

Research proposal

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A Familiar Stranger-based approach for communities' identification in social networks of the web

Requirement: Algorithms; Graph Theory; Probability.

The recent growth of social networks of the Internet has led to new ways of communication and information sharing between members of the same network. An individual (a node) can play several roles in a social network. He may, for example, interact (directly or indirectly) with people who are familiar to him, those who are completely strangers, or even "familiar strangers" to him". The "Familiar Strangers" are individuals who are not directly connected but who share the same "attributes" in their activities in the network. One of the major challenges in the social network analysis is to understand the dynamics of its communities to better monitor and represent them. As in the real society, the social link on a virtual platform will be determined by time, space, attributes (digital identity, interests, etc.) and interaction (data exchange). While the state of art in SNAM (social network analysis and mining) is full of work that takes into account attributes and interactions, few works integrate spatio-temporal constraints. The latest advances in location-based services via mobile phones and other smart devices, open up new perspectives for conceptualizing the notion of virtual space. This conceptualization will contribute ultimately to refine the definition of the concept of community, specifically the notion of familiarity that we can define as an individual's propensity to be or to come in contact with another individual or community.

The work required includes:

1. Produce a state of the art on the concept of "Familiar Strangers" (FS) applied to social network of the Web
2. Build a small application (Java or C ++ or other) to implement a FS algorithm and visualize the result on some graphs
3. Build a simulation tool of evolution and formation of communities based on a probability of familiarity

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Internship Announcement

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Development of a GIS module for the processing and mapping of data collected from social media and other sensors

In recent years, social media have proven their importance in the emergence and ad-hoc crisis management communities. Given the success of these platforms, we are interested in studying their key role in community resilience during a crisis. The contribution of social media like Twitter, Flickr and Facebook and other platforms such as Ushahidi, Sahana Eden Google Person Finder in times of sudden and widespread crises (earthquake, flood, etc..) is no longer to be demonstrated (Goolsby 2010, Norheim-Hagtun & Meier 2010).

However, several issues remain unexplored such as their availability, reliability and efficiency. Among the information that could be displayed for crisis mapping one could include information about missing persons, location of emergency resources (rescue teams, healthcare facilities, etc.), the state of transport and communication networks, etc.

The joint research unit (UMR CNRS STMR) in Sciences and Technologies for Risk Management is involved in the development of a global framework in crisis management. We are now interested in developing research in the area of crisis mapping using an integrated approach involving different sources of information.

The intern will work with an interdisciplinary team working on crisis management.

Specific Tasks:

1. Develop a state of the art on current approaches for crisis mapping,
2. Make an inventory of existing platforms of crisis mapping and their classification according to the input information sources,
3. Build a GIS module for crisis mapping using information collected from social media and other sensors.

The module should take into account not only the data collected from social media, but also other sources of information (sensors, cameras, etc.). A model for integrating multi-source data will be proposed (database or ontology). Indicators built from this data will then be analyzed, integrated and visualized.

Requirements:

The applicant must have a bachelor degree with a strong background in Computer Science, Knowledge Modeling and Knowledge Management, Geoinformatics, or Social Media. Basic programming experience is required (web oriented- php, JavaScript, etc.).

The successful candidate is expected to work in English. Previous knowledge of French is not required.

A basic knowledge of APIs for spatial visualization and data collection on social media will be appreciated but not mandatory.

Applicants should submit a CV, a list of productions (reports, publications, etc.) and a statement of prior studies and research experience with respect to the above mentioned requirements via email.

Bibliographie

Goolsby, R. (2010), 'Social media as crisis platform: The future of community maps/crisis maps', *ACM Trans. Intell. Syst. Technol.* **1**, 7:1–7:11. <http://doi.acm.org/10.1145/1858948.1858955>

Magsino, S. (2009), *Applications of social network analysis for building community disaster resilience: workshop summary*, Natl Academy Pr.

Norheim-Hagtun, I. & Meier, P. (2010), 'Crowdsourcing for Crisis Mapping in Haiti', *Innovations: Technology, Governance, Globalization* **5**(4), 81–89.

Perez, C., Lemercier, M., Birregah, B. & Coppel, A. (2011), Spot1.0: Scoring suspicious profiles on twitter, in 'International Conference on Advances in Social Network Analysis and Mining, ASONAM 2011 (July, 25-27)'. Accepted.

Shklovski, I., Palen, L. & Sutton, J. (2008), Finding community through information and communication technology in disaster response, in 'Proceedings of the 2008 ACM conference on Computer supported cooperative work', CSCW '08, ACM, New York, NY, USA, pp. 127–136. <http://doi.acm.org/10.1145/1460563.1460584>