Situation-awareness in social overlays

Hariton Efstathiades

Research Focus

- **Situation-aware overlay:** Each individual is connected with the source of information, according to the current situation

Scenario - Vision

User

Andres Ledesma

Researcher at University of Cyprus

Cyprus | Computer Software

Andres Ledesma @wizardseal

See you in #stockholm for #iSocial summer school (31st of May - 5th of June)

Andres Ledesma's Skills & Expertise

C | C++ | Java | Python | Programming | Computer Science | Software Engineering | Eclipse | Linux | Algorithms | LaTeX | C# | SQL | JavaScript | Software Architectural Design

Social web data

Nick Thibieroz @NThibieroz · May 6

AMD and Microsoft are presenting on advanced graphics topics in a free Stockholm developer event on Monday 2 June: eventbrite.com/e/amd-microsof...

Anatoliy Gromov @agromov · May 27

Hey crowd! I've got two ticket for Aerosmith in the 1st of June and John Mayer on 12th of June in Stockholm, giving out half-priced, DM

Highlighted Related Research

- Berlingerio, Michele, et al., "**Safer City: A system for Detecting and Analyzing Incidents from Social Media**", IEEE International Conference on Data Mining, December, 2013.
- Gupta, Amarnath, and Ramesh Jain. "**Social life networks: a multimedia problem?**", *Proceedings of the 21st ACM international conference on Multimedia*, October 2013.
- Abel, Fabian, et al. "**Semantics+ filtering+ search= twitcident. exploring information in social web streams**", Proceedings of the 23rd ACM conference on Hypertext and social media, June 2012.
- Adriana Iamnitchi, et al., "**The Social Hourglass: An Infrastructure for Socially Aware Applications and Services**", IEEE Internet Computing, May-June, 2012

Practical Issues

- Limited attention

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- User is not able to follow everyone
- Not interested in the entire social stream of the publisher

