



Applications of SHERLOCK In Crime and Security

Initial Plan

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Project Description

Open source information (intelligence collected from publically available sources, publically accessible and publically writable)¹ has been increasing dramatically since the birth of the internet, and is all the time more important for industries to understand and be able to process this data. The impact of social media has made open source information abundant in understanding the users (including groups, organisations and societies) likes, dislikes, behaviours and, at times, geographic location. This type of open source information can be enormously useful and valuable in some organisations, such as policing². In a policing environment open source information can be used in three different ways; intelligence, investigation and engagement³ which will be explained within a context of an example.

The Gaza protest study⁴, conducted in Cardiff, demonstrates well these different areas of using open source information and how they could have been used efficiently. The foraging of real-time tweets (intelligence) would have been the individuals either inside the protest or those in the bars and the street posting updates from the happenings. Open source intelligence⁵ is the initial foraging and understanding of the open source information, essentially gathering the data. Investigation into open source data will include actions such as looking into a particular individual based on the foraging of data, or potentially understanding the timeline of a particular event, it's looking into more depth at something. There was a small amount of investigation used, as after the event the police appealed for a video that was published on social media. Using the Gaza protest incident, a time line could be created and tracked from the start of the protest, to when the first negative comments were thrown, to the eventual outcome of fights breaking out. Engagement is the online presence and interactions with others. In this event, if the twitter account had been watched, there could have been someone sending out tweets giving advice to those in the crowd, or even updates to others in the area to avoid the incident. South Wales police weren't engaged during the event, or during whilst the press criticism was increasing⁶. The negative publications from the press shows the impact that not monitoring the open sources can lead to. It is the joint effort of using intelligence, investigation and engagement, techniques that will help the police with understand community mobilisation⁷ and signal crime⁸ and it will give an organisation a more accomplished view into this constant flow of source data.

The most challenging part of using open source information is making sense of it and picking up the relevant pieces, the termed has been dubbed sensemaking. The term conversational sensemaking⁹ defines the sensemaking process as being seen as the conversational interactions that take the user from foregoing up to briefing someone on the information. The model developed by Pirolli and Card¹⁰ looks at the sensemaking process for intelligent analysis and is seen as a series of feedback loops which help the iterations within data analysis and sensemaking of the data. The model has two main loops, foraging loop (which

focuses on the gathering, assembly and presenting of the data) and the sensemaking loop (which focuses on connecting the data to the hypothesis and is used to help making informed decision making). The shoebox is a large part of the foraging loop, it's mainly used to add the sense to the information and apply models and knowledge codification methods to assemble the information. To aid the interaction between technology, Pirolli and Card model, and humans a technology has been developed called MORIA, Mobile Intelligence Reporting Agent. The MORIA software is currently being tested in a series of experiments¹¹ called SHERLOCK¹², Simple Human Experiment Regarding Locally Observed Collective Knowledge. The SHERLOCK experiments are designed to specifically focus on crowdsourcing of collective intelligence to build a knowledge base on a real time event which is where conversational sensemaking is linked.

The central question of this study is: **how can conversational sensemaking aid the processes of interpreting open source intelligence, investigation and engagement in the context of conventional policing?** 'Conventional Policing' meaning everyday activities and tasks of a police force e.g. pursuing suspects, community walks, answering emergency calls. Using the results from the SHERLOCK experiments and interviews with police employees this project will look to find requirements that would benefit the policing procedures. Using the MORIA software as a baseline, the final deliverable of the project will be to produce a set of requirements and features for a future version of the MORIA software. If time scales allow, the project will also look to start designing SHERLOCK experiments to test for validity and effectiveness of the proposed features.

Project Aims

1. Gain understanding of how experts make use of Open Source information in intelligence, investigations, and engagement (IIE) activities.
2. Gain understanding of the capabilities and limitations of Moira in the SHERLOCK context.
3. Propose extensions to Moira to address experts' needs in using Open Source information in IIE.
4. Verify feasibility of proposed Moira extensions by engaging with software engineers.
5. Validate potential effectiveness of proposed Moira extensions by engaging with practitioners using simple software prototypes or paper-based exercises, perhaps in a SHERLOCK context.
6. Assemble all acquired knowledge and findings in a comprehensive report

Ethical Issues

There are no ethical issues related to this project. The project will be working closely with open source (publically available) information collected by others.

The SHERLOCK experiments conducted to date have been approved by the schools ethics group. There are no experiments expected to take place during this project, however, if we do they will be subject to the approval by the ethics group.

Work Plan

The work plan outlined below indicates the activities and milestones which I plan to achieve at specific times over the project duration. I plan to keep to this plan and the activities set week by week as much as possible, and have given myself 'lighter' workload if I know of coursework deadlines. I've set weekly meetings (apart from Easter holiday) to ensure that I stay on track and my supervisor knows and understand everything I produce. From the 1st February I expect to be writing parts of my final report whilst conducting the activities set, which meaning less writing (perhaps iteration additions) towards the end of the project.

As this particular project started earlier than expected, a work plan has been added to the appendix to highlight what tasks have been completed to date.

