

The Right to “Net Serendipity”?

The alternative way to tackle the risks of an over-personalized Internet experience

Urbano Reviglio della Venaria
LAST-JD Ph.D. Candidate

Abstract. The paper questions whether serendipity, a natural dynamic in human life, could and should be protected in the Internet space. Nowadays algorithmic systems on the Internet automatically personalize one’s virtual experience accordingly to one’s (assumed) preferences and taste. The result is a personalized Internet experience based on one’s previous searches. This phenomenon may shrink the possibility to encounter unexpected and unimagined information, or to face opinions and perspectives one might disagree with, leading to the creation of ‘echo chambers’, virtual places in which people are not confronted with otherness (of experiences, taste, opinions, beliefs, etc.) and tend to be uncritically reinforced in their convictions. In this self-reinforcing cycle of opinion, over-personalization has the potential to produce a sort of determinism of information, jeopardizing civic discourse and the integral development of both individuals and of democratic societies. The paper aims at analysing the dynamics of the relevant actors at stake and whether one could legitimately claim that the public power have a stake in reducing the negative impact that over-personalization has on their citizens, and on their societies as a whole. The paper will construct the notion of “Net serendipity” in order to face the implications of filter bubbles and echo chambers and triggering a broader debate involving not only academia but also policy makers, engineers and the wider public.

Keywords: Internet, Filter Bubble, Echo Chambers, Serendipity, Rights, Ethics

Introduction

1. Filter Bubbles and Echo Chambers
2. The Public Sphere in the Digital Era
 - 2.1 The Invisible Power of Algorithms
 - 2.2 The Role of Users
 - 2.3 Social Media Platforms: The Case of Facebook
3. The Net Serendipity Principle
 - 3.1 The Value of Serendipity
 - 3.2 A Human Rights Perspective
 - 3.3 Potential Applications of a Right to Net Serendipity

Conclusion

References

Introduction

ἄρμονιή ἀφανῆς φανερῆς κρείττων

“The unexpected connection is more powerful than one that is obvious”

Heraclitus

Social life is intertwined with digital life. The ICT revolution is pervasive and it is changing many aspects of reality itself, bringing deep transformation in the social, economic, political and legal spheres. The governance of the Internet, however, is a unique, problematic and challenging issue. No other network in the past has exhibited the Internet features, a fact that poses unprecedented methodological issues not only for scholars, but also for policy makers and industry. The search for concepts, tools, and categories in order to make sense of the twenty-first-century Internet, as a set of practices and technologies, as an academic field of research, and as a properly legal space, is very much open-ended.

Furthermore, many expectations about the democratizing potential of the Internet have been so far unrealized. On the one hand, Internet is fuelling a society of control. In several countries it has evolved in a massive surveillance-industry complex that risks to escape democratic control and accountability and threatens the free and open character of our societies (Hayes, 2012). Internet, therefore, is no more synonymous with freedom, but it is increasingly a source of domination, especially by authoritarian governments (Morozov, 2010). On the other hand, Internet is increasingly privatized and monopolized by few companies with an inconceivable power: it is the triumph of the “winner-takes-all” model. At the same time, users hold in a subordinate position, firstly being unconsciously raw data producers, and secondly by being fed with addictive social media platforms, alienated by smartphones, often with low quality information (Ippolita, 2016).

Unlike past techno-utopist's hopes, these general trends are a threat for democracy. In particular, an over-personalization of users' Internet experience may fuel at the individual level, the human tendency for confirmation bias, whereas at the collective level decrease the discussion in the public-sphere, giving raise to polarization and, perhaps, also to populisms. Indeed, personalization through recommender systems can create filter bubbles and echo chambers, two size of the same token. The first is a kind of cultural and ideological bubble, in which an internet user continue to see, listen and read what reinforces its view of the world. The latter, is a group situation where information, ideas, and beliefs are uncritically spread and amplified, while dissenting views are censored and/or ignored.

These phenomena occur for many reasons. Primarily, recommender systems are mainly designed to increase the engagement for the sake of profit. Therefore, the value inscribed in the algorithms may not be functional for a healthy democratic discourse. However, it is not clear yet the extent of these phenomena and whether they are harmful. Scholars argued that users have the

possibility to opt-out from over-personalization. Nevertheless, it will be argued in the paper that this cannot be the only solution. Instead, an alternative way to actually help users to burst their filter bubbles and, therefore, weaken the echo chambers, may be not only by giving to users more autonomy to manage their information diet but also with serendipity, namely by algorithmically inscribing the possibility to encounter alternative and opposing unexpected views (Semaan et al. 2014; Makri and Race, 2016; Domingos, 2016).

Any procedure of selection of information, indeed, should recognize and seek to solve the tension between *relevance* – what the readers wants - and *serendipity* – what the reader may want - in a proficuous manner (Gazoia, 2016). In the digital environment this balance inevitably shifted from serendipity to relevance (Thurman and Schifferes, 2012). Users, therefore, may be trapped in a continuous flow of much more relevant information than serendipitous one. Yet, the question becomes broadly: is an unbalanced relation in favor of relevance an inevitable better ratio for any social media platforms for increasing the engagement, so the profit, in an era in which information is so pervasive and internet's usage so addictive?

Despite this general speculation, since information intermediaries such as Google and Facebook still claim to be neutral, this brings anyway the question whether they have a social responsibility to expose the user to individual and public values (Bozdag, 2013). At the same time, it must be questioned the potential for scrutinizing the algorithms at stake as well as the actual autonomy of the users. Many of the issues revolving around this phenomenon, in fact, are unsolved.

The paper aims at analysing the dynamics of the relevant actors at stake and whether one could legitimately claim that states have a duty in reducing the negative impact that over-personalization has on their citizens, and on their societies as a whole. It will be assessed the value of serendipity in the digital environment and whether this could be considered as a principle that belongs to the ontology of the infosphere, in order to trigger a broader debate involving only academia but, most importantly, policy makers and the wider public.

Before deploying the theoretical arguments and the potential practical application to such principle, a brief analysis of the current relations between the main relevant actors - users, algorithms and online intermediaries. Thus, the first part will focus exclusively on the main features of the technocratic delegation to algorithms. Then, the dynamics of the filter bubble effect will be unveiled, taking into consideration the users proclivities and the paradigmatic case of Facebook. This will provide an overview on the main characteristics of the functioning of recommender systems as well as on the trends of the users behaviour's and the politics of the world's largest social network. Finally, in the last section we will frame the “Net serendipity” principle and attempt to justify its potential implementation.

1. Filter Bubbles and Echo Chambers

The dynamics of the “Filter Bubble” effect became popular in 2011, framed by Eli Pariser. The basic idea is that recommender systems, driven by algorithms, can close Internet users in a kind of cultural and ideological bubble, in which they continue to see, listen and read what reinforces their their own view of the world. Indeed, when users google a word or a phrase in a search engine, the result is a personalized query based on their previous researches. Similarly, when something is liked on Facebook it automatically defines users' preferences. These features of search engines and social media are broadly useful from an economic perspective. In fact, they bridge the gap between the demand and the supply in a sea of information. Indeed, it performs a fundamental and recognized filter to reduce the inescapable “information overload”.

Every input on the Internet increases the algorithmic power giving users more personalized output. This, however, creates the so-called “bubble”, the personal background set of information in which Internet users live when they are online. It is a bubble because everything they encounter is tailored precisely for them, and the more they surf the Internet the more it becomes akin to them. Then, it is invisible and nobody decides consciously to enter into, whereas many other do not know they are already living in it. Personalization can, therefore, produce a determinism of information. The risk is that users are trapped in a self-reinforcing cycle of opinions, hardly pushed to discover alternative standpoints. In essence, bubbles fuel the so-called *confirmation bias*, “the tendency to test one's beliefs or conjectures by seeking evidence that might confirm or verify them and to ignore evidence that might disconfirm or refute them” (Oxford reference). As a consequence, the dialectic and civic discourse could be weakened by polarizing and making people more vulnerable to censorship and propaganda, or, to some extent, to self-propaganda (Sunstein, 2007; Pariser, 2011).

There is few and conflicting research about the extent to which filter bubble effect is beneficial or harmful. This phenomenon however, raises concerns both at the individual and collective level; individual, because the filter might reduce opportunities for users' identity to self-determine. Indeed, personalization would reduce opportunities for serendipitous discovery, particularly reducing exposure to alternative points of view (Sunstein, 2007). The consequences may be various: from the limitation of personal creativity, “insight and learning” to a reduction in our ability to build productive social capital (Pariser, 2011). Collective, because by fueling polarization, pluralism may be weakened (Sunstein, 2007). Furthermore, an other prominent risk is that filter bubble could spur inequalities. Indeed, some privileged group of users, that have enough digital literacy and resources, would be able to reach a good balance between *relevance* and *serendipity*, and a larger group of users less aware and alliterate would risk to be exposed only to a minimum, qualitatively inferior part of information (Gazoia, 2016). Indeed, it has been argued a demographic “political divide” for what concerns the Internet usage (Valletti et Al., 2015).

