





Amsterdam
Data Science

Crowd Management with Social Media (CroM-SoM)

Applicants

Supervisor Name	Department/Section	University/Industry
<p>Dr. Kathrin Dentler</p> 	Knowledge Representation & Reasoning	 <p>VU University Amsterdam</p>
<p>Dr. Hannes Mühleisen</p> 	Database Architectures	 <p>CWI Centrum Wiskunde & Informatica</p>

Project Description

The behaviour of large groups of people is difficult to control. Everyone has their own background, state and goals. Yet, stochastic visitor control is crucial both for historic inner cities such as the Amsterdam Canal ring or large-scale events such as the Lowlands festival.



Figure 1: Mock-up of the envisioned system's response.

We propose to use Social Media responses as a tool to "nudge" people to explore areas or events off the beaten track. We plan to do so by taking the previous posts of individual users as well as available activities into account. Through our system, we hope to alleviate the pressure put on neuralgic spots such as the Dam Square or the main stage at a festival. The system will work as follows:

- 1) A user posts a geo-tagged message or picture to Social Media, for example Twitter or Instagram.
- 2) Through already available geographic filtering, the system detects this post.
- 3) The system determines whether the user is in a geographic area currently suffering from overcrowding.
- 4) If so, the previous post history of the user is retrieved and analysed for locations and keywords. This information is used to build an "interests profile" for the user.
- 5) Based on this profile, other areas or current events that are likely to be interesting to this particular user are retrieved.
- 6) The system responds to the user with a customised message. An example at a music festival could be "There is a band currently playing at another stage that we think you'll like more!".

We have already worked in this domain, for example with the award-winning "Appening Amsterdam", which aggregated Social Media posts to suggest events¹. Another project is "Fotofalle NYC", which watches the Webcam on New York's Times Square and responds to Twitter and Instagram Users with pictures of them posting to Social Media².

Project Organisation

We propose to test and configure this system during this year's Lowlands festival. The expectation is that the user interests profile and event matching system can be trained using festival attendants, areas and events. In addition, the festival environment allows us to perform qualitative interviews and to collect quantitative feedback on the social media responses.

The project will therefore be organised in three phases:

- In the first phase, we will develop the basic infrastructure needed to demonstrate the proposed system.
- In the second phase, we will test the system during the festival.
- In the third and last phase, we will test the system in the inner city of Amsterdam.

We would like to request two research assistants for six months each. One assistant will focus on the implementation part, working with the APIs and daily operation of the system. This role requires a technical background with strong skills in Web technologies.

The second assistant will focus on the user interest profiles, A/B testing of the effectiveness of nudging messages sent to users. This role requires a background in Data Science / Machine Learning / Artificial Intelligence. During the festival, this role will also entail conducting interviews with attendants to measure the impact of our suggestions.

Dentler/Mühleisen will focus on the supervision and practical assistance as well as guidance as required.

Our assistants will be recruited among (AI) students at the VU, including the 20 graduates of the "Large Scale Data Engineering" master course organised by Mühleisen³.

Collaboration

Lowlands encourages scientists to carry out their research during the festival, so we will also submit this proposal to the Lowlands Science 2016 call for proposals⁴. Through this, we plan to investigate the effectiveness of our proposed system. An additional positive effect will be the attention raised for data science, by visualising the festival's events with their according interests on a large screen.

We are in contact with Eric van der Kooij of the Urban Planning and Sustainability department of the Municipality of Amsterdam⁵. He and his department will support us to arrange a joint trial in the inner city of Amsterdam. The proposed unique system will showcase the potential for innovation in the Amsterdam region, with its data-driven reactive approach to overcome the pressing issue of "overlast". We will also reach out to the media to feature our project and its results, both from the festival experiment as well as of the Amsterdam city center showcase.

¹ Mentioned: <http://www.parool.nl/amsterdam/beste-apps-voor-amsterdam-krijgen-prijs~a3344405/>

² "Fotofalle", https://twitter.com/fotofalle_nyct5

³ Large-Scale Data Engineering at VU <http://event.cwi.nl/lsde2015/>

⁴ Lowlands Science Program: <http://lowlands.nl/nieuws/lowlands-science-2016/>

⁵ <https://www.amsterdam.nl/gemeente/organisatie/ruimte-economie/ruimte-duurzaamheid/>

Deliverables

The project will produce scientific, practical and societal results:

D1: Scientific Paper

First, we research how to best match mined interest profiles and possible activities. This is an interesting data analysis problem and will result in a paper in the data science domain.

D2: Open Source Software

Second, we will produce a practical implementation of our proposed system as Open Source software, so that interested organisations such as city administrations can experiment with it as well.

D3: Outreach and Dissemination

Third, we will communicate our results through public channels through Social Media itself, blog posts and possibly news media involvement. Our hope is that this exposure will inspire further collaborations between Amsterdam Data Science, Public Administration and Industry.

Planning

1.6.	Start of contract for research assistants
1.8.	First testing version of software available
19. - 21. 08.	Lowlands Festival
31.10.	Refined version of software available
1.11.	Start test run in Amsterdam city center
30.11.	End of contract for research assistants