



## Key Areas

In addition to the formal division of the project into six themes we have begun to focus on several key areas that we believe will be instrumental in understanding social machines.

## Web Observatories

Web Observatories are systems designed to look at data and behaviour on the Web. We are designing our social machines observatory to help gather data and insight on the social machines we have chosen to research in more detail.

## Personal Data

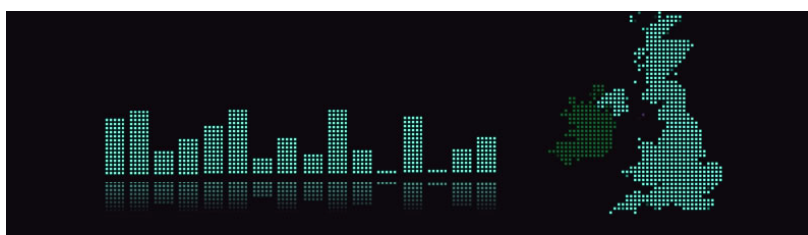
There is growing interest in how personal data is used and in some cases abused on the Web. We believe that individuals may seek to reclaim their own data into personal data stores which can interact with different social machines that want or need our personal data. To this end we are developing our own personal data technology called INDX and will show applications of this work.

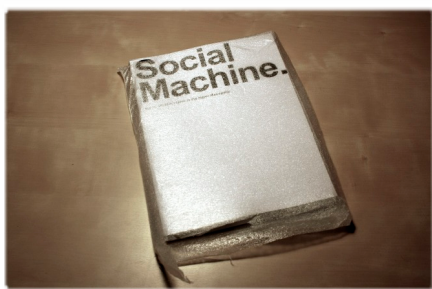


## A Letter from the Director

Dear Partner,

I am writing to update you on our progress and I am delighted to report that we have built a truly outstanding team to address the deep and challenging issues surrounding social machines. I would like to take this opportunity to update you on the aims and structure of our work, share some of the results of the first phase of our work and set the scene for further collaboration in the coming year.





## Provenance & Trust

In order for data to be effectively shared between social machines there must be a basis of accountability and trust. We are fortunate to be working with thought leaders in this area on SOCIAM and the new W3C standard PROV is being embedded into our thinking and research plans. There are several mathematical and formal logic models being developed and deployed within the theme to allow interoperation between social machines.

## The Sociality of the Machine

There can be no social machines without the social component. The social science specialists in our team are looking at models to reflect the qualitative aspects of our research, the nature of the users as well as key challenges in social machine design. This includes themes such as incentive engineering alongside the network and data components of the machines.

## The Significance of Social Machines

In classical models of computation, the Turing machine established limits and properties of machine-based problem solving. Sixty-four years later, we are now witnessing new kinds of "machines" governed not purely by computational processes, but by collective social processes - the amalgam of individual action and coordination, mediated and enabled by the World Wide Web.

This project derives from concepts introduced by Tim Berners-Lee who described the Web as an engine to "create abstract social machines - new forms of social processes that would be given to the world at large". We aim to study these social systems on the Web as "social machines": computational entities governed by both computational and social processes.



Our purpose is to enable the effective identification and interrogation of the components, processes, properties and limits of such systems; in particular the aspects that enable them to solve complex social and computational problems in a decentralised fashion, at large scale.

## Activity so far

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We have run weekly open project meetings and staged academic workshops over the year with partners in Edinburgh, Oxford and Southampton, produced research papers and generated thousands of lines of code. This project is tackling some of the most challenging, important and relevant problems in Web Science and Social Computing. I am delighted at the progress we have made.

To date there have been five "All Hands" meetings and also workshops in Brazil at WWW 2013 and in Korea earlier this year for WWW 2014. We have focussed not only on the technical computer science/architectural questions but have sought to actively engage interdisciplinary methods involving colleagues from sociology, maths and beyond as well as hosting a number of you in workshops around the topics of crime, health and other social machine implementations.

Having engaged with some of our partners already we want to build on and extend this collaboration in the coming year. We want to make the most of the outstanding team of collaborators and partners that we have assembled.

## What's next

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In addition to upcoming research papers and social machine workshops at WebSci 2014 in Indiana we are keen to make the most of your support on this project.

To ensure we have a resource to focus on this we have created an industry liaison function to co-ordinate between you and the project to schedule workshops, meetings, demos, progress updates and to handle the details around leveraging your involvement with SOCIAM. This may be a rotating assignment and currently "in the chair" is Ian Brown from our Web Observatory work stream.