The question is not whether the filter bubbles exist. In fact, there is plenty of evidence of their existence (Wojcieszak, 2009, 2010; Bakhsy et al., 2015; Bozdag, 2011, 2015). As O'Hara and Stevens (2015) argued, the two key questions are, therefore, whether social media's recommender systems are complicit in their growth and, in that case, whether this should be the target of a policy focus. It is difficult to answer these fundamental questions, since most of research is often inconsistent and rarely conclusive because it is generally survey-based, and so dependent on self-reporting, or based on a small or unsatisfactory sample. Some trends, however, are rather clear. If people begin to filter out uncongenial news, then we may see hardening of attitudes (Warner, 2010). Also, users, especially radical ones, are usually more likely to share articles with which they agree (An et al., 2014). Indeed, the filter bubble thesis has a good deal of support, particularly in the context of online radicalization (Sunstein, 2007; Warner, 2010; Wojcieszak, 2010). As populisms are growing in strength and popularity across both Europe and the US, in fact, there are concerns that more and more people who were never confident enough to voice their beliefs openly, are now in a position to connect to like-minded others and become more confident and vigorous, but also dangerous.

Some political radical groups have claimed that they use exposure to opposition to strengthen their opinions further (Wojcieszak, 2010). To some extent, this would undermine the idea that simply exposing people to alternative points of view would undo "echo chambers". However, another study (Semaan et al., 2014) shows that they would do so after better understanding the other political side and, in some cases, formulating new opinions on issues that were against their former beliefs. Certainly, the mere fact of engaging with other groups does not of itself dispel echo chambers (O'Hara and Stevens, 2015). Even if the service providers designed personalization filters that respect alternative values, like serendipity, the user could still trap himself in its own "echo chamber" (Sunstein, 2007). Indeed, filter bubbles are characterized by dynamics similar to the pre-digital "echo chambers", wherein people tend to seek political information that is aligned with their beliefs and discuss them with citizens who agree with their own beliefs. The filter bubbles, therefore seem to be foremost a social phenomenon. This, however, raises a question: if technologically possible, should the public power have the right and/or the duty to dispel or prevent this phenomenon?

O'Hara and Stevens (2015) claim that policymakers would feel compelled to control this phenomenon only if echo chambers are important in fomenting extremism and, therefore, violence. We should consider, however, that despite radical concerns, there is room to consider alternative legal actions by appealing to the so-called precautionary principle and to the fundamental human rights. Indeed, a legal action to dispel filter bubble could be justified not only considering the potential risk that social media are actually strengthening this social phenomenon, by becoming a

social threat, but also as a form of *a priori* defense of fundamental human rights, such as the right of thought, the right to personal identity, the right to information, the right to privacy and the right to self-determination. However, legal research on this key issue has just begun, so we need more work in order to understand and prove anyone of the above conjectures. To argue our position, we needed to analyze the main relevant actors. From the algorithms to the role of users and the case of a giant intermediary like Facebook, we will briefly frame the arguments to support the introduction of a new concept – the Net serendipity principle – both from a human rights perspective and by imagining its potential applications. In this paper, however, we will not attempt to lay the foundations of such a theory of the right to “Net serendipity”, but more modestly to highlight open issues and raise both theoretical and practical questions.

2. The Public Sphere in the Digital Era

The ways in which the web gives more visibility to some information and content than to others is fundamental in the debate on the defining features of the digital space as a “public space” (Musiani, 2013). Castells (1996) presented the idea that the public sphere has moved from the physical world to the network. Indeed, social media can be viewed as a new type of online public sphere (Semaan et al., 2014), though it can be also argued that an ideal public sphere may never have existed and that the Internet is only a public space and not a public sphere (Papacharissi, 2002). Statistics, however, has shown increasing use of the Internet and social media for political activity (Rainie, 2012). Internet is, therefore, potentially a public sphere. We will, therefore, analyze it in the light of the normative prerogatives of the Habermas' public sphere theory.

The Habermasian public-sphere is the “realm of our social life in which something approaching public opinion can be formed” and it operates through an expectation of accessibility that allows all citizens to participate without restraint (Habermas et Al., 1974). According to Habermas, two conditions are necessary to structure a public space: freedom of expression, and discussion as a force of integration. The architecture of the “network of networks” seems to articulate these two conditions. However, if the first is frequently recognised as one of the widespread virtues of the Internet, the second seems more uncertain (Cardon, 2013). The filter bubble, in effect, may limit the discussion and, therefore, weaken the potential of the public-sphere.

Then, freedom of information is a fundamental building block in supporting the autonomous individual. The ability to find and communicate information is the basis upon which democracy is built. Without the ability to gather information, the individual cannot acquire that information that is necessary to make autonomous decisions based on facts. Through manipulation the public information sphere cannot function (Lucchi, 2014). In “Political Communication in Media Society” (2006) Habermas argued that “mediated political communication in the public sphere can facilitate

deliberative legitimation processes in complex societies only if self-regarding media systems gain independence from their social environment, and if anonymous audiences grant feedback between an informed elite discourse and a responsive civil society” (p.411). Currently, however, Internet seems to deviate too much from the ideal articulated by Habermas.

In theory, a fully operable public sphere is fundamental to the functioning of democratic societies (Lucchi, 2014). However, the promise of efficient communications and the development of the Internet into a public sphere without the limitations inherent in Habermas’ model have been proven to be mostly false hopes (Klang, 2006). Even if it remains a normative horizon, Habermas’s theory provides a standpoint from which social institutions that fail to fulfil his very demanding criteria can be critiqued in the hopes of making them more legitimate and just. Yet, the Habermasian notion of a critical publicity is still extremely valuable for media theory today (Boeder, 2005). It will, therefore, be used as a theoretical compass to assess the risks underlying under-regulated filter bubbles in the public-sphere.

2.1 The Invisible Power of Algorithms

Though invisible to most of us, algorithms are the ubiquitous recipes of our information society. They are not only an “encoded procedures for transforming input data into a desired output, based on specified calculations” (Gillespie, 2013), but also political artefacts that have inscribed values that shape our society. By delegating to algorithms a number of tasks that would be impossible to perform manually, the processes of submitting data to analysis are increasingly automated and, in turn, the results of these analyses automate the processes of decision-making (Musiani, 2013).

Algorithms are part of a broad phenomenon that has been also called *algocracy*. According to Aneesh (2009), the term algocracy refers to a digital network environment in which the power is exercised in an increasingly profound manner by algorithms, i.e. computer programs that form the basis of media platforms, which make it possible some forms of interaction and organization and hinder others. In other words, the algorithms subtending the information and communication technologies we daily use are artefacts of governance, arrangements of power and “politics by other means” (Latour, 1988). Thus, this delegation becomes part of a concerning technocratic system. Indeed, today we live more and more in a black-boxed society, where the distinction between state and market is fading and in which capitalist democracies increasingly use automated processes to assess risk and allocate opportunity (Steiner, 2012; Pasquale, 2015). This poses the question of agency and control: who are the arbiters of algorithms?

Of course, the role and the management of invisibility in the processes of classification that order human interaction have been core concerns of science, technology and society scholars for several years (Bowker and Star, 1999). Today, however, we are just entering in the era of Big Data,

an era in which the use of predictive analytics or other certain advanced methods to extract value from large amount of data is becoming increasingly pervasive and effective. This may also create a data-driven mathematical model of social behaviors with unpredictable epistemological and societal consequences (Pentland, 2015). Therefore, the question of the relationship between algorithms and rules is becoming a fundamental interdisciplinary concern, likely to occupy an increasingly central role especially in the study and the practice of Internet governance (Musiani, 2013).

In the Internet environment, the algorithms that have been more publicly discussed are those that function as a gatekeeper and personalize our Internet experience. Personalization is “a form of user-to-system interactivity that uses a set of technological features to adapt the content, delivery, and arrangement of a communication to individual users’ explicitly registered and/or implicitly determined preferences.” (Thurman et al., 2013, p.2). Generally, it can be explicit and implicit. The first makes use of users requests, while the other is mainly based on monitored users activity. Both increased dramatically in the last years, though many websites have acted to make passive forms of personalization the fastest growing forms (Thurman, 2011). To make two simple examples, the algorithm for Google's *PageRank*, which select the results in the search engine, and Facebook's *EdgeRank*, which select friends news, are probably the most known and powerful ones. Despite any concern, these algorithms are broadly useful from an economic perspective: users get a super-customized services; providers boost users’ engagement, thus maximizing their own profitability.