Practical Issues

- Limited discovery

- Only community can discover published info

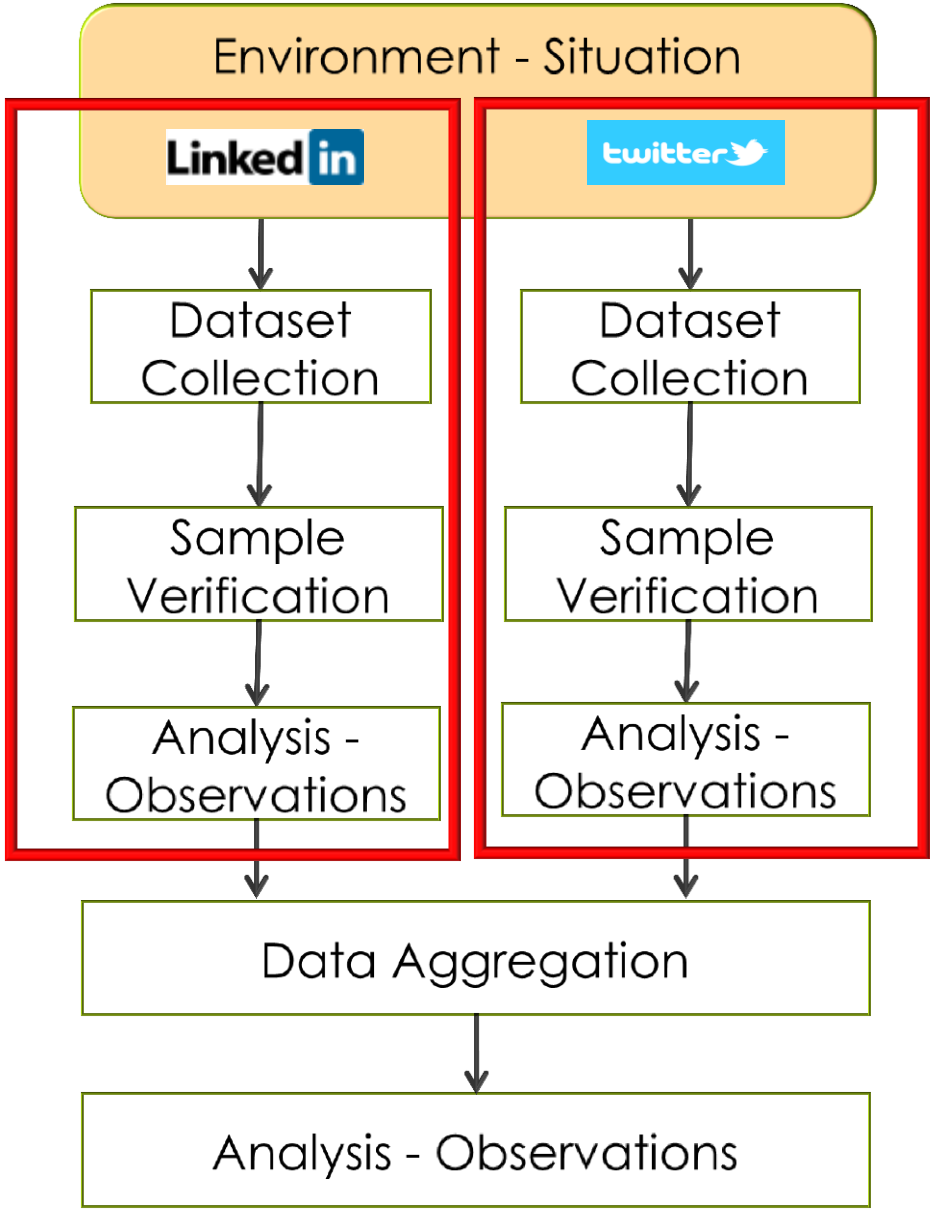
Practical Issues

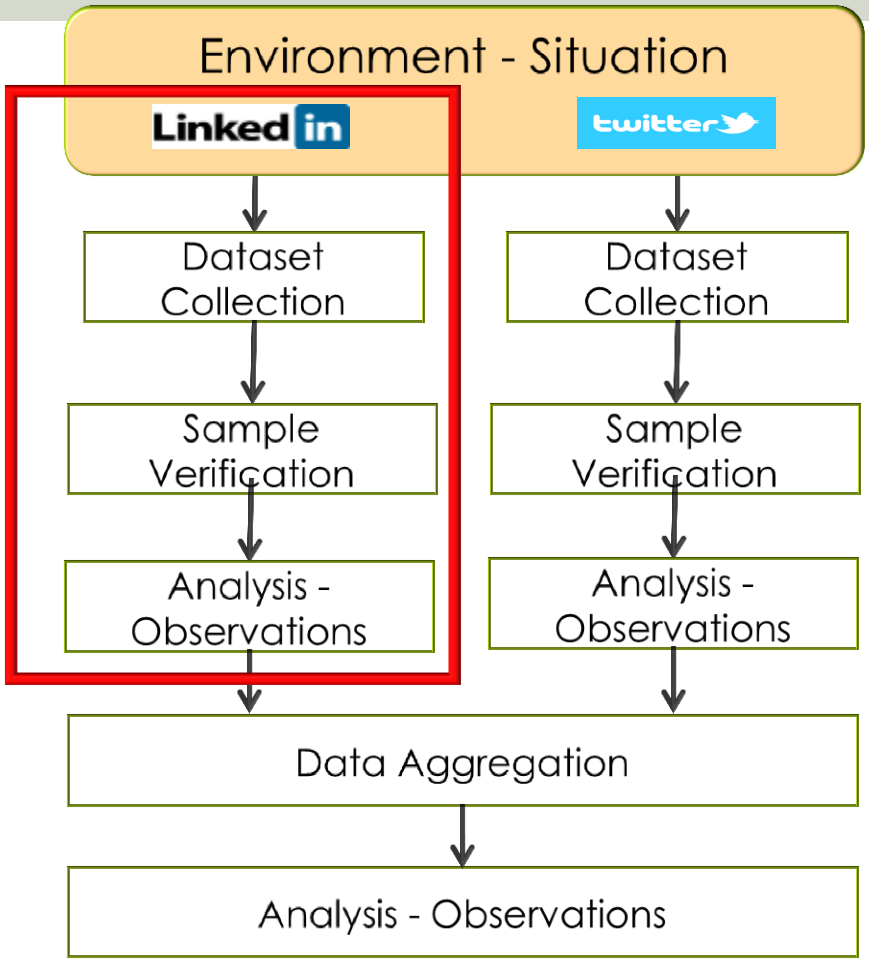
- Fast data

- Information gets obsolete fast
- User's environment change fast

Today's presentation

Today's presentation





Linked in

LinkedIn analysis

Business-market knowledge extraction from online social networks

Dataset Collection

LinkedIn Analysis: Problems

- Existing APIs have many limitations
- LinkedIn API limitations
  - User oriented: Need user to give permissions
- Without users' permissions
  - Access to basic profile fields (name, headline, community size)
  - Throttle limits
    - Search for user
    - Access resource
    - Access company profile

