PATH PREFERENCE IN SELF-HEALING ROUTING VERIFIED AND IMPROVED THROUGH VISUALIZATION IN SENSE

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The problem of reliable and efficient routing in wireless sensor networks is an open and formidable one. Wireless nodes use broadcast as their communication primitive, and radio waves as their transmission medium. These add inherent difficulties in the ability to maintain routing within a network. Broadcast adds difficulty due to the fact that there is no one-to-one connection between nodes, and radio communication often leads to unreliable links. This thesis presents a novel routing algorithm entitled Self Selecting Reliable Path Routing (SRP), which was biologically inspired, and provides a robust yet simple solution. SRP makes an attempt to overcome the problems that are a part of routing in a wireless sensor network. SRP seeks to find a balance between dynamic routing protocols such as GRAdient Broadcast (GRAB), Self Selective Routing (SSR), and Self Healing Routing (SHR), and static routing protocols such as Advanced On Demand Vector Routing (AODV).

SRP has grown from other dynamic routing protocols within the family of Self Selecting Routing Protocols, which began with SSR and SHR. SRP has been inspired by the idea of ants using pheromone to mark paths as they search for paths to food sources, and seek to reuse reliable paths once they are established. In much the same way, once SRP discovers a reliable path from source to destination, it will continue to use that path until such time as the path is broken. If the path is broken, SRP is also robust enough dynamically to find an alternate path to the destination without any central control.

Additionally, researchers are continually looking for new ways to look at different problems. In the field of network protocol research, simulations are often used to design, troubleshoot, and improve protocols. Often these simulations result in cryptic textual outputs that require much effort to understand. If a tool existed that could take the cryptic output and convert it into an animation of a network, it would simplify the work of researchers when trying to understand what is happening in a simulation. This tool also would provide assistance in teaching wireless sensor network principles, by making it easier for students to understand what happens in the life of a network. We have discovered just such a tool, entitled iNSpect, and implemented it in conjunction with SENSE, our open source wireless sensor network simulator. The combination of these tools provides researchers with the ability to

visualize the networks that they are simulating, while leveraging the state of the art in both network visualization tools and wireless sensor network simulation.