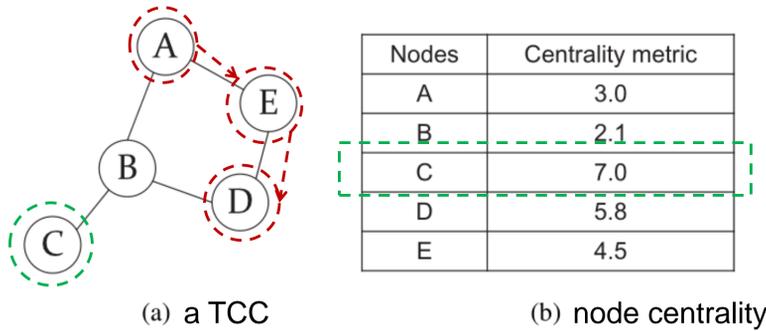


## Overview

### Motivation:

- In mobile social networks, there is ubiquitous existence of Transient Connected Components (TCCs).
- With traditional “compare-and-forward” strategy, the node with the highest centrality (node C) cannot get the data.



### Goals:

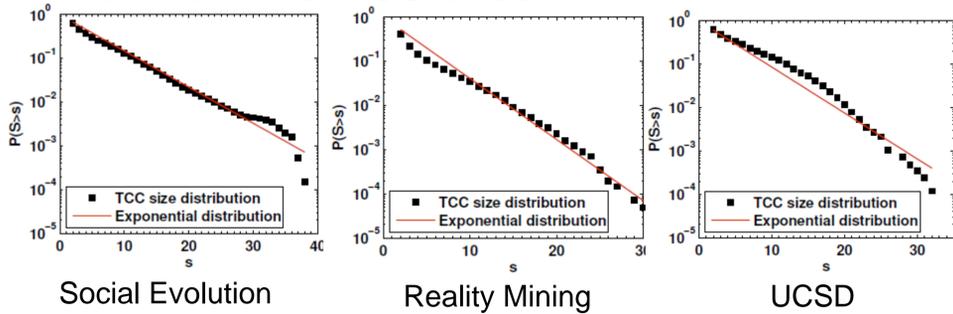
- Identify the existence of TCCs and study how TCCs increase the contact opportunities.
- Design more efficient data forwarding strategies with the existence of TCCs.

### Compare-and-forward:

Original data carrier: A  
Final data carrier: A, E, D  
**Problem:** C (with highest centrality) cannot get the data

## Existence of TCCs

### Distribution of TCC sizes



### The increase of contact opportunities:

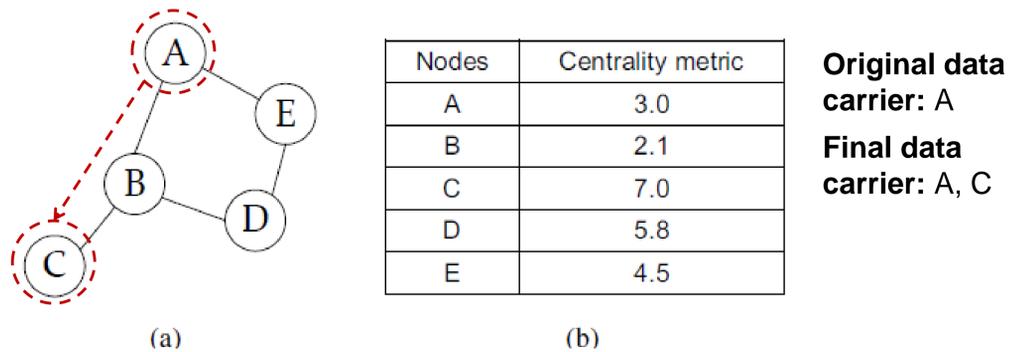
Two nodes are in TCC-contact, if they are within the same TCC.

TCC-contacts( $m_t$ ) vs. direct contacts( $m_d$ )

Trace	Estimated $\frac{m_t}{m_d}$	Actual $\frac{m_t}{m_d}$
Social Evolution	4.0396	4.33448
Reality Mining	2.2037	1.98817
UCSD	2.4683	2.31122

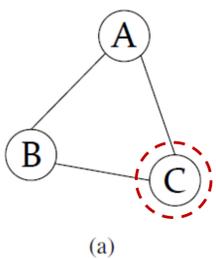
## TCC-aware Strategy

- Forwarding decisions are made when new TCCs are formed.
- Within the new TCC, the data item is forwarded to the node with the highest centrality.



## Enhanced TCC-aware Strategy

TCC-aware strategy is not always the optimal solution.



	A	B	C	D	E	F	G
A	x	1	1	0.7	0.6	0.3	0.2
B	1	x	1	0.1	0.1	0.6	0.5
C	1	1	x	0.5	0.6	0.1	0.1

Original data carrier: C

Final data carriers: A, C (TCC-aware)  
A, B (Enhanced TCC)

**Enhanced TCC-aware strategy:** if  $k$  data copies exist in a TCC, we choose an optimal node set of size  $k$  that maximize the overall data forwarding capability.

**Set centrality:** measuring the overall data forwarding capability of a set of nodes.

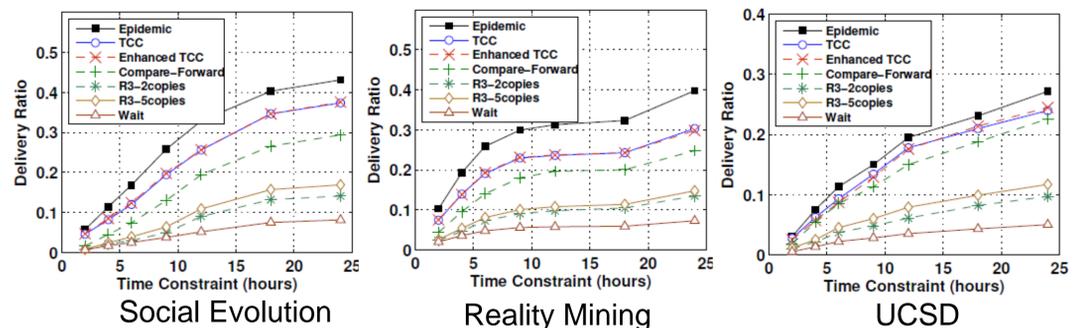
$$C_S(t) = \sum_{i \in N \setminus S} (1 - \prod_{j \in S} (1 - p_{ji}(T-t)))$$

## Related Publications

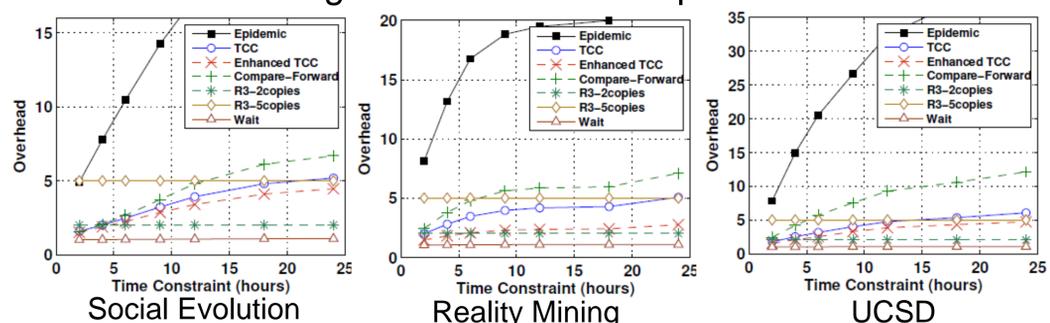
Xiaomei Zhang, Guohong Cao, “Efficient Data Forwarding in Mobile Social Networks with Diverse Connectivity Characteristics”, IEEE International Conference on Distributed Computing Systems (ICDCS), 2014.

## Performance Evaluation

**Delivery Ratio:** proportion of data items successful delivered



**Overhead:** average number of data copies for each data item



TCC-aware strategies outperform existing strategies with better data delivery ratio and less network overhead.