The TEASE Project

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THALES HWCommunications Cyber Security and Resilience

OXFORD CYBER SECURITY CENTRE THE UNIVERSITY OF WARWICK

Research Councils UK Digital Economy Transforming Business and Society

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2012 PSCE Conference

PSCEurope Public Safety Communication Europe

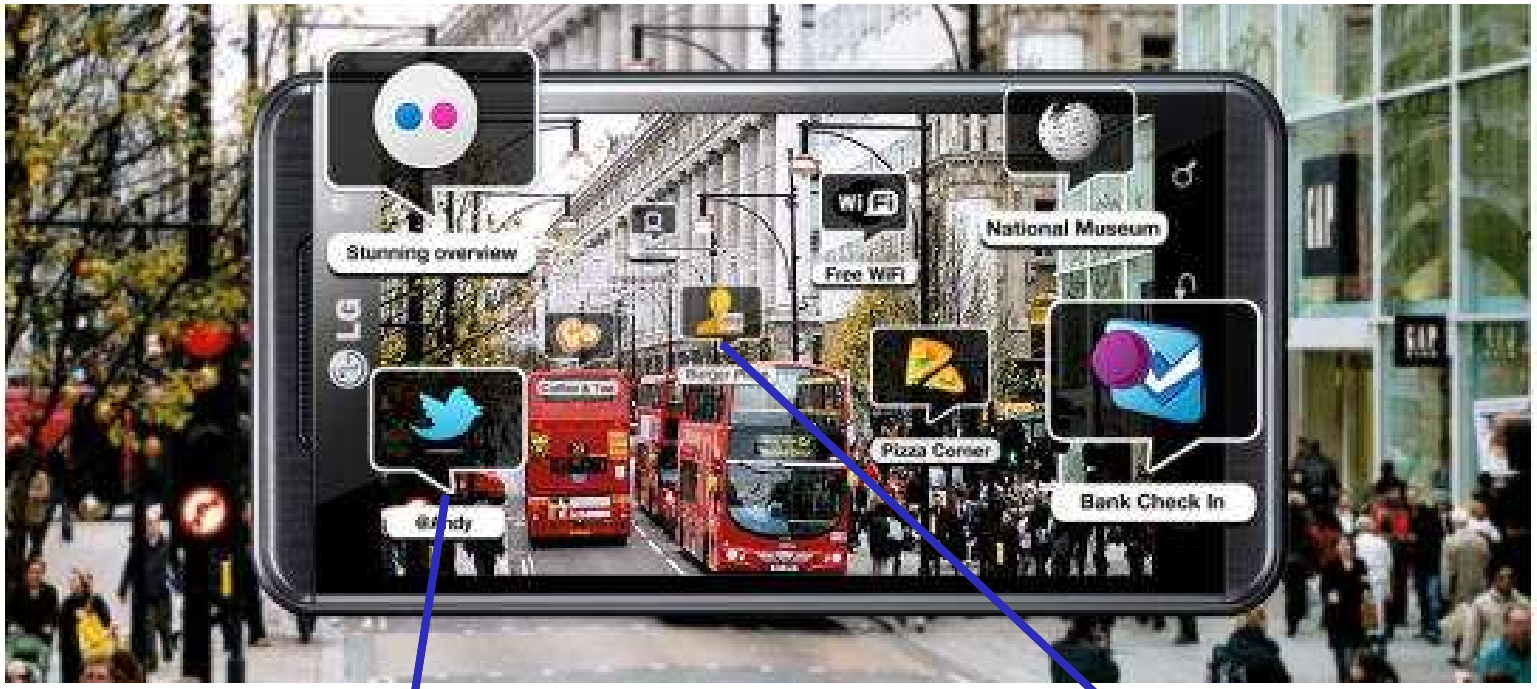
TEASE

Introduction and Motivation

- **TEASE project – Trust-Enabling Augmented-reality Support for information Environments**

- **Core aims of TEASE:**
  - To provide users with a tool to measure the trustworthiness of information available to them on the web.
  - To enable such a tool to be used with other confidence building tools by defining a trustworthiness architecture within which they can operate.
  - To incorporate the trustworthiness metadata in applications, presenting information to the user in such a way as to tend to build trust in it where and only where deserved.