01.02.2016

- Progress meeting
- Experiment: SHERLOCK game with 2nd years

08.02.2016

- Progress meeting
- Experiment: SHERLOCK meeting with members of police force (3 day meeting)
- Deliverable: determine and evaluate methodology of which to conduct project
- Meeting: discover the capabilities and limitations of MORIA

15.02.2016

- Progress meeting
- Deliverable: Conduct interviews and research with police individuals on open source information in IIE activities
- Deliverable: determine model to test feasibility of requirements

22.02.2016

- Progress meeting
- Deliverable: determine functional and non-functional requirements based off previous experiments, research and interviews. **(MILESTONE)**

29.02.2016

- Progress meeting
- Deliverable: propose potential extensions of MORIA based from requirements
- Deliverable: evaluate potential extensions with an appropriate model

07.03.2016

- Progress meeting
- Deliverable: verify feasibility of proposed extensions with software engineers

14.03.2016

- Progress meeting
- Deliverable: verify feasibility of proposed extensions with software engineers
- Deliverable: determine most effective way to demonstrate prototypes

Have given myself a slightly lighter workload as there is coursework for other modules due in this week

21.03.2016 (Easter break)

- Deliverable: develop prototypes demonstrating proposed features

28.03.2016 (Easter break)

- Deliverable: develop prototypes demonstrating proposed features
- Deliverable: design interviews to determine validity from individuals in the environment

04.04.2016 (Easter break)

- Deliverable: potentially design SHERLOCK experiment

I intend to carry on from previous week's deliverables and catch up on any tasks that are outstanding

11.04.2016

- Progress meeting
- Deliverable: submit 1st draft report (**MILESTONE**)
- Deliverables: make changes to 1st draft

18.04.2016

- Progress meeting
- Deliverable: submit 2nd draft report
- Deliverable: make changes to 2nd draft report

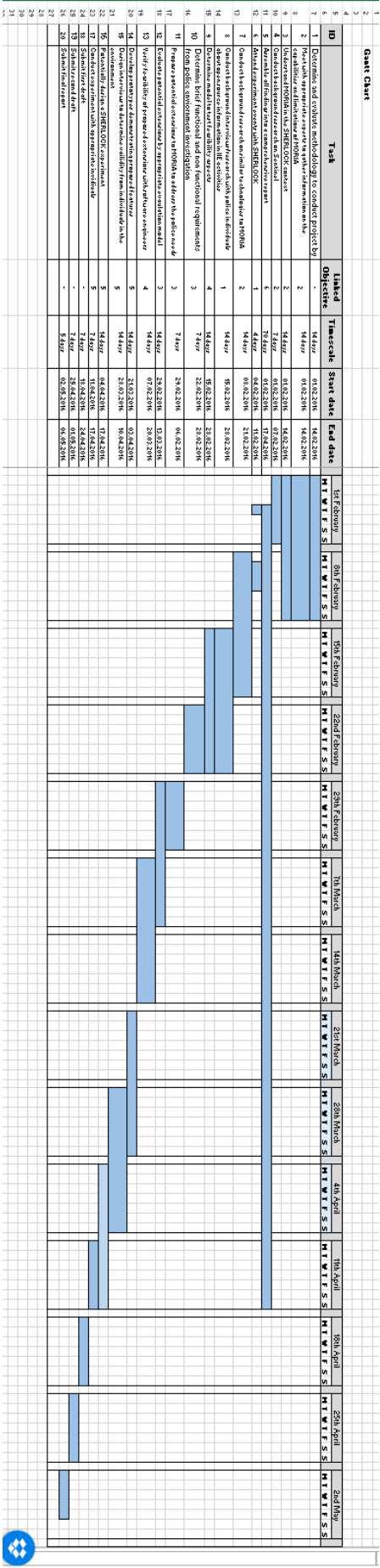
25.04.2016

- Progress meeting
- Action: make final changes to report

02.05.2016

- Make final changes
- Submit project report **6th May**

Gantt chart of project workflow



References

- ¹ “Open source intelligence”, Wikipedia, https://en.wikipedia.org/wiki/Open-source_intelligence
- ² Martin Innes, Nigel Fielding, Nina Cope “The Application of Science?”
- ³ “Open source intelligence”, Wikipedia, https://en.wikipedia.org/wiki/Open-source_intelligence
- ⁴ Alun Preece, Will Webberley, Dave Braines “Tasking the Tweeters: obtaining actionable information from Human Sensors”
- ⁵ “OSINT”, OSINT - intelligence, <http://www.uk-osint.net/intelligence>
- ⁶ BBC, “Policing of Violence at Cardiff Gaza protest ‘poor’”
<http://www.bbc.co.uk/news/uk-wales-south-east-wales-28509791>
- ⁷ Colin Roberts, Martin Innes, Alun Preece, Irena Spasic “Soft facts and spontaneous community mobilisation: the role of rumour after major crime events”, Cardiff
- ⁸ Martin Innes, Nigel Fielding “Signal Crime”, Wikipedia,
https://en.wikipedia.org/wiki/Signal_crime
- ⁹ Alun Preece, Will Webberley, Dave Braines “Conversational Sensemaking”
- ¹⁰ Peter Pirolli and Stuart Card “The Sensemaking process and leverage points for analyst technology as identified through cognitive task analysis”
- ¹¹ Alun Preece, Dave Braines, Diego Pizzocaro, Christos Parizas “Human-Machine conversations to support multi-agency missions”
- ¹² Alun Preece, W Webberley, D Braines, N Hu, T La Porta, E Zaroukian, and J Z Bakdash, “SHERLOCK: Simple Human Experiments Regarding Locally Observed Collective Knowledge”