- **The public information that we can find on the website is much more than the information that we can retrieve from API!**

LinkedIn Analysis: Solution

- Development of LinkedIn crawler
  - "Web Scraping" method
- Simulates visitor's behavior
- Reads the tags and extracts the data

LinkedIn Analysis: Crawler

- Two parts:
  - Directories collector
  - Users collector

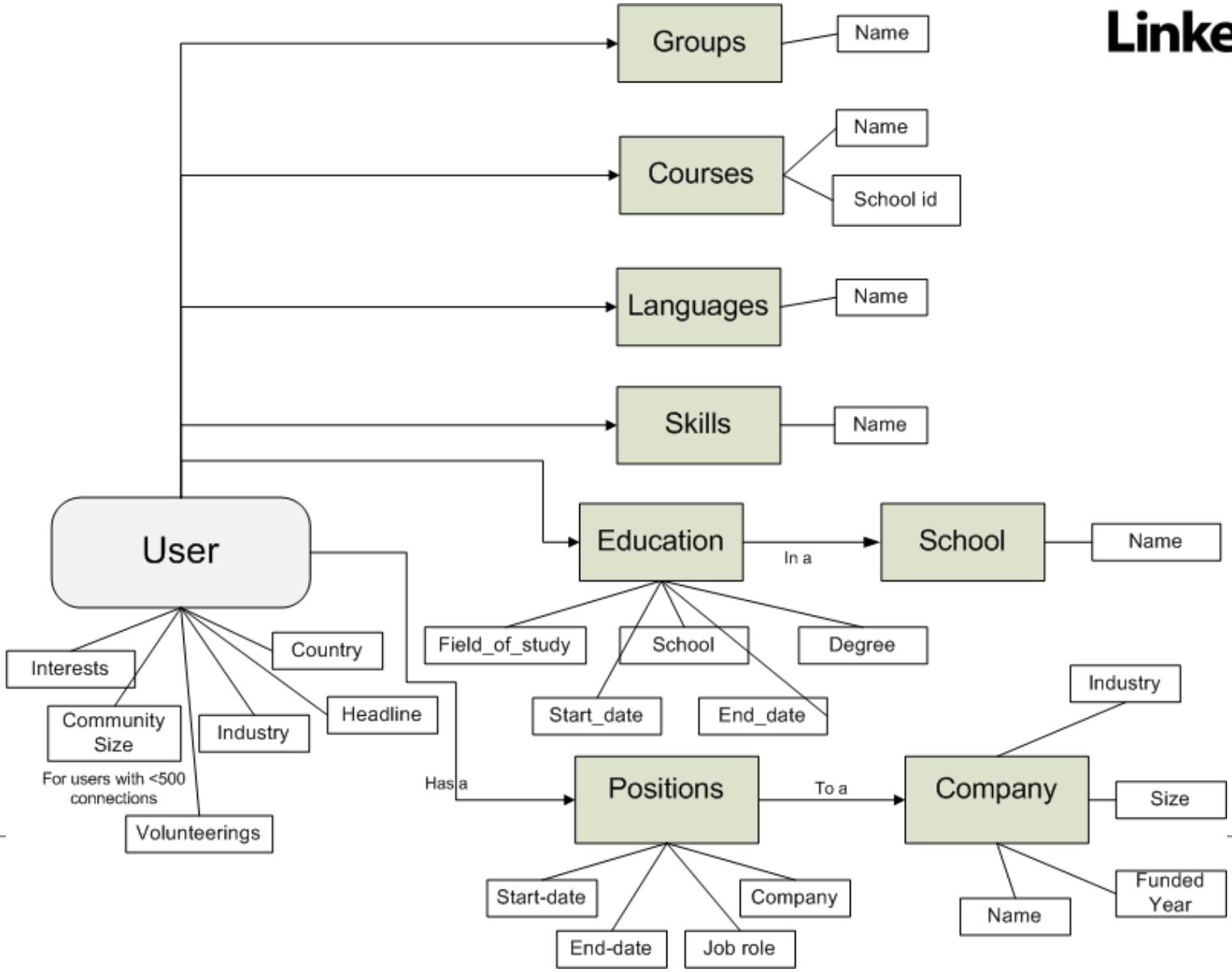
Dataset Collection tool

- Directories collector
  - OSNs have directories with the public URLs of their users
  - The tool is able to visit and retrieve LinkedIn's directories
    - Country-wise
    - Global directory

