Self similarity and predictability of contact opportunities in opportunistic networks

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Abstract

Predicting future contact opportunities in opportunistic networks can assist mobile nodes to make intelligent decisions on efficient content forwarding and can greatly improve the message delivery ratio. But predicting future contacts has to depend on the past history of contacts and then naturally a question arises on how valid is the use of past history of contacts for the estimation of future contacts. Recent research studies in complex network analysis have proved that the real complex networks such as opportunistic networks do exhibit self repeating patterns on all length scales. We use statistical estimators to show that the opportunistic network connectivity traces possess the self similarity property and therefore are capable of predicting future contact opportunities using the past history. We incorporate this concept to develop an adaptive, reactive routing protocol for opportunistic networks which can predict the future contact opportunities with certain levels of confidence and we show that the adaptive routing protocol outperforms existing routing algorithms.

Indexed keywords

Adaptive routing protocols; Intelligent decisions; Opportunistic networks; Reactive routing protocol; Repeating patterns; Self similarity properties; Self-similarities; Statistical estimators

Engineering controlled terms: Routing protocols

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