

Reliable and energy efficient routing protocol (REEP) for underwater wireless sensor networks (UWSNs)

ABSTRACT

In this paper we focus on routing's issues in UWSN and propose an adaptive and lifetime aware routing protocol, REEP (Reliable and Energy Efficient Protocol). Research on acoustic channel has conducted from decades but that focused mostly on issues related to physical layer such as high latency, low bandwidth and high bit error. However, research on routing layer in UWSN is still in its infant stage and in need of a standard operational protocol. Due to unique nature of acoustic communication we cannot directly implement protocols defined for terrestrial sensor network or MANET. However, different researchers put their efforts to define a standard operational protocol for UWSN but most of these protocols follow OSI layer structure, which were proposed for wired Network and does not suit well acoustic environment. Our proposed routing protocol uses generic MAC protocol and aims to improve network lifetime by evenly distributing residual energy of nodes and by finding most suitable and economical routing path for data transmission. REEP uses ToA (Time of Arrival) to find node distance to its respective sink and utilizes this information to find best available routing path. We use NS2 based simulator, Aquasim to simulate and compare performance of REEP with a well known pre-existing UWSN routing protocol, DBR (Depth Based Routing). Simulation results show that REEP out-perform DBR by energy efficiency, extending network life time and by reducing end to end delay.

Keyword: Energy efficiency; Reliability; Underwater sensor network; Routing protocol