Dataset Collection tool

- Users collector
  - Each user has a public profile URL
  - The tool is able to retrieve user's public profile information
    - Input: Public URL
    - Output:
      - Information about the User, experience, education, interests
- Tested on cy.linkedin.com
  - 119,817 profiles
- Collection in progress
  - Netherlands, Portugal

Data Description

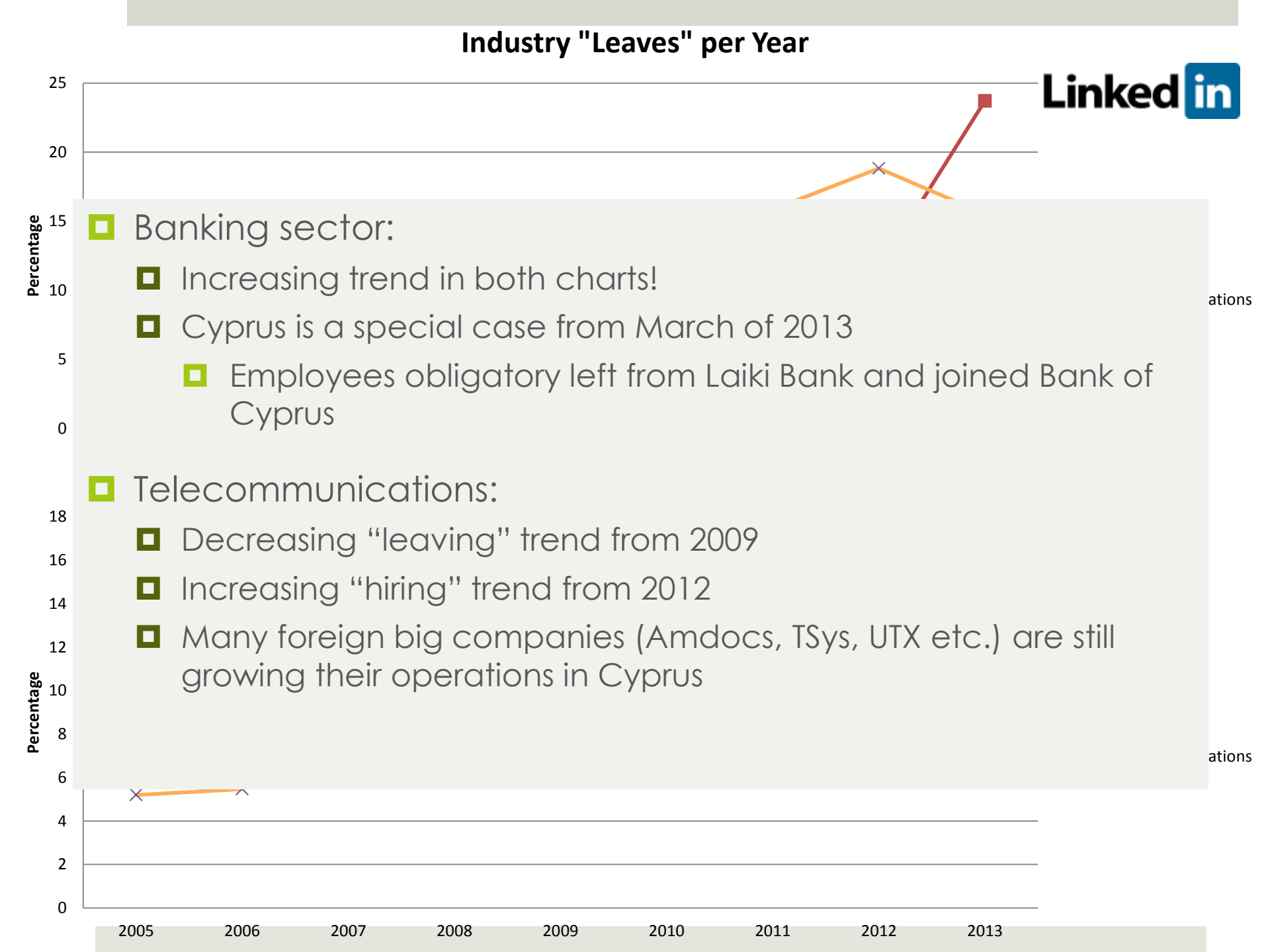


Data analysis

Data analysis

- Purpose
  - Infer implicit connections between users
  - Identify market-business trends
    - Collaboration with Department of Management, University of Cyprus
  - Anomalies detection for early warning system
  - Personalized warnings based on user's background