Ian will be contacting a number of sponsors each month to synchronise upcoming project deliverables with the types of support each of you has offered in terms of running workshops, offering resources and tools or advising us on your own areas of expertise.

We look forward to speaking with you soon.

A handwritten signature in black ink that reads "Nigel Shadbolt". The signature is written in a cursive, flowing style.

Professor Sir Nigel Shadbolt FREng

## Appendix SOCIAM Overview

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SOCIAM is split into 6 main themes: some are theoretical/informative, some are practical/integrative - all them will ultimately be collaborative across our partner network. A summary of work to date is provided below.

### Theme 1 - Social Computation (Design and Enactment)

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One of the initial goals is to understand how interactions within social machines can be represented in formal terms. The lightweight computational calculus (LCC) has been extended to model social computations resulting in a new lightweight social calculus (LSC). Progress is being made to develop tools that support this new calculus. It has allowed us to create web-integrated and twitter-integrated interactions which both record interactions and derive key provenance information in the standard PROV format from social interactions expressed in LSC.

### Theme 2 - Curated Data & Social Computation

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Our goal here is to understand the requirements for storing and annotating the data consumed, produced and inferred by social machines. Social machines will need to share data between them. Whilst an analysis of diverse data sets gathered from social machines will require the ability to link data across data structures. This stream has produced a series of significant papers on querying diverse data types as well as the requirements, specification and challenges of data annotation.

### Theme 3 - Privacy, Accountability and Trust

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The need to develop tractable, practical and effective models for personal privacy and trust in services and systems has never been greater. Our work has focussed on developing a model for trust based on the recent PROV standard. Trust flows from knowledge of, and certainty about, the source and authorship of data. We believe that PROV will be highly significant in this space. We are seeking to integrate these representations and expressions of trust into other SOCIAM outputs.

## **Theme 4 - Interaction**

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We have been designing interaction models to support users' defining, requesting and coordinating computation in social computing machines. This theme has also delivered a new personal data store (PDS) platform called INDX for the storage, processing and sharing of personal information between social machines. It focuses on cognitively off-loading information management to the PDS, data capabilities include: background data collation, integration and consolidation, privacy management and longitudinal information maintenance.

## **Theme 5 - Social Machines Implementation**

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This integrative theme extends or develops social machines in application areas such as citizen science, health and well-being, policing, scholarly research and leisure activities such as music. We have provided key insights into how some of the most important citizen science projects are functioning and might be enhanced. Our health and well-being applications are linked to widely deployed platforms such as Moves, Nike+ and others. These are being integrated with our research on data annotation and provenance. They are also used to help develop key functionality in our Personal Data Store. In the policing domain we have presented to the National College of Policing on the importance of social machines in crime reporting. In collaboration with Hampshire Constabulary we have developed a mobile crime/nuisance reporting application.

We are keen to speak with our partners to discuss potential social machine platform proposals where we have the best chance of significant traction/usage perhaps through in-house communities or as adjuncts to existing curated communities or customers, service users or other groups.

## **Theme 6 - Web Observatories**

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Another of our practical/integrative work packages, the Web Observatory is a type of "multi-meter" in Web Science seeking to infer knowledge and produce insights based on digital footprints left on the Web. These insights come from a constant interplay between the affordances and data that are made available ON the Web and the resulting usage, behaviours and changes that result - effectively knowledge ABOUT the Web.

There are two key challenges in this area: the first is interoperability (discovering and sharing datasets from different observatories and thus reducing increasing the scope of what can be studied whilst reducing redundancy and wasted effort). The second challenge is observability - what data can be extracted from social machine activity in a reliable, efficient and ethically responsible way.

The project has built an Observatory platform which currently hosts several data sources using different storage technologies. We are experimenting with efficient distributed queries across multiple datasets and are planning to integrate social machine data from other work streams with additional open data and social media sources to enhance the quality of analysis that can be performed on social machines.

## *About SOCIAM*

*This work is supported under SOCIAM: The Theory and Practice of Social Machines.*

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*To find out more please visit the website at <http://www.sociam.org>, follow us on Twitter at @project\_sociam, or visit github at <http://sociam.github.io>*

*For comments or corrections please contact the editor, Ian Brown via the SOCIAM web site.*