Pseudonymity in Social Machines

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ABSTRACT
This paper describes the potential of systems in which many people collectively control a single constructed identity mediated by socio-technical networks. By looking to examples of identities that have spontaneously emerged from anonymous communities online, a model for pseudonym design in social machines is proposed. A framework of identity dimensions is presented as a means of exploring the functional types of identity encountered in social machines, and design guidelines are outlined that suggest possible approaches to this task.

Categories and Subject Descriptors
H.5.m [**Information interfaces and presentation (e.g., HCI)**]: Miscellaneous.

General Terms
Design; Theory.

Keywords
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1. INTRODUCTION
Social machines are socio-technical networks characterised by the resources of the internet and modern scales of computing and storage, namely: rapid connectivity; low cost of participation; access to large libraries of data and cultural materials; and an abundance of processing and organising tools.

Identity is a core part of most social machines. The systems often shape social interaction for particular parts of the processes required. For example a system of guidelines and automated messaging may ensure that new users are welcomed by a more experienced member or an active contributing community [1]. Motivations for such a pairing dynamic to be created and sustained are numerous, in this example the new user of a large-scale system is offered a personal-scale relationship, encouragement and explanation, while the established user is given a sense of responsibility and a role of authority. Such an open, two-way communication can also act to establish a broader ongoing community of support, and motivation through implied social capital [2]. Here we draw on a broad definition of identity encompassing identity as a narrative of social belonging and as an identifier. As an identifier, identity acts as a distinctive representation of persistent autonomy that can accrue reputation and social capital. As a narrativisation, identity is closer to a tone-of-voice, a process of articulating shifting cultural and social belonging, expressions of power which can be as much about marking exclusion and difference as they are a point of attachment [3].

The distinct identities encountered in a social machine environment can form a strong part of why someone decides to contribute, learns how to engage, stays motivated, helps others, and so on, within the framework of an effective social machine. Beyond appropriating existing identities in a system to serve a particular task, those shaping a social machine may wish to try to design or engineer identities for particular purposes. For a grounding in the role design plays in identity and persuasion see discussions from Frid-Jimenez on charisma [4]. Pseudonymity is the decoupling of prior social history from the creation of a new character. We can think of designed identities as the process of shaping pseudonyms. This paper seeks to describe the potential and design parameters for pseudonyms within social machine systems.

2. DIGITAL PSEUDONYMITY
The flexibility of digitally mediated networked identities and the limit of subtle signals enforced by low communication bandwidth online has allowed for rapid and varied experimentation with constructed identity. In order to emphasise the decoupling between a person and the potential media used to portray the identities they are controlling, this paper draws little distinction between the terms 'author', 'controller', 'performer', and so on when describing the person who is interfacing with a created pseudonym character. We can characterise the control of pseudonyms decoupled from authors by considering the relationship between authors and identities.

In physical contexts people have often been limited to maintaining a single pseudonym. The effort and technical costs of decoupling their established identity from their new creation and physical limits, such as only being able to be in one place at a time, have limited most (although not all) historical examples of pseudonyms to a one-to-one relation between performer and character. There are pre-digital examples of mass pseudonymity such as Voltaire, who is said to have written under at least 176 different pseudonyms [5], but these tend to have been maintained sequentially, or over long time spans between outputs. In online contexts adherence to one-to-one correlation of person controlling and a single identity signalled in a particular context is often not so technically constrained or enforceable. The cost of maintaining multiple concurrent simple pseudonyms is low enough for one-to-many control to be easily possible. Studies of early web social pseudonymous systems such as usenet [6] describe regular uses of

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one-to-many identity control as a means of exploring different identities and contexts with relative ease.