Apparently, therefore, these algorithms are not doing anything wrong: they select and inform or recommend neutrally. However, this is not the case. There is no objectivity in the realm of filtering and personalization (Thurman et al., 2013; Bozdag and Timmermans, 2011). Humans shape the algorithms and the algorithms shape us continuously, in a “co-productive” manner (Jasanoff, 2004). Any artefact – like algorithms – embodies specific forms of power and authority (Winner, 1986). Algorithms, indeed, are using supplied criteria to determine what is “relevant” to their audiences and worth knowing (Gillespie 2014), though these biases are not generally recognized because they are assumed to be impartial (Bozdag 2013; Pariser 2011; Gillespie, 2014).

Of course, the embedded values are secrets and assessable only indirectly. Indeed, its understanding in the academic world is weak due to two major factors: the impermanence of Internet technologies and the black-boxed nature of most influential algorithms (Duggan et al., 2015). The first means that by nature the Internet is transient, rapidly changing at a rate that regularly outpaces the research process (Karpf, 2012). Effectively, there are no locked, finished algorithms. Then, the black-boxed nature of algorithms occurs not only to protect trade secrets but also prevent malicious hacking and gaming of the system (Duggan et al., 2015; Pasquale 2011).

As any human product, algorithms are fallible. Indeed, they supposed to know what we want but (as powerful as they can get) they are still not able to understand the complexity of an

individual. In a sense, they are forever stuck in the past, as they base their calculations on our actions in times foregone. However, since they reduce the amount of visible choices, algorithms are actually restricting our personal agency. Indeed, the lack of transparency in the criteria that determine the outputs or just by not informing properly the public of algorithms changes, have been repeatedly criticized.

For all these reasons, institutions' ruling of algorithms is becoming a main issue for scholars and policy makers (Barocas et al., 2013). Indeed, several questions arise: is transparency possible? Should regulation of algorithms be pushed in specific contexts? And, if possible, how this would look like?

2.2 *The Role of Users*

It is very hard to generalize the role of users and how the Internet is actually used. It is, in fact, a very complex, stratified and dynamic phenomenon. Nonetheless, some main categories and trends may help us in supporting the arguments in favour of policy intervention. In this subchapter we will explore users' proclivities in order to make clear one the main problems for what concern the filter bubble phenomenon.

A recent survey by the Reuters Institute Digital News Report (2016) shows that ordinary people across the world share and embrace automatically generated personalized recommendations. Algorithms seems more popular than journalists, as long as the algorithms are based on people's personal consumption. Most people, in short, trust themselves more than they trust journalists. Obviously, the only outcome directly visible of the great work of algorithms filtering is the satisfaction of user's actual desires, *hic et nunc*, hardly taking into consideration the importance of the *undesired* in the future construction of its identity. Nevertheless, concerns over both filter bubbles and algorithmic discrimination are also widespread. Across all the countries surveyed, people tend to be worried that "more personalised news may mean that they miss out on important information and challenging viewpoints" (p.113). Users, in short, may not trust algorithms very much but they enjoy their services everyday. Though people have reservations about algorithms, many have even more reservations about journalism and editorial selection.

One may argue that the management of the filter bubble should depend only on users. Indeed, individual choice has a larger role in limiting exposure to ideologically cross cutting content (Bakhsy et al., 2015). Yet, users could sabotage personalization systems by "erasing web history, deleting cookies, using the incognito option, trying other search engines and fooling the personalization system either by entering fake queries or liking everything ever produced by your friends" (Bozdag, 2015, p. 254). However, because of the opacity in the management of users data it is not clear how much the de-personalization is effective, and if all our data are actually definitely

deleted. Independently from conspiracy theories, it is a fact that users' autonomy is rather limited. The opting-out actions require a remarkable amount of time and will that most of the people do not have or do not want to spend, so that generally they cannot be the only solution (Rodotà, 2014). Therefore, the autonomy of users can be questioned on several grounds.

First of all, in order to access any social service platform users have to give up the social data they generate. It is the business of the meta-data that allows the existence of the "free" web. In the economy of profiling users are at the same time commodity producers, commodity consumers and the commodity themselves. Users are exploited as "raw material", and this occurs with their consent. Thus, every time they surf the Internet they leave their digital fingerprint, as if we were on the scene of a crime. Indeed, profiling is an activity that comes from the criminology and users are the "criminals" to get to know in order to predict our desires and satisfy a compulsive thirst of consumerism (Ippolita, 2011). This is the chimera of the data-driven society in which sociality is turned into economic value.

Interestingly, Bauman and Lyon (2013) summarized a new strategic change, what they called the "post-panoptic society": "on the one hand, the old ruse panoptic (you'll never know when I look at your body, and in this way your mind will never stop feeling observed) is implemented gradually but consistently and seemingly unstoppable, on an almost universal scale. On the other hand, now that the old nightmare of panoptic "never alone" has given way to the apparent hope of "never to be alone" (or abandoned, ignored, rejected and excluded), the joy of being noticed takes the upper hand on the fear of being revealed." (p.39) From an other perspective the writing collective Ippolita (2016) calls this attitude the "emotional pornography", as the compulsive widespread need to show off our own intimacy. Indeed, the information intermediaries' smart power for increasing profit through users engagement also manifests itself in the development of unconscious addictive rituals. For instance, the system of notification has the goal of keeping the level of attention high, by sending a number that has been presumably calibrated from your big data profile. Ippolita (2016) considers this system as a form of *gamification* in which the repetition of an action is stimulated thanks to a prize, in the case of Facebook a (number of) "like". There is no space for dislike. Thus, these systems create addictive behaviors that function acting directly on the system of the neurotransmitter dopamine (Turel et al., 2014).¹ This may explain, for example, why a majority (59%) of the URLs mentioned on Twitter are not clicked at all (Legout, 2016).

The power of manipulation of users is astonishing. Search Engine Manipulation Effect (SEME), for instance, demonstrated that biased search rankings can shift the voting preferences of undecided voters by 20% or more (Epstein and Robertson, 2015). The concerns of this shift

1 - Yet, there are many other forms of addiction related to the Internet in general, like FOMO, the "Fear Of Missing Out", so that the social network and email account are compulsively checked, to the more general Internet Addiction Disorder (IAD).

increases considering that the effect can be much higher in some demographic groups, and that it can be masked so that people show no awareness of the manipulation. Similarly, also Facebook has the same power. An experiment reported that flashing “vote” ads to 61 million Facebook users caused circa 340,000 people to vote when they would not have done so (Bond et Al., 2012). Apparently, these occurs simply because people trust algorithms, even though they generally ignore how they work (Epstein and Robertson, 2015). Certainly, it is already well established that biased media sources such as newspapers, political polls, and television influence voters (Ibid). Nonetheless, these research shed the light on the power of what was theorized in *The Hidden Persuaders* (Packard, 1957), a prophetic book about the subliminal messages which could be presumably applied to the Internet as well in a more pervasive as much as personalized manner.

Yet, users simply use to delegate with little regret or cogitation their data on the flow of the net (Madden, 2014). This attitude can be noticed also for what concerns the systems of mass surveillance. In fact, most of the users underestimate the value of their data and justify their behaviour simply claiming that they have “nothing to hide”, a fallacy resulting from a narrow way of conceiving of privacy (Solove, 2007). Yet, the former NSA whistleblower Edward Snowden brightly summarized the unsuitability of this widespread attitude: “arguing that you don't care about the right to privacy because you have nothing to hide is no different than saying you don't care about free speech because you have nothing to say”. (p.39) This attitude is akin for what concerns all the rights involved in the algorithmic manipulation of information and the faith for them, and it shows also the perverse appeal to transparency which, in the end, occurs only for the users.

To conclude, Internet does not manifests itself as a public space but falls much more in the frame of the private sphere and the exposure of the self. Our digital form of life does not build on the Habermasian communicative action, but it actually hinders free discourse. Thus, the public-sphere is hampered and the growing narcissism leads to a de-politicization of society (Byung-Chul Han, 2013). At the same time, users are overloaded by information and their general awareness seem to be rather limited. While some deterministically argue that the consequent multitasking and disintermediation of information are also worsening our capacity of problem-solving and critical analysis (Carr, 2011), others stress the primary role of digital literacy in order to overcome the widespread *digital amnesia* (Rheingold, 2012). At the end the question which must be seriously addressed is the following: to what extent are users really autonomous?

2.3 Social Media Platforms: The Case of Facebook

Information intermediaries are a fundamental actor in this context. Therefore, we will focus now on Facebook Inc., probably the most pervasive and powerful intermediary on the Net. For the sake of simplification it will be now assessed how it may fuel filter bubbles and provides users ways for

opting-out from personalization. Certainly, the social media platforms that exist today have important differences in functionality and it is not very clear whether they have similar properties when it comes to diverse information exposure (Nikolov et al., 2015).

