An Efficient Content Sharing Scheme For Delay-Tolerant Smart Phone Networks

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ABSTRACT:
Some smart phones in the network store content that they are ready to share with others. All Smartphone users are eager to assist and provide a limited amount of their resources such as bandwidth, storage and processing power to aid others. The objective is to permit users to issue queries for content stored on other smart phones wherever in the network and to measure the chances of obtaining the information needed. We take for granted that smart phones can carry out searches on their local storage and we find the applicable results for a given query to make easy searching. Theoretically the content sharing process is considered into two phases the content discovery phase and the content delivery phase. In the content discovery phase a user inputs requirements for content in a content sharing application. In our work we scrutinize a network of smart phones with the deliberation that Smartphone carriers expend most of their time indoors where GPS cannot be accessed. Previous research shows that GPS signal is available for 4.5 percent only of a typical user’s day. Consequently we require to design a system to support location-based services in indoor environments.

INTRODUCTION:
Among the proposed DTN routing protocols Epidemic routing is a basic DTN routing solution. In Epidemic routing messages are presumptuous to every come upon node that does not have a copy of the same message. This solution makes obvious the best performance in terms of delivery rate and latency but it requires plenty resources such as storage, bandwidth and energy. The works which are proposed following Epidemic routing are classified into three categories resource based, opportunity based and prediction based. In the first category systems employ “data mules” as message transmits that directly deliver messages to destinations. Opportunity-based routing protocols use spontaneous and random encounter opportunities to swap over messages. In prediction-based systems complicated usefulness functions are designed using the history of mobility, encounter times and encounter rates. Each node upholds a utility value for every other node and this value has been updated using the time between contacts. A node forwards a message copy only to nodes with a superior utility for the message destination. Prediction-based schemes do better than opportunity-based routing protocols both in terms of delivery ratio and delivery latency.

RELATED WORK:
DTN routing protocols are calculated to bring a message to a given destination while the content sharing method first find out content before delivering it to the destination. This two-step process is demanding due to the lack of central servers. In searching for contents previous works used two approaches flooding and random walk. Most flooding-based systems use a time-to-live (TTL)-based limit to manage the increase of the search queries. By difference search schemes based on chance walks keep away from the massive spread of messages that flooding creates but still attain dependability using probabilistic paths to reach the responder. The state-of-the-art content-searching protocol in DTN was proposed by Pitkanen et al. They mostly focused on preventive search query propagation and proposed a number of query processing methods. In the present paper we focus on the delivery of content while using a geographic search query propagation limit in addition to Pitkanen’s work. Many routing protocols merely oversee the question of gaining location information indoors.

EXISTING METHOD:
We mainly focus on the efficiency of content sharing and we provide propositions on creating significant content. Therefore Delay-Tolerant Network (DTN) routing protocols attain better performance than traditional mobile ad hoc network (MANET) routing protocols. One way to decrease a user’s burden is to depend on an ad hoc method of peer-to-peer content sharing. In this method contents are impulsively discovered and shared. The efficiency of this sharing method depends on the competence of sharing and the significance of the shared contents.

DISADVANTAGES:
Many routing protocols simply supervise the issue of attaining location information indoors. In our work we inspect a network of smart phones with
the consideration that Smartphone carriers spend most of their time indoors where GPS cannot be access. They mostly focused on preventive search query propagation and proposed a number of query processing methods. And not focus on the geographic search query propagation limit.

PROPOSED METHOD:
The goal of our work is to discover the solutions to the content sharing problem in Smartphone-based DTNs. These solutions are the well-organized discovery of contents and their delivery to the proper destinations within a given time. Discover-predict-deliver (DPD) is a competent content sharing scheme for Smartphone-based DTNs. DPD imagines that the communications between smart phones occur in a set of locations where Smartphone carriers stay for a significant duration. It utilizes a hidden Markov model and Viterbi algorithm to predict the future locations of individuals.

ADVANTAGES:
We assess the proposed scheme using simulation tools based on real human movement traces. We authenticate the viability of content sharing with DTN by implementing a sample application on commercial smart phones. We expand a practical place mobility learning system for both outdoors and indoors. Also we mean a mobility prediction algorithm to precisely guess the contact opportunities for Smartphone users.