Beyond one-to-one and one-to-many authorship, a third mode of control is made possible by this decoupling of performer and character in pseudonym systems. Many-to-one identities, in which a group of several authors simultaneously, or sequentially, control a single persistent identity are made possible by the interface and controller being flexibly mediated by digital media and networking. For example sequential controllers can drive a chat support system for a company under a single pseudonym. The site user starts a conversation with an invented chat identity, authored by an initial 'welcome' script or low-training support operator, and as the conversation progresses remaining unresolved, the identity can be taken on by more and more skilled controllers as seamlessly as possible. Simultaneous control is a much greater technical and organisational challenge, and so current examples are much fewer. However historical examples suggest many-to-one control may be possible, at least in certain domains or types of communication. For example in the field of mathematics the Bourbaki group wrote collectively under the name Nicholas Bourbaki, sustaining the pseudonym over several published works [7].

Can we expect identities to be created and controlled in self-assembling and crowd participation systems just as effectively as software, knowledge and visual design have been produced in social machines? A characteristic quality of many social machines is that a task traditionally completed by a single expert can be fragmented in to an ecosystem of contributors and scaled up more easily as a consequence. Software testing and bug reporting systems for example fragment and scale the task of testing and improving code, replacing or augmenting certain activities of the traditional expert software engineer. This process of fragmentation requires systems of coordination and socio-technical interfaces to overcome challenges of untrained volunteers, transient attention of temporary contributors and a 'long tail' of relevant experiences. Just as the protein folding game Foldit has exposed the bounded but complex task of searching for low energy states in 3D protein models to a much larger audience [8], so too might we expect to see systems that expose aspects of character creation or control to a large group of users.

3. SPONTANEOUSLY EMERGENT IDENTITIES

The anonymous posting norms of forum discussion sites like 4chan [9] demonstrate a community maintained on the shortest possible duration of identity. Each post on sites such as this can be thought of as the product of a unique pseudonym that lasts only for the duration of the text and images in that post, or more recently on 4chan, within one thread for the length of a day. Identity can be sustained to some extent through tone of voice over short periods in one conversation, but mimicry and community enforcement of anonymity over longer periods mean that all participants are using established subcultural voices to fit in and show belonging. Vast and influential pop-cultural production is borne out of the dynamics of constantly reasserting community belonging by re-posting and appropriating signifiers of community voice.

In environments of anonymity such as 4chan, it is perhaps no coincidence that many of the memes that have evolved are themselves strongly recognisable characters. It is as if an 'identity vacuum' has encouraged identities to be created as part of the daily conversations of entertainment and community. Examples of widely understood and used characters within these communities include the despairing Rage Guy, the uncanny, mocking and community policing Pedobear and the ever optimistic Advice Dog. Some of these characters first appeared in anonymous boards, while others were appropriated from pseudonymous contexts but seem to have developed into fuller characters in the context of anonymity. Images are appropriated and voice added, and over time some characters take on well established and distinct identities. The one-to-one pseudonyms of each single post or thread in this community seem to sustain a number of ongoing, rich and familiar identities. Many characters given life in online subcultural environments like this have gone on to achieve wide-reaching popular recognition and use. For example the character Forever Alone has featured widely in mainstream media including a 2011 Sony Ericsson advertising campaign [10]. Many-to-one characters it seems have emerged spontaneously within this community, and just as with code projects, we can also see examples of characters being 'forked' in to families of related but distinct identities. For example a range of relate 'rage comics' characters have developed in the style of Rage Guy [11] while a number of distinct identities have emerged in the Advice Animals meme, forking the original Advice Dog format and building on the tone of voice [12].

The emergent identity of Anonymous itself has taken form both visually and in character through a similar coauthoring process. Over several years the identity has shifted from a uniform and nondescript signature of 'Anonymous' on each post on 4chan to a well understood community identity. For the most part, the name is evoked as a group identity. However, at times Anonymous has been embodied as a single pseudonymous visual identity in images and video press releases during hacktivism activities. The Anonymous pseudonym has been forked and merged many times since it has emerged, leading to several differing identities coexisting under the same name. We could suggest that the Anonymous character is a prototype of a linux-scale identity project.

The anonymous and emergent beginnings of these characters mean that little ownership can be exerted over them – suggesting that free software and opensource models might offer the closest analogies of organisation and control. These rudimentary examples of spontaneous emergent identities suggest the possibility that more complex constructed identities may be sustained as part of future social machines. This would imply that such many-to-one identities could be shaped to particular tasks, although perhaps only inasmuch as the direction of open source software projects can be steered. In the remainder of this paper the dimensions that characterise how identities are used in social machines are reviewed, before going on to suggest potential design guidelines for fostering and sustaining social machine pseudonyms.

