challenging conditions of underwater environments, such as node mobility and large-scale networks, achieving localization in large-scale mobile underwater sensor networks (UWSN) is a difficult task. This paper introduces a scheme known as the Flexible Localization Method with Mobility Estimation (FLMME) for UWSNs by utilizing the expected mobility patterns of underwater objects. FLMME performs localization hierarchically by splitting the process into anchor and ordinary node localization. Each node estimates its next mobility pattern based on previous location information, enabling estimates about its next location. Anchor nodes, holding known locations, manage the localization process to balance accuracy and error trade-offs. Extensive simulations demonstrate that FLMME reduces localization errors and hence increases localization accuracy.**

Keywords— **Underwater Wireless Sensor Networks (UWSN), Localization, Movement Estimation, Tracking, Sensor Deployment**

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