DEALING OUT OF INCOMING QUERY:

DYNAMIC NEIGHBOR DISCOVERY:
In dynamic neighbour innovation each mobile device can be in one of three modes idle (discoverable) mode, search mode or aggressive search mode. When an application does not have any queries or content to forward the device is in discoverable mode and does not broadcast intervallic hello messages. When an application has a query or content to forward and did not programme encounters by prediction the device periodically searches neighbours according to the given query. In case neighbour devices are not discovered the device continuously augments the discovery interval up to 10 times of the initial discovery interval. Neighbour discovery is a significant task for routing protocols. Particularly in delay-tolerant networking efficient neighbour discovery considerably improves the performance of the routing protocols. Though most protocols authenticated with simulations do not address this issue as these protocols assume that nodes always perceive neighbours with recurrent hello messages. In real implementations frequent hello messages are not adequate due to high energy consumption.

MOVEMENT TRACKING:
The movement detector function of the Activity Manager is essentially a classifier M that has two outputs moving or stationary. When the user is walking, running or moving in a vehicle the motion is classified as moving whereas when the user stays at a certain location the motion is classified as stationary. In Life Map the Activity Manager checks the stepping up vector of a three-axis accelerometer and detects the motion of the user.

MOBILITY LEARNING:
Content sharing is productively performed in places where Smartphone users stay long enough as perceiving the existence of other nodes and message swapping requires several minutes depending on the size of the message the bandwidth and the network interface. Hence we are basically interested in discovering places where the user stays longer than certain duration i.e. meaningful places and the context in user movement. In daily life people typically visit a number of places but not all of these are meaningful for learning people's mobility. Indeed DPD requires the detection of locations where content sharing can be performed.

DISCOVERING AND LEARNING MEANINGFUL PLACES:
In modern society places are usually located in multiple floor buildings. Thus the logical information of significant places has more advantage to the proposed scheme as content sharing is conducted in indoor environments. Currently obtainable location technologies focus on providing geographical information. This information is inadequate to discover meaningful places because the physical location is not precisely generated at the same place in spite of the fact that a user usually has a comparable life pattern every day. In addition this information cannot differentiate a place that has a similar geocode but different floors.
MOBILITY PREDICTION:
As DPD uses location information to approximation if a node approaches the destination of the content or deviate from the destination the prediction of nodes’ mobility information is necessary.

ALGORITHM USED:
Algorithm 2. Mobility Learning
Input: Stride Length $\gamma$, Last Location $L_0$, Meaningful Places $\mathcal{P}$, Path Information $\mathcal{P}$
Output: Learning Meaningful Places and Paths
1. $t_0 \leftarrow $ Time; $s \leftarrow 0$; $\bar{t} \leftarrow 0$;
2. $T_{\text{stationary}} \leftarrow 0$; $T_{\text{moving}} \leftarrow 0$;
3. while true do
4.   $\bar{t} \leftarrow $ get accelerometer readings
5.   if $A(t) \text{ is moving}$ then
6.     if $\bar{t} \geq \mu(\bar{t}_1, \ldots, \bar{t}_i) + \sigma(\bar{t}_2, \ldots, \bar{t}_i)$ then
7.       $s \leftarrow s + 1$; $\tilde{t} \leftarrow \bar{t}$
8.       $T_{\text{moving}} \leftarrow T_{\text{moving}} + (t - t_0)$
9.       $T_{\text{stationary}} \leftarrow 0$; $t_0 \leftarrow t$
10.   end if
11.  if $T_{\text{moving}} \geq \delta$ then
12.     $\mathcal{G}_s \leftarrow $ get GPS readings \{lat, long\}
13.     $t \leftarrow t + \gamma$
14.     if $\mathcal{G}_s \neq \phi$ then
15.       $l \leftarrow \{\mathcal{G}_s, t, \epsilon\}$
16.     else
17.       $l \leftarrow \{t_0 + \epsilon, \epsilon, \epsilon\}$
18.     end if
19.     $\mathcal{P} \leftarrow $ updatePath($p(L_0, l_i)$)
20.   $l_0 \leftarrow l$
21.   end if
22.   else
23.     $t_0 \leftarrow $ Time
24.     $T_{\text{stationary}} \leftarrow T_{\text{stationary}} + (t - t_0)$
25.     if $T_{\text{stationary}} \geq \delta$ then
26.       $\mathcal{G}_s \leftarrow $ get GPS readings \{lat, long\}
27.       $t \leftarrow t + \gamma$
28.       $A \leftarrow $ scan and get WiFi access points
29.       if $\mathcal{G}_s \neq \phi$ then
30.         $l_{\text{new}} \leftarrow \{\mathcal{G}_s, A, \epsilon\}$
31.       else
32.         $l_{\text{new}} \leftarrow \{l_0 + \epsilon, A, \epsilon\}$
33.       end if
34.     for all $L \in \mathcal{L}$ do
35.       if $S(L, l_{\text{new}})$ is true then
36.         $\mathcal{L} \leftarrow $ update(L, $l_{\text{new}}$
37.         goto 41
38.     end if
39.     end for
40. $\mathcal{L} \leftarrow $ addPlace($l_{\text{new}}$
41. $T_{\text{moving}} \leftarrow 0$; $t_0 \leftarrow l_{\text{new}}$; $t_0 \leftarrow t$
42. end if
43. end while

