Efficient Photo Crowdsourcing in Delay-tolerant Networks with Evolving POIs

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ABSTRACT:
In a disaster or battlefield zone, rescue workers, soldiers, and other survivors (referred as nodes) may need to survey damages and send images to the command and control center (the server) in a hop by hop fashion in the absence of any communication infrastructure. The server considers some area/landmark as the point of interest (POI) and distributes a request to the nodes to collect more information about them. Nodes take photos of POIs and share them with each other using store and forward paradigm, also called Delay-tolerant Networks (DTNs), to send photos to the server. Due to highly intermittent contact characteristics of nodes in a DTN network and bandwidth and storage limitations, redundant photos need to be removed in this forwarding technique whereas photos that cover different angles and views of targets need to be shared. Another challenge is that, over time, some server-listed POIs may not be of importance, whereas some new POIs might be of more interest. In this work, we proposed a scheme that is able to dynamically update the list of POIs based on the current photo metadata, with reduced consumption of the bandwidth, energy, and the storage at DTN nodes by sending only important photos of POIs. We compare our proposed schemes with another related scheme to show the scalability of our approach, which provides the same level of photo coverage but consumes much less energy and bandwidth than the other scheme.

BIOGRAPHY:
Shudip Datta is a Ph.D. student and a research assistant in the Department of Computer Science at the Missouri University of Science and Technology, Rolla, USA. He received his Bachelors in computer science and engineering from Bangladesh University of Engineering and Technology, Bangladesh. His research interest includes the application of Delay Tolerant Network (DTN), analyzing and designing efficient ways of collecting and forwarding information among the various nodes associated with the network, application of machine learning for optimizing routes in DTN. Besides research experience, he has worked for two years as a software engineer at System Solutions and Development Technology in Bangladesh.