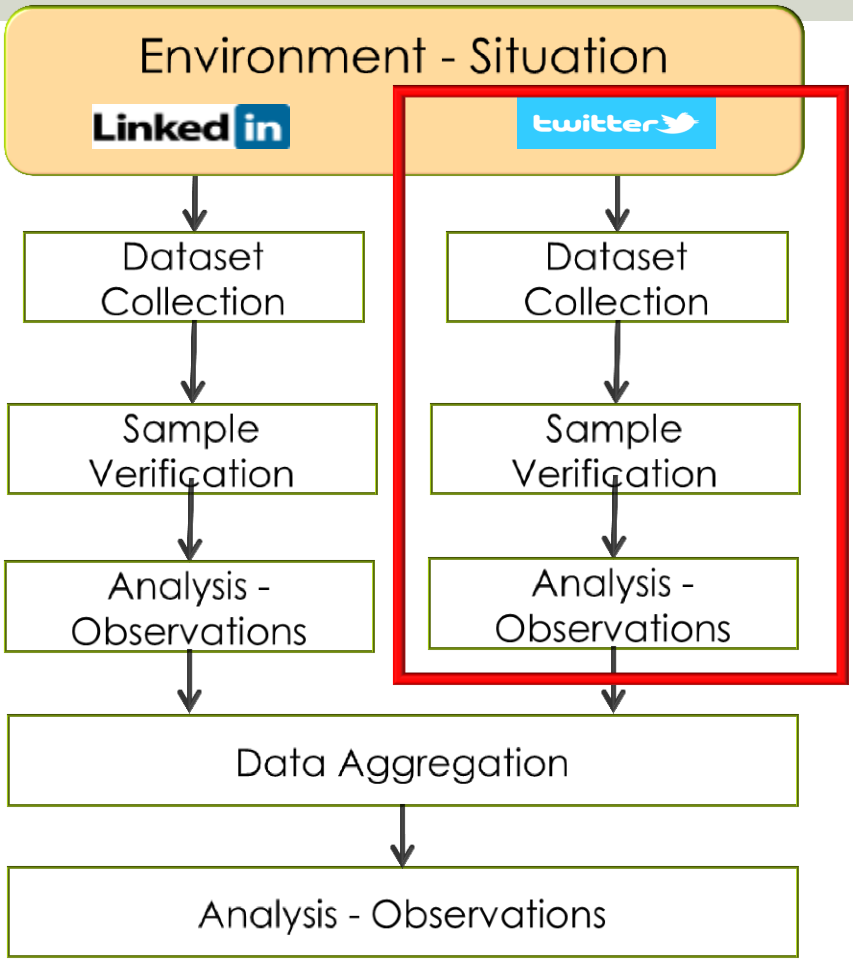
Early results



- Banking sector:
  - Increasing trend in both charts!
  - Cyprus is a special case from March of 2013
    - Employees obligatory left from Laiki Bank and joined Bank of Cyprus
- Telecommunications:
  - Decreasing "leaving" trend from 2009
  - Increasing "hiring" trend from 2012
  - Many foreign big companies (Amdocs, TSys, UTX etc.) are still growing their operations in Cyprus

Industry Leaves for 2013 (per month)

- Banking sector:
  - About 30% of total year leaves left in August
  - Deadline to get a reimbursement if they decide to leave
- Education:
  - **Government Policy:**
    - Temporal school teachers' contracts expire in June.
    - Renew in September



Twitter analysis

Identification of transportation patterns based on online social networks' meta-data

Dataset Collection

Dataset Collection

- Problems:
  - Twitter throttle limits
  - We can retrieve only 1% of total Twitter stream
- Solution:
  - Development of Twitter stream listeners
  - Distribute different listeners in the areas that we want to collect