Introduction and motivation



Trustworthiness 30%

Two buses have collided in London on Scarman street! (@Andy)

Trustworthiness 80%

Definitely no collisions in Scarman street! I'm there now! (by Frankie)

- **Several challenges of interest to TEASE:**
  - **How do we calculate the trustworthiness scores?**
  - **How to deal with multiple potential realities?**
  - **How do we present it to users in a cognitively enhanced way and to build trust in information only where deserved?**

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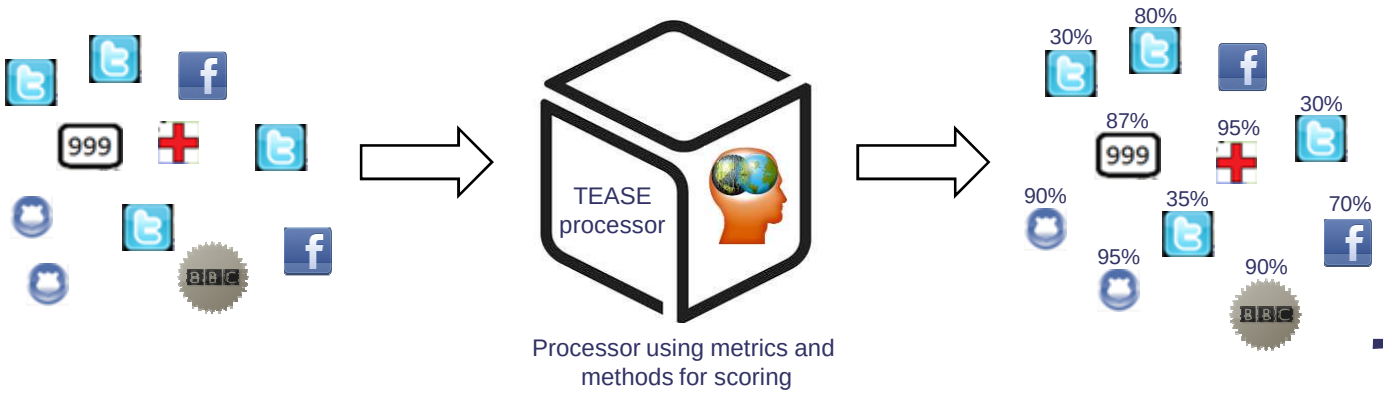
Calculating Trustworthiness of Open-source Information

How do we calculate the trustworthiness score?

- **Definition and analysis of core factors that influence confidence in information:**
  - Information Provenance
  - Intrinsic Information Quality
  - Infrastructure Integrity (current)

- **Development of metrics and methods to assess incoming information and metadata in light of of these factors and creating a combined confidence score**

NLP
Sentiment analysis
Reputation
Popularity
Time



Processor using metrics and methods for scoring

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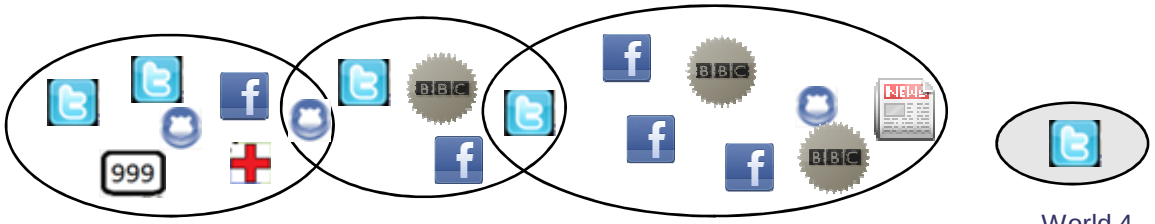
Appreciating Multiple Potential Realities

- **How do we deal with multiple potential realities?**
  - **TEASE has to cope with and manage multiple potential realities or worlds**
    - A *world* refers to a set of information objects that is mutually consistent
    - Worlds are important as they help decision makers better understand what's going on around them as well as identifying similar and differing views
    - Worlds are rated based on the trustworthiness of the constituent information
  - **As information is received, it is checked for consistency with existing worlds and a decision is made whether to include it or to create a new world**
  - **TEASE utilise on-going work in the Oxford group which attempts to group similar pieces of information into consistent worlds**



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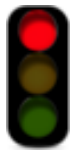
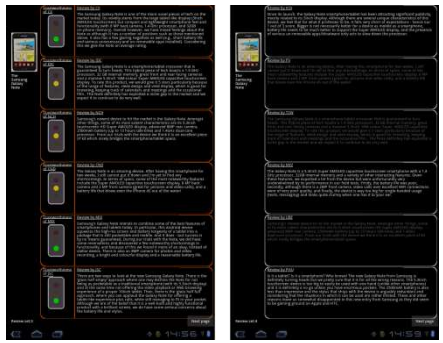
Cognitively Enhancing the Decision-Support Interface