4. DIMENSIONS OF IDENTITY IN SOCIAL MACHINES

Some social machines form through a phase of rapid involvement and activity before running their course or stabilising in to a more steady state sustained by bureaucratic systems. For example the emergent social mechanics of early 'operations' in the Anonymous community are described as periods of rapid recruitment to a cause followed by development of structures of organisation and planning to sustain activity [13]. More generally social machines might be described as characterised by phases of charismatic growth and bureaucratic stability. For most projects identity plays a number of important roles in both of these phases, influencing design goals of trust, stability, support, direction and inspiration. Bickmore and Picard [14] outline key areas in which

social relationships have significant influence including emotional support (reassurance, guidance, social introductions), persuasion (closeness, trust), learning (cognitive, behavioural, emotional engagement) and management (performance, responsibility).

The identities encountered in social machines are clearly not all uniform in character or motivation. This paper proposes the dimensions of longevity, hierarchy and reciprocity as a framework to discuss existing identity types and to consider future pseudonym design.

The dimension of longevity captures something of how enduring and familiar a character is intended to be. We can compare a fleeting single encounter to one that is expected to last over many meetings. The game player in von Ahn's ESP Game [15] is paired with an image labelling partner, an example of a connection lasting only as long a single game session. Yet the connection a player feels they can establish at a distance with a partner forms a central narrative of motivation in the game. It is interesting to note that in some cases the co-player in the game is a fabricated identity formed from the results of previous games [15]. While most contributors to wikipedia spend only short moments engaging with the meta discussions on the site if at all, for more dedicated participants of the project, long-term social interaction and familiar identities can play a central role in engagement and motivation. As the WikiProject guide page emphasises "Creating a WikiProject is the process of creating a group of people who want to work together" [16].

Hierarchy describes how someone views an identity in the context of social or organisational standing. Is the character a symbol of leadership and inspiration, a peer of equal standing or an identity to be supported or taught? Social signals of hierarchy are dependent on context and local cultural references. Signals such as formality and expertise are common indicators of social position. The personal tone of voice in project descriptions and confirmation emails often shifts between 'we' meaning the core team of organisers to a sort of 'royal we' (majestic plural) where the character of the social machine itself speaks on behalf of all participants. The hierarchy the character of a large project develops is often one of a figure of leadership and charismatic authority. Some projects explicitly design character representatives, for example the mascot developed as part of the Firefox adoption campaign sought to produce a cute version of the red panda in the logo. Here, we might read the identity hierarchy evoked as a personal companion or character to be cared for.

The dimension of reciprocity describes whether a character is likely to remember or recognise a user. It describes the character's ability to recall the user, to develop mutual recognition and to foster a sense of persistence of relationship. Many twitter identities with high numbers of followers have informal tones of voice, which can suggest a hierarchy position of equal peer, but are unlikely to recognise or respond to most followers, so have a low reciprocity. If a user of a system is expecting a leadership figure to not reciprocate in their encounters, and then receives a message from that identity that refers to personal details shared elsewhere in the system, they are likely to find this disconcerting. Similarly a friendly character that uses the language of a peer, but on repeat meetings fails to recall the user is just as disorientating.

Potential to encounter persistent identities establishes a motivation to build social capital. One aspect of altruism is a latent desire to contribute to a community, even in cases where such contributions will not actually be remembered. Motivation to participate in citizen science is often altruistic in character. The starting point for new users of systems like the first version of Moon Zoo [17] involve little online social interaction. The interface presents no explicit identities, but rather instructions and training examples. We can think of the social motivation here as the offline social capital accrued by the participant being able to say that they are "contributing to valuable science" [17]. The interface does however embody a tacit identity in the character of the project itself. The branding of the interface and tone of voice in the instructions give off social signals of a particular constructed identity.