Dataset Collection

- Collection of Twitter users from city of Amsterdam
  - Tweets history (<=3200 tweets) for each user
  - Meta-data of each Tweet
    - Timestamp
    - Location
  - Dataset:
    - ~10,000 users
    - ~6 millions tweets
      - ~1,5 millions geo-tagged

Dataset Collection

- Ground truth data from the city of Amsterdam
  - Amsterdam zones in polygons
  - Information about each zone:
    - #habitants
    - #jobs

Data analysis

Data analysis

- Purpose (Steps in progress…)
  - Infer implicit connections between users from meta-data
    - E.g. same working/leisure area
  - Identification of transportation patterns
  - Analysis of the influence of home or working location to the transportation pattern of the user
  - Events detection based on meta-data

Early results

One example

Data analysis

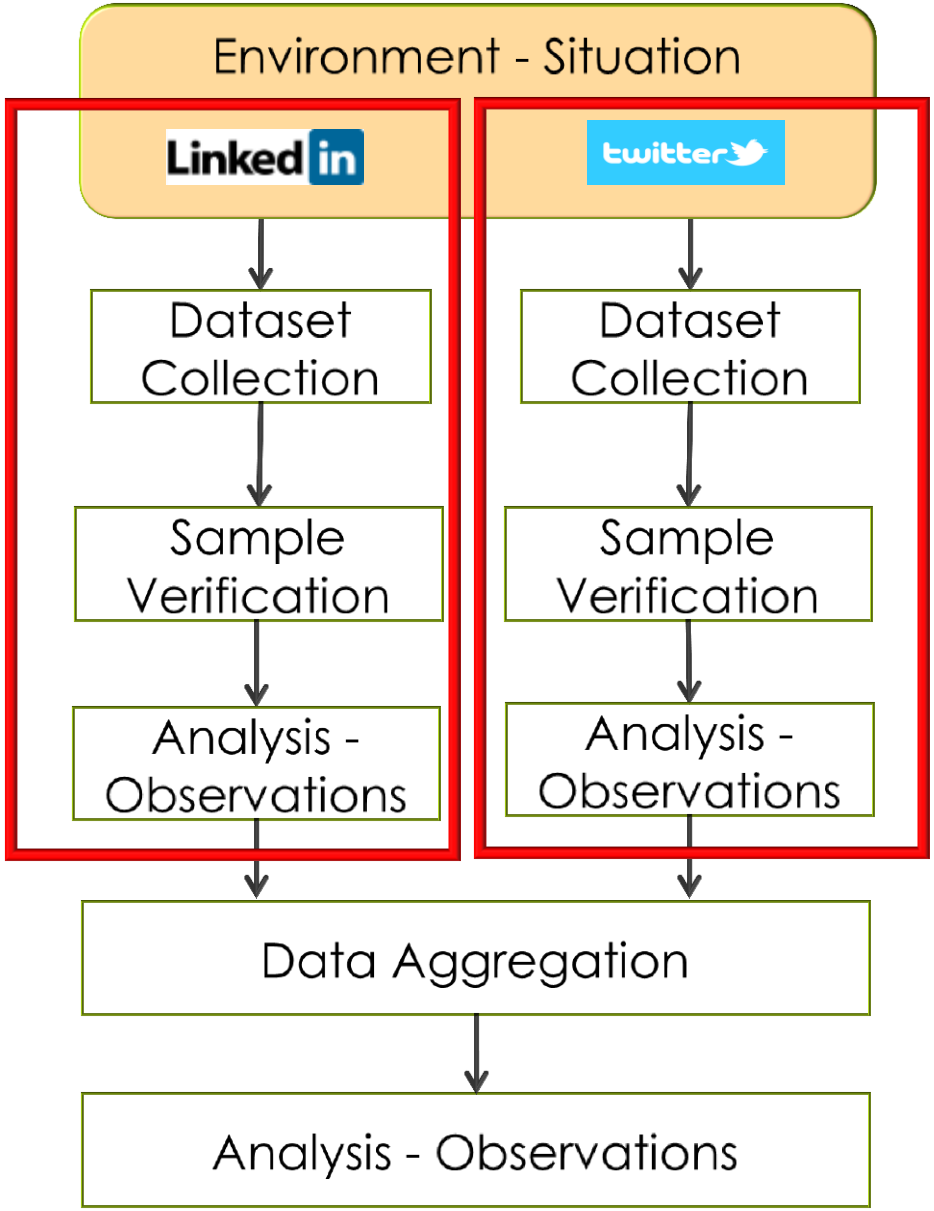
- Identification of Home/Working Location
  - Divide day-hours in parts (case of Netherlands)
    - Working: 09:00 – 17:30
      - Most popular area: marked as Job area
    - Home: 22:00 – 09:00
      - Most popular area
    - Leisure:
      - Most popular area except Home

