Navigable Overlays for Information Dissemination in Decentralized Online Social Networks
Muhammad Anis Uddin Nasir, Chen Chen, Hariton Efstatiadis, Šarūnas Girdzijauskas
1 KTH Royal Institute of Technology, 2 IBM Research Lab Haifa, 3 University of Cyprus (UCY)

1. Motivation

➢ Privacy and Scalability cause a shift towards decentralized online social networks
➢ Existing solutions do not provide an efficient solution for fixed sized friend-to-friend network
➢ Navigable Overlays can help in efficient dissemination of information

2. Design Goals

➢ Efficient and secure message propagation, i.e., no uninterested nodes should participate in propagation; propagation should involve minimum forwarding nodes
➢ Load balancing in both computation and communication
➢ Fault tolerance with robust churn handling mechanism

3. Approaches

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4. How can we construct a navigable overlay for an existing friend-to-friend network?

(a). Ring like structured overlay, where each node (square box) is assigned an identifier from an identifier space, e.g., [0,1], uniformly at random
(b). Social network embedded on top of the ring, resulting in involvement of many uninterested nodes for information dissemination
(c). What if we remove the randomly assigned identifiers, can we assign the identifier following small world network

5. Problem Formulation

➢ Suppose, we have a G = (V,E), where
  • V is the set of vertices
  • E is the set of edges among those vertices
  • Each v ∈ V has a bounded degree, i.e., d_v ≤ k
➢ The algorithm should disseminate information from a user, to all of its neighbors, using the minimum number of interested nodes

6. Proposed Approach

➢ Initialize by assigning random node identifiers and edge labels
➢ Use gossip based algorithm to create an overlay and reassign node identifiers and edge labels for the purpose of navigability
➢ Leverage the social ties information in order to place strongly connected nodes closer in overlay

7. Applications

➢ Distributed Search
➢ Distributed Storage
➢ Secured Network
➢ Publish/Subscribe
➢ Advertisement

Contact: {anisu, sarunasg}@kth.se, h.efstatiadis@cs.ucy.ac.cy, chenc@il.ibm.com