Careful organisational design and personal motivation through utility or reward can create large scale social machines without the need for any explicit identities. Examples include the tight functional integration and utility reward of reCAPTCHA and the systematically organised financial rewards of Mechanical Turk. However, even here we can see how principles of cognitive engagement and emotional guidance could be important for longer term performance of a system like Mechanical Turk, while engendering trust in the intentions behind the system is important for the ongoing successful adoption of reCAPTCHA [18].

We could ask whether a social machine sustained solely on voluntary contributions can exist without any encountered identities or potential to accrue social capital. The global price index site priceofweed.com, in which visitors can contribute a location, price and quality of marijuana they have illegally purchased, provides a potential example of a project where altruism overcomes cost of effort despite legal risks. Perhaps even in this case many participants in the project are entering information in a social way, with the social capital accrued in a physical social context beyond the online system.

5. DESIGNING FOR MANY-TO-ONE PSEUDONYMS

Constructed identities suggest a powerful mechanism for mobilising communities of people to action and perhaps also as a means of anthropomorphising mechanical aspects such as recommendation algorithms, reminder alerts or online interface support. Depending on the dimensions of identity required, cooperatively performed pseudonyms may vary in difficulty to design. For example, a distant figurehead intended to express the goals of a project or a short-lived naive companion in a training task seem easier to create and control than forms of pseudonym that require building emotional connection, refer to a history of communication or dictate specific tasks under tight deadlines.

Of particular challenge are constructed pseudonymous characters with high longevity, matched hierarchy and high reciprocity. Such identities will be expected to use shifting cultural cues, recall and build on a history of encounters and relationships and do so consistently over a long period of time. In one-to-one performances with established identities, such as when an experienced ventriloquist interacts with an audience member, the controller is engaged in a skilled effort to 'add life' to a character. We can understand this as a feedback loop where the performer is drawing from a well formed model of the identity and is also able to read the social cues their character is 'giving off' [19] and subtly adjust their inputs to compensate for any emerging uncanny aspects. Such a performance requires sufficient fidelity of control and bandwidth of gesture.

Automated or novice performers of pseudonym characters will struggle to create a feedback loop of tacit social signals needed to maintain a feeling of rich life. This challenge is exacerbated in many-to-one systems in which communication between the controllers themselves will be slow and incomplete. We can outline some possible design approaches. Drawing on historical examples of pseudonymity in publishing, asynchronous

communication offers larger time periods in which groups can more effectively control a character. Interface symmetry describes a design approach in which performers should be able to see their character within the context that the audience sees it to allow for social signals given off to be assessed and for an effective performance feedback loop. Automation should be balanced. Automation reduces the signals given off by the controllers from leaking in to a character unintentionally and can simplify control. However automation also reduces the ability for controllers to make subtle or tacit adjustments to their performances to maintain their character feedback loop.

Attempting to design or engineer an identity also creates issues of trust. This is partly due to the reduction of social cues in the decoupling of the performer from the character in most pseudonyms. However it is also the act of decoupling itself. Creating a character that is not connected clearly to a single human is currently a mistrusted action as many of our tools of social accountability are maintained in physical contexts [6]. Anonymity can be an important aspect of some social machines to protect contributors from retribution, but it can equally be used to reduce accountability in how social machines are being steered or obfuscate intentionally disruptive activities. Even in the simplest of contexts the process of decoupling performer from character can evoke a sense of deception. For example, if a user of online chat support notices they are being handed from one author to the next under a consistent pseudonym they may start to mistrust the information provided because of their perception of this as deception. Many examples of social machines operate on concepts of openness. It may be that open accountability can be extended to apply to identity construction in these contexts. Pseudonyms do not have to be anonymous. Within society there are many historical examples of classes of identity which we could describe as 'owned pseudonyms'. The decoupling here is not absolute and technically enforced, but rather a social agreement. Musicians, performers and puppeteers all tend to establish distance between themselves and their pseudonym characters through social norms rather than technical barriers [5]. Openly many-to-one systems may struggle with how the character's tone of voice is perceived consistently, but do suggest a model that closely matches the successes of free software systems, and so may fit well with the approach of many social machines.

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