Data Analysis

twitter

Working Area

Summary

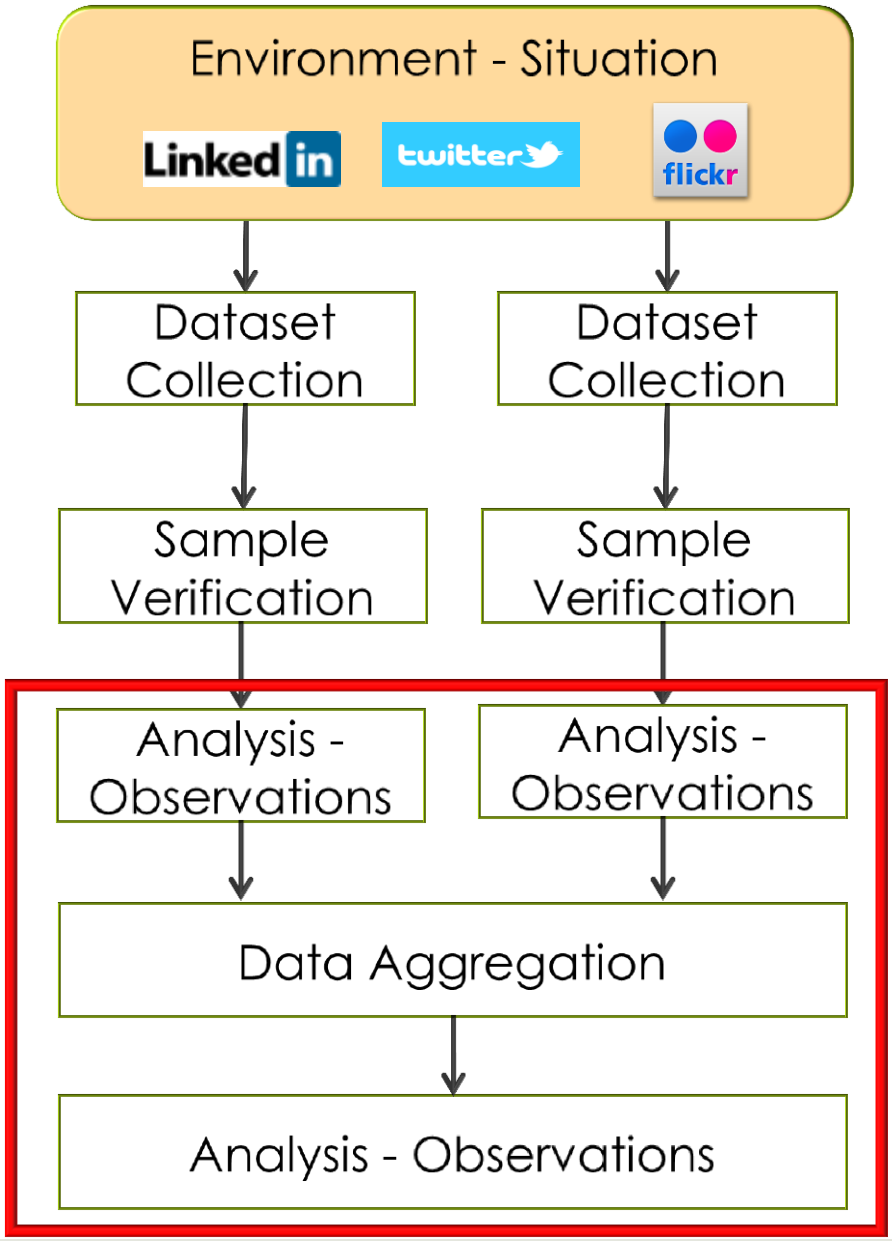

Environment - Situation
Linked in
twitter
Dataset Collection
Dataset Collection
Sample Verification
Sample Verification
Analysis - Observations
Analysis - Observations
Data Aggregation
Analysis - Observations