The choice for this analysis, nonetheless, is twofold. On the one hand, with almost 2 billion users, Facebook is obviously the paradigmatic case of the pervasive power of the social media providers. Indeed, social media platforms like Facebook enact a global governance via platform design choices and user policies (DeNardis and Hackl, 2015). On the other hand, the choice for analyzing a social media depends on the fact that regarding personalization, search engines like Google, are generally less problematic because they tend to deliver one-size-fits-all services (Smyth et al., 2011). Instead, the diversity in social media communication is significantly lower than that of search and inter-personal communication (Nikolov et al., 2015).

On Facebook, there are at least three filters that can fuel filter bubbles and echo chambers: the social network, the feed population algorithm, and a user's own content selection. According to a recent study (Nikolov et al., 2015), these three filters combine to decrease exposure to ideologically challenging news from a random baseline by more than 25% for conservative users, and close to 50% for liberal users. The same study however highlights the complexities in interpreting these results. An other recent study financed by Facebook (Bakhsy et al., 2015), for instance, shows that liberals tend to be connected to fewer friends who share information from the other side of the political spectrum, compared to their conservative counterparts: 24% of the hard content shared by liberals' friends are cross-cutting, compared to 35% for conservatives. More importantly, this study concludes that individual choices more than algorithms limit exposure to attitude-challenging content. This result could play a fundamental role for the purpose of this paper. However, it is not conclusive.²

Facebook itself has been repeatedly accused of manipulating information in an opaque manner. For instance, in 2014 it manipulated the balance of positive and negative messages seen by 689,000 Facebook users without their knowledge or consent (?). More recently, there has been a leak that triggered a debate on the feature "*trend topics*". For many reasons, Facebook workers routinely suppressed news stories of interest to conservative readers from the social network's influential "trending" news section, artificially "injecting" selected stories into the trending news module (Gizmondo, 2016). This manipulation is in stark contrast to the company's claims to be neutral. Nonetheless, this should not be taken as a surprise. In fact, FB's Terms of Service are

2 - In fact, on the one hand, thanks to its research on its big data – The Facebook Research Center – Facebook holds the largest amount of data ever available for these kind of researches. From this point of view, the study can be highly reliable. On the other hand, however, despite the Facebook's Data Policy and research ethics review process, one may naturally suspect a conflict of interests. That is why independent research is necessary before jumping to any final conclusion.

emblematic of its interests in the management and manipulation of data.³ As well known, Facebook announces changes and the choice for users remains always the same: agree or leave Facebook. The risk for any users, however, is to lose some “social capital” due to the Facebook's *network effect* (Ellison et Al., 2007).

Facebook profit-driven model undermines its supposedly neutral role in several ways. For instance, *Instant Articles*, the news feature of Facebook in which users are able to open an article directly on the app newsfeed, has been hardly criticized. Indeed, this strategy gave Facebook unprecedented power and control over the news market, since already 66% of users get news on Facebook (Gottfried and Shearer, 2016). Certainly, many have warned that this system is favoring big publishers. As a matter of fact, exposure is partly related to how much money the publisher put into advertisement. Yet, small publishers have fewer resources to adapt to Facebook technical regulations. This gives “mainstream” large media group a comparative advantage, threatening the openness and the variety of online news found on Facebook.

Actually, the News Feed – the system of news updating in Facebook – is taking an increasingly central role in the information flows. It is based on EdgeRank, a complex algorithm which constantly changes its outputs based on “your behavior, the behavior of people you are connected with, and the behavior of the affinity and personality-based sub-group of users the system judges you to belong to” (Duggan et al., 2015, p.16). By doing this, some values are embedded in the process. For example, if Facebook is going to prioritize posts from close friends, engineers must decide on criteria that defines a “close friendship” versus an acquaintance. This is definitely a value-driven decision. According to Duggan et Al., these values in descending order of influence are: friend relationships, explicitly expressed user interests, prior user engagement, implicitly expressed user preferences, post age, platform priorities, page relationships, negatively expressed preferences, and content quality. Friend relationships, in particular, moderate how the other values will be expressed. Friends on social media, however, tend to be ideologically clustered and this potentially “places the lens through which the News Feed algorithm filters all other values firmly within your personal bubble to begin with” (Ibid, p.15). Indeed, social homogeneity is the primary driver of content diffusion, also misinformation and conspiracy theories, and one frequent result is the formation of homogeneous, polarized clusters (Del Vicario et al., 2016).

In short, Facebook policies and technical design choices serve as a form of *privatized governance* directly enacting rights and regulating the flow of information online. Indeed, their policies, design choices, and business models predicated up on identity infrastructures and metadata

3 - Facebook allows to (1) track its users across websites and devices; (2) use profile pictures for both commercial and non-commercial purposes and (3) collect information about its users' whereabouts on a continuous basis. Facebook even started monitoring stats like how long your cursor hovers over something on the site, or whether your Newsfeed is visible on your screen at any particular moment (Betsy Morais, 2013). It actually has a huge amount of data and metadata about users that they seldom share with its users.

aggregation, enact Internet governance or affect the universality and free flow of information on the Internet and, in doing so, promote or constrain civil liberties (DeNardis and Hackl, 2015). As Rebecca MacKinnon (2012) argued, these platform stake a “Hobbesian approach to governance” (p. 164), with users consenting to give up fundamental rights in exchange for services.

To conclude, social networking environments can be viewed as a new type of online public sphere (Boyd and Ellison, 2007). At the same time, they can be also considered playgrounds for accidental information discovery (Dantonio et al., 2012). However, there is scope to create more opportunities for serendipity (Makri and Race, 2016). Apparently, Facebook has the power to spot and manage filter bubbles. The answer to the crucial question, whether the latest depends on the influence of social versus algorithmic effects, still needs further research (Nikolov et al., 2015). However, not only individual choices more than algorithms limit exposure to attitude-challenging content, but also Facebook's design choices can do that. Moreover, we believe that, even if filter bubbles were only a social phenomenon, policy-makers should legislate anyway to prevent polarization and favor the discussion in the public-sphere by intervening on design choices. Obviously, this would go against the interests of any major information intermediaries, especially Facebook. This gives to the issue an high political intensity which – as we will discuss later – could justify legal intervention by national and supra-national public power.

3. The Right to Net Serendipity?

It has been recently suggested that an alternative way to actually help information-seekers to burst their filter bubbles may be achieved cultivating serendipity in the digital environment, especially by algorithmically inscribing more possibilities to encounter alternative and opposing unexpected views (Semaan et al. 2014; Makri and Race, 2016; Domingos, 2016). Serendipity, however, it is a multifaceted concept that changed over time. It is, therefore, important to look deeper into the nature and the functioning of such phenomenon. Also, we need to provide a broader interpretation that would possibly lead to a specific definition of what we called “Net serendipity”. In fact, by having specific features and specific dynamics to make it occur, we believe that serendipity in the digital environment can be considered a particular phenomenon. Indeed, as Floridi (2014) argues, we also believe that “our current conceptual toolbox is no longer fitted to address new ICT-related challenges” and this is a risk because “the lack of a clear conceptual grasp of our present time may easily lead to negative projections about the future: we fear and reject what we fail to semanticise.” (p.3).

3.1 The Value of Serendipity

The Persian fairy tale “The Three Princes of Serendip” narrates how these traveling princes were

“always making discoveries, by accidents and sagacity, of things which they were not in quest of”. From this story in 1754 the English writer Horace Walpole originated the fascinating concept of Serendipity. In fact, it is the art of discovering new things by observing, and learning from unexpected situations. It can be also defined as “an unexpected experience prompted by an individual’s valuable interaction with ideas, information, objects, or phenomena.”(McCay-Peet and Toms) and it has been studied and searched by scholars and computer engineers in the digital environment (Race and Makri, 2016) and also increasingly in the learning context (Kop, 2012; Fyfe, 2015). Indeed, it helps us to innovate and to be creative, leading us to the emergence of a theory, a law or perhaps simply an opinion or an observation, which had never been planned and therefore not intentionally sought for (Guha, 2009; Johnson, 2010; van Andel and Bourcier, 2012).

Certainly, serendipity plays a relevant role in our everyday life. Yet, the ability to extract knowledge from an unexpected event covers all areas of human activity, including business, law, politics and, particularly, science. According to the great sociologist Robert K. Merton (2006) it is the “happy accident” inherent in scientific research, one of the main forces that has steered the progress of science.⁴ In fact, it has been estimated that over 50% of scientific discovery were unintended (Dunbar and Fugelsang, 2005). As for any discovery, however, serendipity is not all up just to chance but it is usually the result of a lot of groundwork, observation, and knowledge. As Louis Pasteur once said: “in the field of observation, chance favours only the prepared mind.” (Merton, 2004, p.163). In fact, there are no serendipitous discoveries if there is no mindset able to grasp them.