- **How to present information and trustworthiness in a cognitively enhanced manner?**
  - **Fields from which we drew inspiration:**
    - Human cognition and cognitive processing
    - Risk communication
    - System usability, and Security usability



  - **Defined various design principles for TEASE interface and tool, and now assessing their use**
  - **Recent experiments have tested:**
    - Human's ability to cognitively combine information content and trustworthiness measures
    - Preferences in trustworthiness visualisation techniques (between traffic lights, transparency, test tubes, stars)

Tech Review scenario



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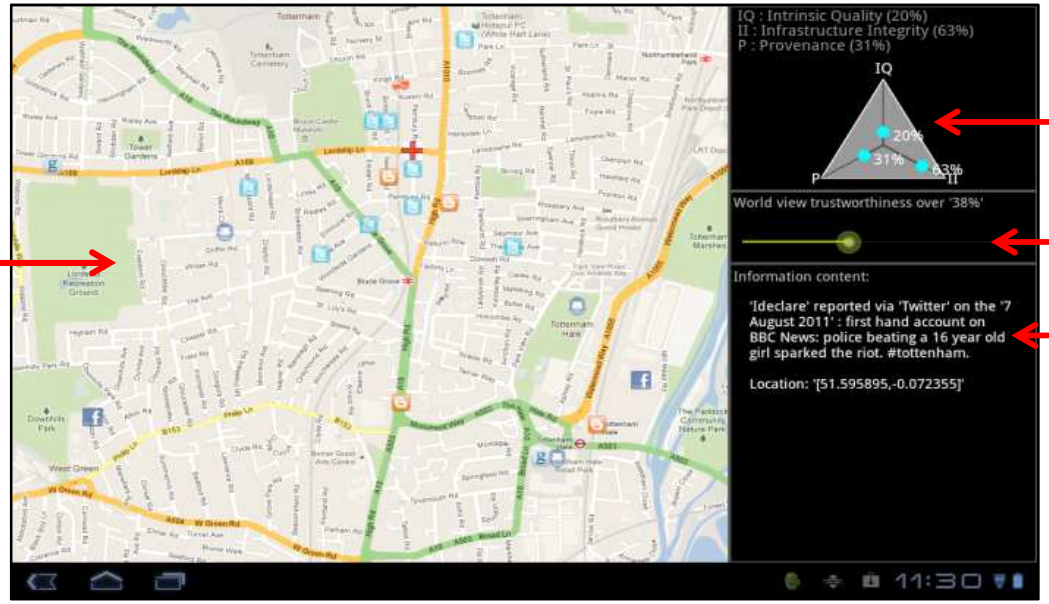
Cognitively Enhancing the Decision-Support Interface

- **Upcoming experiments will test:**
  - Human's ability to cognitively combine information content and trustworthiness measures when presented with an increased amount of data and less time. There is also a different scenario context
  - Ability to sensitise decisions based on the criticality of the task (e.g., are different decisions made when faced with leisure activities as compared to work activities?)
  - Filtering mechanisms (e.g., information confidence slider) and how they are used by individuals when faced with important decisions



Map interface with information icons overlaid according to geo-tags

Trustworthiness factor breakdown

Information confidence slider

Information content

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Other Challenges within TEASE

- **Other challenges**
  - **Data sources**
    - TEASE needs to be able to extract data from several heterogeneous sources (Twitter, Facebook, FourSquare, RSS feeds, Weather)
    - Data is likely to be unstructured and this therefore needs to be processed and tagged before being used within TEASE
    - Some ideas for addressing challenges: creation of data scrapers for gathering data; adapters and indexers for converting it; mechanisms for tagging incoming data with appropriate semantics

  - **Constraints in dealing with mobile devices (tablets, smartphones, PDAs)**
    - Small screen real estate
    - Limited processing capacity
    - No rich enough toolsets available for development
    - Field (platforms) progressing extremely quickly

Conclusions

Summarising work

- Overviewed the TEASE research project
- Highlighted the main research questions and how TEASE expects to address them
- Reported on the current research work and developments

Future work

- Formally define the metrics and methods for measuring information trustworthiness
- Utilise existing data sets to test how well our logic with respect to worlds (creation, joining, splitting, and so on). The London Riots 2011 data set is currently being used, and we're very interested in the Olympics right now.
- Continue user experiments to evaluate the interface designs created

Thanks for listening!

Questions, comments…