iTrust with SMS/HTTP

Decentralized Mobile Search and Retrieval Using SMS and HTTP to Support Social Change

a presentation by Isaí Michel Lombera
1 Purpose
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4 Instant messaging examples
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6 Related work and conclusions
Isaí Michel Lombera

Purpose
iTrust heterogeneous network
Distribution of metadata
Distribution of a request

Source of Information

Request Encounters Metadata

Requester of Information
Retrieval of information
iTrust with SMS bridge diagram

cellular network  iTrust with SMS  iTrust over HTTP

SMSC

THREAD 1
SMStools
incoming spool

THREAD 2
PHP parser
extract headers

THREAD 3
search.php
register SMS callback

THREAD 4
query.php
register query

THREAD 5
inbox.php
register match

encounter matching

SMS callback
4 Instant messaging examples

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Isaí Michel Lombera

Instant messaging examples

Tahrir Square
Sent: 11:25 PM

meet near talaat harb street @ 2330.

11:26 PM

Enter message here
iTrust SMS app

Instant messaging examples

Send SMS

Status: waiting to send.

Tahrir Square

Send SMS

Status: waiting to send.

Hit from iTrust node @ +1760689:
meet near talaat harb street @ 2330.
Probability of a match

\[ p = 1 - \left( \frac{n - mx}{n} \frac{n - 1 - mx}{n - 1} \cdots \frac{n - r + 1 - mx}{n - r + 1} \right) \]

\( p \)  probability of an encounter occurring (match or hit)
\( n \)  number of participating nodes
\( m \)  number of nodes to which metadata is distributed
\( r \)  number of nodes to which requests are distributed
\( x \)  proportion of operating nodes
Probability of a match emulation vs. analysis

- 250 Node Network with 100% of the Nodes Operational
- 250 Node Network with 60% of the Nodes Operational
Mean messages for a match

\[
p(k) = \frac{(mx \frac{mx-1}{k-1} \ldots \frac{mx-k+1}{1}) \left(\frac{n-mx}{r-k} \frac{n-mx-1}{r-k-1} \ldots \frac{n-mx-r+k+1}{1}\right)}{\left(\frac{n}{r} \frac{n-1}{r-1} \ldots \frac{n-r+1}{1}\right)}
\]

- \(p(k)\) probability of \(k\) matches
- \(k\) number of matches (\(k\) reporting matches)
- \(n\) number of participating nodes
- \(m\) number of nodes to which metadata is distributed
- \(r\) number of nodes to which requests are distributed
- \(x\) proportion of operating nodes

\[
y = 2 + r + \sum_{k=1}^{\min\{mx,r\}} kp(k)
\]

- \(y\) mean number of messages for a match
Mean messages for a match emulation vs. analysis
Related work

- gnutella
- OneSwarm: Privacy preserving peer-to-peer data sharing
Conclusions
Future work
Contact information

http://itrust.ece.ucsb.edu

Advisors: L. E. Moser and P. M. Melliar-Smith

Isaí → imichel@ece.ucsb.edu
Yung-Ting → ytchhuang@ece.ucsb.edu

NSF: CNS 10-16193