Serendipity manifests itself on the Internet as well, as “the experience of receiving an unexpected and fortuitous item recommendation” (Ricci, 2011, p.97). However, it can be considered much more broadly, as any serendipitous discovery made online. Indeed, some consider hyperlinked digital environments to be fertile ground for serendipity (Merton and Barber, 2004), providing a diversity of resources to which users may not have otherwise been exposed (Thurman and Schifferes, 2012).

At first sight, a loss of serendipity in the digital environment could seem as a mere technical issue, a peculiarity tied to software-dependent environments only or, perhaps, a mere philosophical speculation. In effect, also in the pre-internet world there were echo chambers and if we discovered a great new band, maybe it was because we were taken there by friends with similar music tastes, so that our discoveries were still taking place mostly within already known existing “parameters”. Nevertheless, the point we wish to stress here is exactly the extent of these parameters, and how

4 - A paradigmatic example is the accidental discovery of mirror neurons by Federico Rizzolatti and his team. Indeed, they had implanted electrodes in the brains of several monkeys to study the animals’ brain activity during different motor actions. One day, as a researcher reached for his own food, he casually noticed neurons begin to fire in the monkeys’ premotor cortex, the same area that showed activity when the animals made a similar hand movement. This serendipitous discovery has radically altered the way we think about our brains and ourselves, particularly our social selves.

these may affect our individual and collective identity. In principle, in fact, in the Information age users *could* have the possibility to freely choose more extended “parameters”, as well as narrow them, and to manage their own information diet according to their interests.

In the discussion about Internet developments serendipity is not a new concept. Nicholas Negroponte in *Being Digital* (1995) already advocated the possibility to crank personalization up or down. He claimed that “depending on time available, time of day, and our mood, we will want lesser or greater degrees of personalization” having “a slider that moves both literally and politically from left to right to modify stories about public affairs” because “we may wish to experience the news with much more serendipity” (p.49). Then, in 1997 Ted Gup published a theory about “The End of Serendipity”, which warned that the tools of efficiency-quick retrieval were helping us to better find information we need but hindering us in accidentally discovering information we need, but did not realize we needed. More recently, Pedro Domingos (2015) by describing the development of a potential “ultimate master algorithm”, a single algorithm that combines the key features of different machines learning, argues that, in order to avoid filter bubbles, it will be necessary “to leave some things open to chance, to expose you to new experiences, and to look for serendipity” (p.270). In fact, the information science and library communities are developing more and more ways to cultivate serendipity (Fyfe, 2015).

Also, serendipity demonstrated to be an effective way to burst filter bubbles and echo chambers (Makri and Race, 2016; Semaan et al. 2014). Other studies also showed that users are willing to sacrifice some amount of accuracy for improved novelty/diversity/serendipity in the algorithms filter performance, because such systems are more satisfying overall (Ziegler, 2005; Ratner, 1999). Qualitative comments seem to indicate that serendipity is usually, but not consistently, a positive contributor to this. Moreover, there are methods in which novelty, diversity and serendipity can be improved simultaneously, without any apparent trade-off between the three qualities (Zhang, 2012). However, relatively little research has been undertaken to assess how well existing and novel approaches to information interaction support serendipity (McCay-Peet et al., 2014). There is plenty of room for studying the differential rates of narrowing across media, and across algorithms.

Several search environments, however, have been designed by academics with the purpose of creating opportunities for accidental information discovery through recommendation (Bozdog and van den Hoven, 2015). In theory, the main aim of search diversification is indeed “to help users come across information they might not otherwise have found; information that they might have needed to know, but did not realize they needed to know” (Ibid, p.56). Paradigmatically, one of these recommender was “effective in supporting serendipity” but “the recommendations were not considered particularly interesting or relevant” (Ibid, p. 255). It seems, therefore, that there is

indeed a trade-off: the more you want to discover accidental information, the more you invest/waste your time. Indeed, looking for serendipity is time-consuming and these research highlight the importance of “striking the right balance between result unexpectedness and usefulness when making search recommendations” (Makri and Race, 2016). This, however, also highlights the importance to consider the context in which users may be searching; accidental information discovery may be more useful when trying to get news of developments in a specific area than when trying to get a background understanding.⁵ In short, the “sweet spot” is likely to differ based on the user’s information needs and, therefore, “it is likely to differ across search and browse tasks, and across users” (Ibid, p.78).

To conclude, serendipity as it belongs to the ontology of reality, it is something that perhaps belongs also to the infosphere. Considering its potential in bursting the filter bubbles and by giving users the possibility to look for something diverse and unexpected, it encapsulate not only the users' right to autonomy to get alternative information and to better manage their own information diet, but also the possibility to strengthen the discussion in the public-sphere and, therefore, defend fundamental values for all democracies, that are pluralism and dialectic. “Net Serendipity”, therefore, can become a broader concept able to capture the complex and invisible dynamics of the filter bubble effect, specifically intended as the possibility to manage the “filter” and/or to burst “bubble” at will, as we will briefly explain later. In its broad sense, it could be defined as the possibility to choose in different ways – yet to be established – the extent and the forms of personalization in an hypothetical spectrum “hyper-personalization/serendipity/randomness” in order to encourage unexpected discoveries (particularly political and moral).

After a brief theoretical explanation of the Net serendipity principle with a human rights perspective, we will also explore potential application of a right to Net Serendipity. In fact, the philosophical question that the paper suggests is the following: can serendipity be an essential feature of our everyday –increasingly digital– life for the full construction of our identity and, in turn, of society as a whole? Or, more concretely, could “Net Serendipity” be considered a new essential prerogative for democracy, and for the development of a wealthier Habermas' public sphere?

3.2 A Human Rights Perspective

To investigate the human rights framework of Net serendipity we need, first of all, to identify the variety of different rights which are related to it. Secondly, to balance the identified demands with the rights of intermediaries who own their algorithms and currently provide the services. However,

5 - Otherwise, in the Negroponte's perspective (1995), when we want to read the “*daily me*” newspaper/newsfeed – perhaps during the week, when we don't have time to “waste” - or the “*daily us*” newspaper/newsfeed – perhaps sunday, when we have the time to look for serendipity.

unpacking all the human rights intertwined with the notion of Net serendipity would exceed the scope of this paper. In fact, arguing that Net serendipity should be understood as a right would imply an assessment of whether it warrants the construction of a new enforceable law or right (national and/or international) and, at the same time, it necessitates an examination of the relation between such right and the rights which underpin the notion of a right to Net serendipity.

In recent years academia has internationally addressed the current proliferation of human rights in terms of inflation or proliferation (Kennedy, 2006). Rodotà (2010) also considers improper to refer to the category of “new rights” because it is sufficient to interpret extensively the traditional constitutional rights. The principle of Net Serendipity, however, is undeniably specific to the technological environment. In terms of substantive content, such kind of right may involve the extension of established civil rights to the digital sphere. As the right to be forgotten is grounded on the right to privacy, non-discrimination, etc. (Jones, 2016), similarly, a right to Net serendipity would also be grounded on other rights, especially the right to information, free and full development of one’s personality and to self-determination. This parallel is explanatory to stress how enhancing fundamental rights on the Internet proves challenging because the traditional vocabulary on rights lacks the tools to analyse the specificities of the Internet space in its relaying with the categories of fundamental human interests and needs.

Yet, there is a lack of a uniform human rights based approach to Internet. For instance, the recommendation of the Council of Europe “a Guide to human rights for Internet users” (2014) focuses on human rights in the virtual space, stating how different human rights must be protected and promoted in Internet as well. Nonetheless, it fails to tackle the influence of algorithms in limiting the concrete enjoyment of such rights. This effort, however, has been made in the many attempts of “digital constitutionalism” (Gill et Al., 2015). From the major principles that emerged from these attempts, Net serendipity may especially entails to the following principles: 1. Non-discrimination, which means that everyone has the right to be free from discrimination on the Internet, both in terms of the technical infrastructure and within online communities. 2. Control and self-determination, which means that everyone has the right to control how their personal data is used, shared, represented, and managed on the Internet and 3. User awareness and education, which means that everyone has the right to be aware of their rights and obligations online. Users should have a right to informed decision-making about how they use the Internet whereas states and private corporations should have an obligation to provide transparent information about these rights and obligations. In addition, one may also invoke the precautionary principle. Indeed, “when human activities may lead to morally unacceptable harm that is scientifically plausible but uncertain, actions shall be taken to avoid or diminish that harm”. However, we are aware that, after careful reflection and evaluation, fears surrounding new information technologies are often based on

logical fallacies and inflated threats that lead to irrational panics, as Sunstein (2004) argued. In fact, our proposal is not driven by any restriction for the users, as typically the precautionary principle does for environmental and health issues, but, rather, by the intent to increase users's resiliency concerning their Internet usage.

Depending on the many models of democracy the filter bubble effect is considered harming for particular different reasons (Bozdag and van den Hoven, 2015). Therefore, it has to be questioned on the base of what model of democracy and what values a legal provision related to Net serendipity could be designed. Generally, we agree with Bozdag and Van der Hoven (2015) that “if we want to fully use the potential of the Internet to support democracy, all these diversity related norms should be discussed and designed, and not just the popular or most dominant ones”. Yet, the aim of this paper is to highlight two particular values, fundamental for both the liberal and the Habermasian models: autonomy and transparency. This is because, on the one hand, as we have seen throughout the paper, the role of users tend to be one kind of passive subordination to information intermediaries while, on the other hand, the latest are often opaque and are also unwilling to share users' big data. Therefore, as Bozdag and Timmermans (2011) have already argued, it is fundamental to consider the design for autonomy, so that “the user can customize the filter, and change the identity that is formed on basis of his previous interactions” and, also, the design for transparency, so that “the user is aware that a filter is taking place” and “must be able to see which criteria is used for filtering, and which identity the system has of the user.” (p.13)

As most of the exercises in digital constitutionalism, our proposal is currently more aspirational rather than practical, and tend to articulate broad moral and philosophical issue rather than a legal perspective and a policy agenda. Yet, for further arguments for the introduction of such a principle, one may appeal, on the one hand, on consumers protection laws, to strengthen the individual interests, while, on the other hand, on the law that are enforced to protect media pluralism, to strengthen the collective interests. However, as said, this would exceed the scope of the paper. Nonetheless, it will be now provided an imaginative effort of what a right to Net serendipity could mean.

3.3 Potential Applications of a Right To Net Serendipity

By considering the principle of Net serendipity as the digital ground for optionally encourage more diversity, autonomy, transparency and, as a potential final consequence, less polarization and, in turn, more discussion in the public sphere, we can try to frame its potential application.

Planning for serendipity may sound like an oxymoron. How can a subjective process that is only discernible in retrospect and for which the unexpected plays such an important role in its perception be supported? Indeed, serendipity cannot be created on demand but it can only be

cultivated by creating opportunities for it “through the design of physical, digital, and learning environments” (Race and Makri, 2016, p.3). Besides, it is possible to observe serendipity in controlled research environments, by directly observing information encountering behaviour (rather than relying only on self-reported data) (Makri et Al., 200?).

Andre et al. (2009) researched serendipity to try to understand how it could be introduced in recommender systems and claimed that it consists of two components: the finding of unexpected information and then by making connections to what is already known, perhaps in a particular domain, a creative insight might follow. The first part might be facilitated through recommender systems, but the second part, the insight that might follow, which is related to learning, is much harder to achieve and depends specifically on education. However, as educators might not be available during networked learning, a mixed supply of information provided through the mediation of people could advance self-directed networked learning (Makri et Al., 200?). Digital information environments could support exploration and make users feel “in control”, by providing functionality to support both active and passive discovery. Firstly, *digital tools* that help users visualize result sets and documents, especially if the user can manipulate the information in different ways. Secondly, *visualization tools* can extract value from your big data sets meaningfully, illustrate connections, and stimulate creative associations.

Speculating, there could be two main features that would satisfy the outcomes of a right to Net serendipity as we intend it; first, as a passive feature, by indirectly inscribing a certain degree of serendipity in each social media recommender system. This has been proven to be likely. By making recommendations that intersect user interests, that are actually only partly related to their interests, it may result in accidental discoveries. The coming Semantic Web also holds great potential to be harnessed as a technology for spurring serendipity (Makri and Race, 2016). And, second, a slider that would allow users to choose the extent of that serendipity, increasing serendipity until pure casualty.

As explained by Bozdag and van den Hoven (2015), individuals, as persons, are meant for autonomy, which requires actual access to comprehensive information. For this reason “loss of autonomy caused by filters seems to be the main issue, accordingly to the liberal view”. This would be assured by the right to choose the extent of personalization/serendipity and by the access to the management of their own personal information. The actual problem, then, is that who would benefit more of such a richer pluralistic perspective are presumably those who are less willing to do it. On the other hand, it is argued that individuals, as citizens, should be granted a collective right to burst the bubbles as a corollary of the right to democracy itself in order to “address societal problems and matters of public concern by reasoning together about how to best solve them”. As said, this would be assured by a certain degree of serendipity inscribed in the algorithms (perhaps assessed indirectly

throughout surveys).

These two main features are intended to satisfy the two models of democracy that are not only the most mainstreamed ones – the liberal view and the deliberative democracy – but are also those that are easier to grasp and embrace within a utilitarian view of the legitimacy of the state that correspond to the way most of democratic citizens understand the nature of the state there are part of. Nonetheless, it seems arguable that a potential right to Net serendipity may be advocated more easily by appealing on the autonomy of users than to a collective right but, at the same time, rely on the autonomy of users may not be sufficient. Therefore, in order to increase user's autonomy to find diverse unexpected content, there are several visualization tools able to track user information diet, its interests and manage its bubble that may be improved and become fundamental features potentially compelling for any social media. To mention a few, *Balancer* shows an approximate histogram of the user's liberal and conservative pages, with the hope to increase user-awareness so that they would make their reading behaviour more balanced. The same aim is taken by *Scoopinion* which visualize what journals you are used to read and for how long (Fig.1). Moreover, as the visualization design developed by Nagulendra and Vassileva (2014) does (Fig.3), it would be possible to display to users their filter bubbles, showing them which categories and friends are in their bubble and which ones are not, allowing them to control the algorithm by manipulating the visualization to “escape” the bubble (by adding/removing friends on a certain topic to the filters).

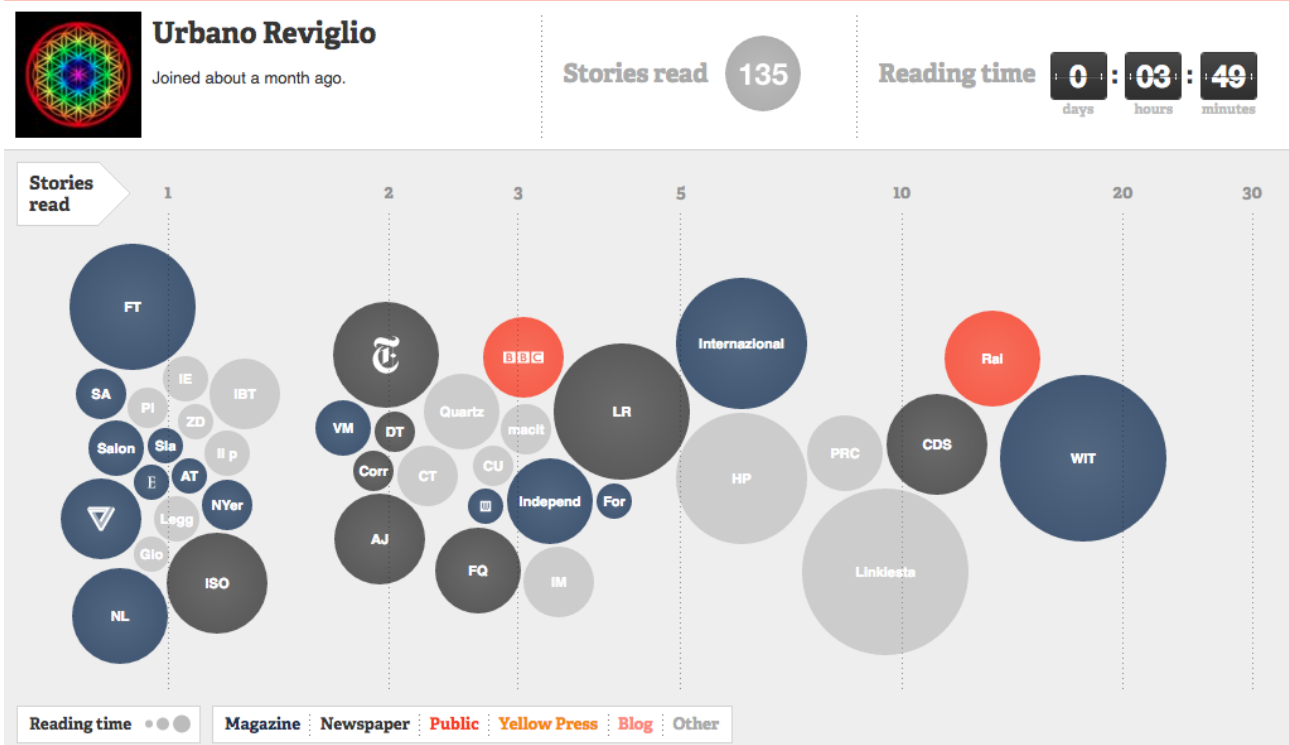


Fig.1 Scoopinion

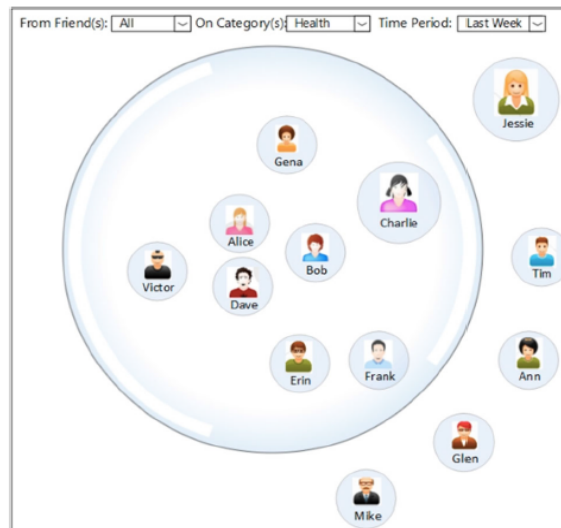


Fig.2 Nagulendra and Vassileva (2014)

In this paper, there is obviously no room to deal with the unintended consequences of these applications, nor to balance these tools with the different models of democracy. The question such as which individual and public values should be included remain open and more debate is needed. Yet, Net serendipity – as it has been broadly framed – demonstrated to be potentially highly valuable for a healthy infosphere and, therefore, suitable for further inquiry for academics, engineers and policy-makers.

Conclusions

After having framed the dynamics of the filter bubbles and the echo chambers in the public sphere, a framework of the main issues behind the invisible power of algorithms has been provided. Then, it has been generalized the role of users and briefly analyzed the case of Facebook. After a brief introduction of the value of serendipity, it has been proposed to shed the light on the power of serendipity in the digital environment and broadened the concept that we have called “Net Serendipity”, in order to enrich the discussion on the potential risks and solutions of personalization.

On the one hand, the technocratic delegation to information intermediaries' algorithms is becoming an actual threat for democracies. In fact, these invisible and extremely powerful algorithms are filtering in a black-box huge amount of information that constitute our own personal access to the world. Legally, they cannot be scrutinized while, technically, they constantly change. There are no easy solutions to address this issue. On the other hand, the autonomy of users has been questioned on several grounds. Usually, people cannot renounce to personalization. They are in a subordinate position and they have no clear ways for opting-out. Indeed, social media like Facebook are opaque and unwilling to share users' data. For these reasons, the public-sphere seems to be

weakened.

Simultaneously, filter bubbles and echo chambers do exist. They are not only a social phenomenon but they are both potentially fuelled and manageable by recommender systems. Yet, it is not clear to what extent they can be actually harmful, both for individuals and for societies. Nevertheless, there is room to improve algorithms by embedding different values able to decrease the potential risks of personalization. Indeed, the primary aim of this paper was to stress the positive value of serendipity in the digital environment, and how this has the power to limit the filter bubbles and echo chambers' externalities. In fact, serendipity appears to be a fundamental feature of social reality, a phenomenon which occurs in all realms of human life, first of all in science research. If not addressed, the slight shift from serendipity to relevance that occurred in the digital environment may imply several negative consequences.

By invoking the “Net serendipity” principle, the paper advocates the possibility to increase users' autonomy and algorithms' transparency by enforcing a series of software and visualization tools for giving users the power to better manage their filters and burst their bubbles. Certainly, it must be acknowledged that serendipity is co-produced. If on the one hand it depends on recommender systems, on the other hand it primarily depends on education. In fact, it is a value that users should autonomously research. Therefore, any normative intervention to increase the power of serendipity in the digital environment would have to be supported with a deeper effort in education and digital literacy.

Far from having systematically framed its boundaries, a potential right to “Net Serendipity” may, in the end, represent not only a political mean to balance the inequality between users and information intermediaries or become an epistemic tool to increase the awareness of users, activists, policy-makers and computer engineers, but also a broader concept that would permit us to have more choice for chance in the near future. This may also be seen on the light of potential technological developments. Future advances in Artificial Intelligence (AI), Machine Learning, and the Semantic Web have the potential to enable recommender systems to make ever more sophisticated recommendations, while virtual reality (VR), augmented reality (AR) and the Internet of Things (IoT) will definitely blur the distinction between online and offline. As Pedro Domingos (2016) argued, tomorrow's cyberspace will be a vast parallel world that selects only the most promising things to try out in the real one and it will be like “a new, global subconscious, the collective id of the human race” (p.270). Perhaps, the principle of Net Serendipity may be further developed as an effective semanticization able to address these new ICT-related challenges and enrich our current conceptual toolbox to become a new fundamental principle for the wealth of the infosphere and, therefore, of hyperconnected human beings.

References

- André, P., Teevan, J., & Dumais, S. T. (2009). Discovery is never by chance: designing for (un)serendipity. In *Proceedings of the seventh ACM conference on Creativity and cognition* (pp. 305-314). ACM.
- Aneesh, A. (2009). Global Labor: Algoratic Modes of Organization. *Sociological Theory*, 27(4), 347-370.
- Bakshy, E., Messing, S., & Adamic, L. A. (2015). Exposure to ideologically diverse news and opinion on Facebook. *Science*, 348(6239), 1130-1132.
- Barocas, S., Hood, S., & Ziewitz, M. (2013). Governing algorithms: A provocation piece. *Available at SSRN 2245322*.
- Bauman, Z., & Lyon, D. (2013). *Liquid surveillance: a conversation*. Cambridge, Malden: Polity.
- Blondiaux, L., & Sintomer, Y. (2002). L'impératif délibératif. *Politix*, 15(57), 17-35.
- Boeder, P. (2005). Habermas' heritage: The future of the public sphere in the network society. *First Monday*, 10(9).
- Bond, R. M., Fariss, C. J., Jones, J. J., Kramer, A. D., Marlow, C., Settle, J. E., & Fowler, J. H. (2012). A 61-million-person experiment in social influence and political mobilization. *Nature*, 489(7415), 295-298.
- Bowker, G. C., & Star, S. L. (1999). Sorting things out: classification and its consequences. 1999. *New Baskerville: MIT*.
- Boyd, D., and Ellison, N. (2007). Social Network Sites: Definition, History, and Scholarship. *Journal of Computer-Mediated Communication*, 13, 1, 210-230.
- Bozdag, E., & van den Hoven, J. (2015). Breaking the filter bubble: democracy and design. *Ethics and Information Technology*, 17(4), 249-265.
- Bozdag, E. (2013). Bias in algorithmic filtering and personalization. *Ethics and information technology*, 15(3), 209-227.
- Carr, N. (2011). *The shallows: What the Internet is doing to our brains*. WW Norton & Company.
- Castells, M. (1996). The rise of the network society. Vol. 1 of *The information age: Economy, society and culture*. *Massachusetts and Oxford: Blackwell*.
- Council of Europe. (2014, April 16). Recommendation CM/Rec(2014)6 of the Committee of Ministers to member States on a Guide to human rights for Internet users.
- Del Vicario, M., Bessi, A., Zollo, F., Petroni, F., Scala, A., Caldarelli, G., Quattrociocchi, W. (2016). The spreading of misinformation online. *Proceedings of the National Academy of Sciences*, 113(3), 554-559.
- DeNardis, L., & Hackl, A. M. (2015). Internet governance by social media platforms. *Telecommunications Policy*, 39(9), 761-770.

Domingos, P. (2015). *The Master Algorithm: How the Quest for the Ultimate Learning Machine Will Remake Our World*. Basic Books, New York.

Duggan, M., Ellison, N. B., Lampe, C., Lenhart, A., & Madden, M. (2015). Social media update 2014. *Pew Research Center*, 9.

Dunbar, K., & Fugelsang, J. (2005). Scientific thinking and reasoning. *The Cambridge handbook of thinking and reasoning*, 705-725.

Ellison, N. B., Steinfield, C., & Lampe, C. (2007). The benefits of Facebook "friends:" Social capital and college students' use of online social network sites. *Journal of Computer-Mediated Communication*, 12(4), 1143-1168.

Epstein, R., & Robertson, R. E. (2015). The search engine manipulation effect (SEME) and its possible impact on the outcomes of elections. *Proceedings of the National Academy of Sciences*, 112(33), E4512-E4521.

Flaxman, S. R., Goel, S., & Rao, J. M. Filter Bubbles, Echo Chambers, and Online News Consumption.

Floridi, L. (2015). *The onlife manifesto*. Springer-Verlag GmbH.

Fyfe, P. (2015). Technologies of serendipity. *Victorian Periodicals Review*, 48(2), 261-266.

Gavazza, A., Nardotto, M., & Valletti, T. M. (2015). Internet and politics: Evidence from UK local elections and local government policies. *Available at SSRN 2700587*.

Gazoia, A. (2016). *Senza filtro. Chi controlla l'informazione*. Minimum Fax.