CACHING MECHANISM:
1) Upon receiving a message M, the node tries to forward to every connection. If a connection is established and M is forwarded via that connection, M's source ID, destination ID is cached as a record (entry) in the cache table.
2) That connection's other end node ID is also stored as next hop in the same record. Additionally, that record's flag is set as NULL as this route is not cross checked by a returning message. Therefore, this caches information is not usable yet.
3) How route information is cached when a message is traversed through this concerning node for the first time. For every message M, the corresponding node also checks whether M's destination ID and any cached record's considered as a returning message. In this case, cached record's next hop is set with M's previous hop ID and record's flag is set as OK.
4) It shows this cache table update process when destination node is sending a returning message to the source node. Typically, such returning message can be an acknowledgment message.
5) Upon receiving every message the corresponding node also looks up the cache table to find a match of M’s destination ID and a cached record having same destination ID. If there is a match, this message is considered as a consecutive message.
6) If such match is found and corresponding record's flag is marked as OK, messages M's next hop field is set with the corresponding record's next hop ID. This is possible because previous traversal of message is cached in the cache table as mentioned previously.
7) This cache table based forwarding of M. While a message M is forwarded, the node follows routing protocol use limited flooding by fixing initial number of copies of M.
8) Whenever M is forwarded, this number of copies is divided by 2 - receiver gets half and sender keeps half.
9) So, numbers of copies are decreased if next node is a mobile node. Otherwise, M is forwarded with number of copies value same.

EXPERIMENTAL RESULTS:
The involvement efficiency reveals the definite efficiency of the proposed content sharing mechanism. Sharing efficiency is the proportion of discovered and delivered contents in the total generated queries. In DPD and DPD-Optimal contents are exposed based on two forwarding decisions and then are delivered using utility-based routing. In Epidemic contents are discovered and delivered using Epidemic routing. In Spray and Wait contents are discovered using Epidemic routing but are bring using the Spray and Wait mechanism. The results are comparative to those in the discovery and delivery phases. DPD achieves a sensible sharing efficiency still with a short
query/content lifetime and a few content holders in the network.

CONCLUSION:

We have developed a mobility learning and prediction scheme. This system is created to provide coarse-grained mobility information with a low calculation overhead. When the difficulty of mobility learning and prediction system can be unarded for the schemes mentioned can be used to provide fine-grained mobility information. The performance of our system on Android platform point out that the scheme results only in a 2 percent CPU overhead and decrease the battery lifetime of a Smartphone by 15 percent at most. At last we consider our system still has room for improvement. Especially the use of asymmetric multicore processors and proficient sensor preparation is compulsory to trim down the energy consumption of smart phones’ sensors. More since location is the key constituent of the proposed solution user privacy should be cautiously measured.

REFERENCES: