Understanding and Exploring the Fundamentals and Applications of Evolutionary Social Behaviors and Interactions Through ICT-Based Extra-Scale Privacy-Preserving Real-World Experimentations

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Various scientific research communities have worked on the modeling and applications of various social networks

- Sociology, anthropology, biology, physics, epidemiology, forestry/environmentology, geography ....
- As a complex system, analyzed through modeling, simulations, interviews or sometimes small-scale experiments

Existing work on the Internet of Things and Social Networks *from a Computer Scientist’s perspective*

- Through (nearly) ubiquitous ambient intelligent devices for computational, memorial and/or communication purposes
- Affiliated w/ humans; being deployed in various environments

Converging above concepts: a unique opportunity for *extra-scale* and *realistic* social network research

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Problem Statement

• Analysts on social network/link structure & dynamics:
  – Mostly relying on assumptions and simulations, which may not reflect some aspects (e.g. situation-dependency) of social behaviors

• Scientific domain experts (e.g. epidemiology, sociology):
  – Hardly can find ways to distinguish identities in a dynamic and global environments (without disclosing the users’ privacy)
  – Evolutional social behaviors desired but data hardly able to get

• Information Technology (IT)/Internet of Things (IoT):
  – Able to design, deploy and measure complex network infrastructures with high awareness of security, privacy
  – But only limited knowledge on applied domains(’ semantics)

• An integrated approach is missing & of paramount importance to understand social nets as complex systems
  – Like facebook but not owned&protected by a proprietary company

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The Vision

Online social networks (facebook, twitter, QQ, ...)

Knowledge domains: fundamental issues on social sciences, epidemiology, environmentology, etc.

Data collection and processing

Intelligent ICT/IoT infrastructure and software deployment

Anti spam and sybil attack prevention; Privacy, Ethic

City wide hybrid wireless sensor network (w/ or w/o infrastructure) and opportunistic communication network

Social applications/software systems on mobile sensors, mobile phones, PDAs, and other moving objects (e.g. bikes, buses, cars, taxis) etc

Validation, simulation, modeling, new development of information and behavior diffusion models, social structures dynamics, and assumptions

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The Expected Contributions

• Novel approach for extra-scale realistic experimental data collection
  – Through global infrastructure using Internet technologies and large-scale mobile social network experiments
  – Experimenting privacy-preserving communications in various environments, by volunteers and ordinary users
  – Community forming, detection, and leaving at users’ will

• New evidence for analyzing social network structure, dynamics and evolutions

• Novel approach for studying the impacts of human mobility, social interaction and environmental issues

• Establishment of new inter-disciplinary research agenda
Towards an FET Initiative

• Core group identified; 20+ institutions interested and may be selected based on the size and goal for FET initiative
  – University of Göttingen (CS, social nets, sociology), DE
  – MPI-DS (complex systems, epidemic modeling), DE
  – University of Cambridge (CS, social nets), UK
  – Deutsche Telekom Laboratories (online social nets; DTN), DE
  – NEC Europe Network Laboratories (online social nets), DE
  – Swedish Inst of Computer Science (mobile social nets, DTN, data mining), SE
  – Nanjing University (EE, CS, sociology, epidemiology), CN
  – Tsinghua University (CS, social nets, sociology), CN
  – and MORE ...

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