Gill, L., Redeker, D., & Gasser, U. (2015). Towards Digital Constitutionalism? Mapping Attempts to Craft an Internet Bill of Rights. *Mapping Attempts to Craft an Internet Bill of Rights (November 9, 2015)*. *Berkman Center Research Publication*, (2015-15).

Gillespie, T. (2013). The Relevance of Algorithms. Forthcoming in *Media Technologies: Essays on Communication, Materiality, and Society*, ed. Tarleton Gillespie, Pablo Boczkowski, and Kirsten Foot. Cambridge, MA: MIT Press.

Gillespie, Tarleton. (2014). "The Relevance of Algorithms." In *Media Technologies: Essays on Communication, Materiality, and Society*, edited by Pablo Boczkowski and Kirsten Foot, 167-193. Cambridge, MA: MIT Press.

Gottfried, J., and Shearer E. (2016) News Use Across Social Media Platforms 2016. *Pew Research Center*

Gup, T. (1997). Technology and the end of serendipity. *The Chronicle of Higher Education*, 44(21), A52.

Habermas, J., Lennox, S., & Lennox, F. (1974). The public sphere: An encyclopedia article (1964). *New German Critique*, (3), 49-55.

- Habermas, J. (2006). Political communication in media society: Does democracy still enjoy an epistemic dimension? the impact of normative theory on empirical research1. *Communication theory*, 16(4), 411-426.
- Han, B. C. (2014). Razionalità digitale. La fine dell'agire comunicativo (Vol. 5). goWare.
- Hayes, B. (2012). c. The surveillance-industrial complex. *Routledge handbook of surveillance studies*, 167.
- Ippolita, (2011), Luci e Ombre di Google, *Futuro e Passato dell'Industria dei Metadata*. Feltrinelli Editore. Milano 2007.
- Ippolita, (2016) Anime elettriche, Jaca book, Milano 2016.
- Jasanoff, S. (Ed.). (2004). *States of knowledge: the co-production of science and the social order*. Routledge.
- Jones, M. D. (2016) Ctrl + Z: The Right to Be Forgotten. NYU Press
- Karpf, D. (2012). Social science research methods in Internet time. *Information, Communication & Society*, 15(5), 639-661.
- Kennedy, D. (2006). Two Sides of the Coin: Human Rights Pragmatism and Idolatry”
- Klang, M. (2006). Virtual censorship: controlling the public sphere. In *IFIP International Conference on Human Choice and Computers* (pp. 185-194). Springer US.
- Kop, R. (2012). The Unexpected Connection: Serendipity and Human Mediation in Networked Learning. *Educational technology & society*, 15(2), 2-11.
- Latour, B. (1988). The politics of explanation: An alternative. *Knowledge and reflexivity: New frontiers in the sociology of knowledge*, 10, 155-176.
- Lucchi, N. (2013). Internet Content Governance & Human Rights.
- MacKinnon, R. (2012). Consent of the networked: The worldwide struggle for Internet freedom. *Politique étrangère*, 50(2).
- Madden, M. (2014). Public Perceptions of Privacy and Security in the Post-Snowden Era. Pew Research Center, Internet. *Science & Tech. Washington, DC*. Online verfügbar unter: <http://www.pewinternet.org/2014/11/12/public-privacy-perceptions/>(Zugriffsdatum: 15.05. 2015).
- McCay-Peet, L., Toms, E. G., & Kelloway, E. K. (2014). Development and assessment of the content validity of a scale to measure how well a digital environment facilitates serendipity. *Information Research*, 19(3), 19-3.
- McKeown, M. M. (2013). Internet and the Constitution: A Selective Retrospective, *The. Wash. JL Tech. & Arts*, 9, 135.
- Merton, R. K., & Barber, E. (2006). *The travels and adventures of serendipity: A study in sociological semantics and the sociology of science*. Princeton University Press.
- Gup, T. (1997). Technology and the end of serendipity. *The Chronicle of Higher Education*, 44(21), A52.

- Morais, B. (2013). "Sharing is Caring is Sharing" *New Yorker* (October 30). <http://www.newyorker.com/tech/elements/sharing-is-caring-is-sharing>
- Morozov, E. (2012). *The net delusion: The dark side of Internet freedom*. PublicAffairs.
- Munson, S. A., Lee, S. Y., & Resnick, P. (2013). Encouraging Reading of Diverse Political Viewpoints with a Browser Widget. In *ICWSM*.
- Musiani, F. (2013). Governance by algorithms. *Internet Policy Review*, August 2013.
- Negroponte, N. (1996). *Being digital*. Vintage. New York
- Nagulendra, S., & Vassileva, J. (2014). Understanding and controlling the filter bubble through interactive visualization: a user study. In *Proceedings of the 25th ACM conference on Hypertext and social media* (pp. 107-115). ACM.
- Newman, N., Fletcher, R., Levy, D., & Nielsen, R. (2016). *The Reuters Institute Digital News Report 2016*.
- Nikolov, D., Oliveira, D. F., Flammini, A., & Menczer, F. (2015). Measuring online social bubbles. *PeerJ Computer Science*, 1, e38.
- O'Hara, K., & Stevens, D. (2015). Echo chambers and online radicalism: Assessing the Internet's complicity in violent extremism. *Policy & Internet*, 7(4), 401-422.
- Packard, V. (1957). *The Hidden Persuaders*. Penguin Books.
- Papacharissi, Z. (2002). The virtual sphere The internet as a public sphere. *New media & society*, 4(1), 9-27.
- Pariser, E. (2011). *The filter bubble: How the new personalized web is changing what we read and how we think*. Penguin.
- Pasquale, F. (2015). *The black box society: The secret algorithms that control money and information*. Harvard University Press.
- Pentland, A. (2014). *Social physics: How good ideas spread-the lessons from a new science*. Penguin.
- Race, T. & Makri, S. (2016). *Accidental Information Discovery: Cultivating serendipity in the Digital Age*. Chandos Publishing.
- Rainie, L., Smith, A., Schlozman, K. L., Brady, H., & Verba, S. (2012). Social media and political engagement. *Pew Internet & American Life Project*, 19.
- Rheingold, H., & Weeks, A. (2012). *Net smart: How to thrive online*. Mit Press.
- Ricci, F., Rokach, L., & Shapira, B. (2011). *Introduction to recommender systems handbook* (pp. 1-35). Springer US.
- Rodotà, S. (2014). *Il mondo nella rete: quali i diritti, quali i vincoli*. GLF Editori Laterza.

- Semaan, B. C., Robertson, S. P., Douglas, S., & Maruyama, M. (2014). Social media supporting political deliberation across multiple public spheres: towards depolarization. In *Proceedings of the 17th ACM conference on Computer supported cooperative work & social computing* (pp. 1409-1421). ACM.
- Smyth, B., Coyle, M., & Briggs, P. (2011). Communities, Collaboration, and Recommender Systems in personalized web search. In *Recommender Systems Handbook* (pp. 579-614). Springer US.
- Solove, J. "I've got nothing to hide'and other misunderstandings of privacy." *San Diego law review* 44 (2007): 745.
- Sunstein, C. R. (2003). Beyond the precautionary principle. *University of Pennsylvania Law Review*, 151(3), 1003-1058.
- Sunstein, C. R. (2009). *Republic. com 2.0*. Princeton University Press.
- Steiner, C., & Dixon, W. (2012). *Automate this: How algorithms came to rule our world*. New York: Portfolio/Penguin.
- Thurman, N. (2011). Making 'The Daily Me': Technology, economics and habit in the mainstream assimilation of personalized news. *Journalism*, 12(4), 395-415
- Thurman, N., & Schifferes, S. (2012). The future of personalization at news websites: lessons from a longitudinal study. *Journalism Studies*, 13(5-6), 775-790.
- Winner, L. (1980). Do artifacts have politics?. *Daedalus*, 121-136.
- Wojcieszak, M. E., & Mutz, D. C. (2009). Online groups and political discourse: Do online discussion spaces facilitate exposure to political disagreement?. *Journal of communication*, 59(1), 40-56.
- Wojcieszak, M. (2010). 'Don't talk to me': effects of ideologically homogeneous online groups and politically dissimilar offline ties on extremism. *New Media & Society*.
- Xing, X., Meng, W., Doozan, D., Feamster, N., Lee, W., & Snoeren, A. C. (2014). Exposing inconsistent web search results with bobble. In *International Conference on Passive and Active Network Measurement* (pp. 131-140). Springer International Publishing.
- Zhang, Y. C., Séaghdha, D. Ó., Quercia, D., & Jambor, T. (2012). Auralist: introducing serendipity into music recommendation. In *Proceedings of the fifth ACM international conference on Web search and data mining* (pp. 13-22). ACM.
- Ziegler, C. N., McNee, S. M., Konstan, J. A., & Lausen, G. (2005). Improving recommendation lists through topic diversification. In *Proceedings of the 14th international conference on World Wide Web* (pp. 22-32). ACM.