# SELF-SELECTING RELIABLE PATH ROUTING FOR ALL ENVIRONMENTS USING SENSE WITH VISUALIZATION

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Routing protocols for Wireless Sensor Networks(WSN)face three major performance challenges. The first one is an efficient use of bandwidth that minimizes the transfer delay of packets between nodes to ensure the shortest end-to-end delay for packet transmission from source to destination. The second challenge is the ability to maintain data flow around permanent and transient node or link failures ensuring the maximum delivery rate of packets from source to destination. The final challenge is to efficiently use energy while maximizing delivery rate and minimizing end-to-end delay.

Protocols that establish a permanent route between source and destination, such as Advanced On Demand Vector Routing (AODV), send packets from node to node quickly, but suffer from costly route recalculation in the event of any node or link failures. Protocols that select the next hop at each node on the traversed path, such as GRAdient Broadcast (GRAB), Self Selective Routing (SSR), and Self Healing Routing (SHR), suffer from a delay required to make such selection. This led to Self Selecting Reliable Path Routing (SRP), which attempts to take advantage of both by creating a reliable path.

Even with the use of a reliable path the way in which a protocol repairs routes determines the number of packets lost by each failure and ultimately affects the energy used for communication. This thesis presents a novel family of wireless sensor routing protocols, the Self-Selecting Reliable Path Routing Protocol Family (SSRPF), that address all three of the afore-mentioned challenges. In addition to collaborative work on the SRP protocols, which make up two-thirds of the SSRPF, the specific contributions of the author of this thesis were modifications of the route repair procedure of the protocol and investigation of the impact that the choice of route repair has on the overall performance. These improvements are the basis of the third protocol in the SSRPF, Reliable Path Self-Selecting Protocol (RPSP).