Next steps

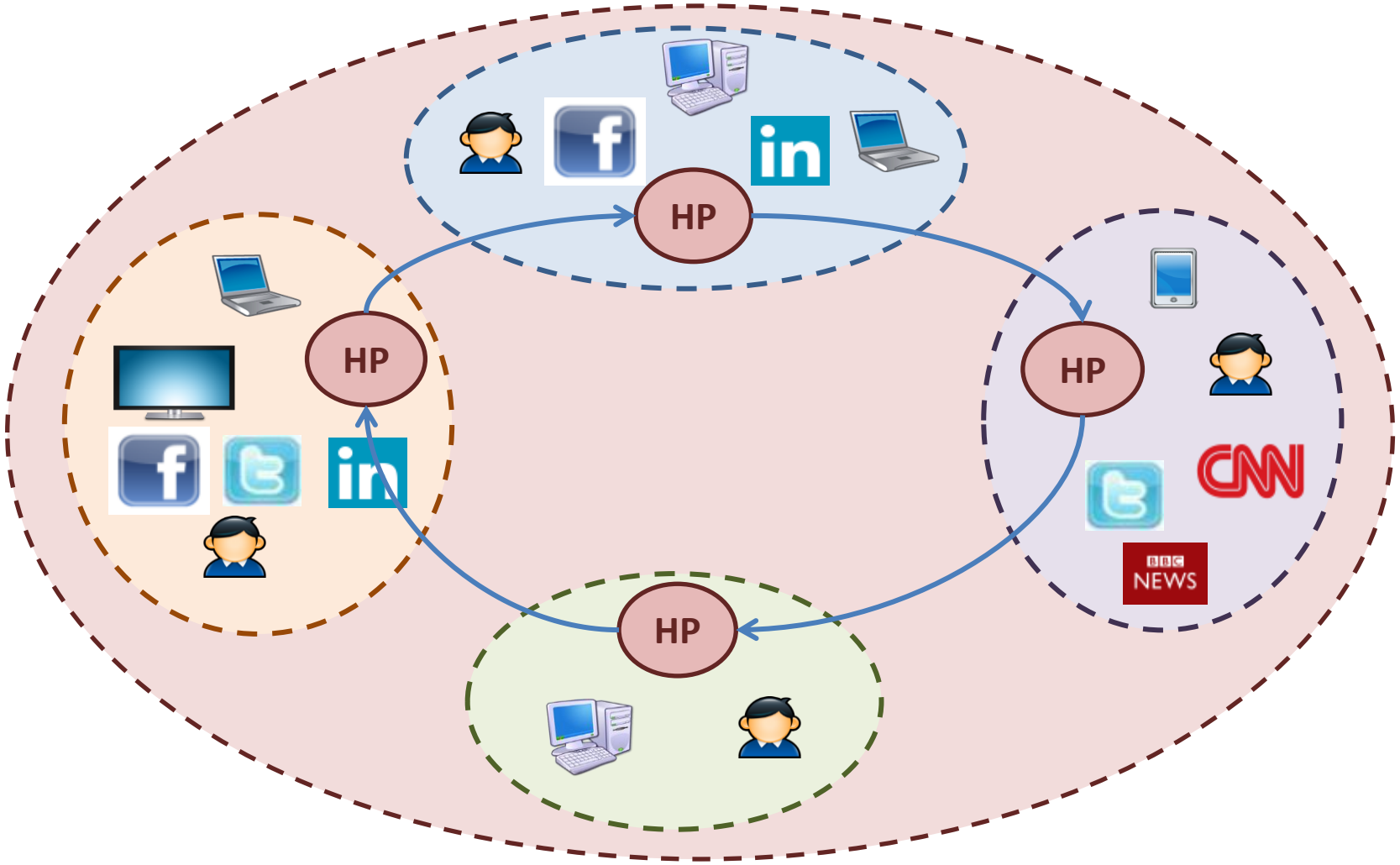
Next steps

- Extend datasets (In progress)
  - LinkedIn: Different countries
  - Twitter: More users
  - Other SNs
- Enrich users' profiles based on knowledge from social networks analysis (e.g. Unemployed, based on transportation pattern, working location etc.) (In progress)
- Identify the same user in different platforms (Early stage)
- Investigate the correlation between data that user publishes (*Twitter*) with his background (*LinkedIn*) during the reported period
- Investigate if we can model the behavior of the user based on the situation

Next step focus



Decentralized Vision



Questions?