



City Research Online

City, University of London Institutional Repository

Citation: Carmi, E. (2020). Rhythmedia: A Study of Facebook Immune System. *Theory, Culture & Society*, 37(5), pp. 119-138. doi: 10.1177/0263276420917466

This is the accepted version of the paper.

This version of the publication may differ from the final published version.

Permanent repository link: <https://openaccess.city.ac.uk/id/eprint/26724/>

Link to published version: <https://doi.org/10.1177/0263276420917466>

Copyright: City Research Online aims to make research outputs of City, University of London available to a wider audience. Copyright and Moral Rights remain with the author(s) and/or copyright holders. URLs from City Research Online may be freely distributed and linked to.

Reuse: Copies of full items can be used for personal research or study, educational, or not-for-profit purposes without prior permission or charge. Provided that the authors, title and full bibliographic details are credited, a hyperlink and/or URL is given for the original metadata page and the content is not changed in any way.

Rhythmedia: A Study of Facebook Immune System

Elinor Carmi 

University of Liverpool

Abstract

This paper examines the politics behind algorithmic ordering in social media, focusing on the advertising logic behind them. This is explored through a practice I call *rhythmedia* – the way media companies render people, objects and their relations as rhythms and (re)order them for economic purposes. As a case study I examine the way the Facebook Immune System algorithm orchestrates people's mediated experience towards a desired rhythm (sociality) while filtering out problematic rhythms (spam). This anti-spam algorithm shows that it is important for Facebook to understand people as rhythms and assemble a dynamic database from their mediated experiences, to convince advertisers that they know when and where people do things. People's rhythms become a product that advertisers pay and bid for through Ad Auction to intervene in specific moments and shape people's experience. Thus, the company can shape, manage, and filter specific rhythms to order sociality that brings more value.

Keywords

digital advertising, Facebook, processed listening, real-time, rhythm, rhythmedia

Introduction

Ordering, sorting, selecting and presenting information in particular times and spaces on media is not a new thing. Mass media such as newspapers and television, which have mainly been sponsored by subscription, have developed a recognized separation between editorial content and advertisements. Nevertheless, according to *mass media logic* (Altheide and Snow, 1979) these media have presented their ordering as 'natural' and 'neutral', as if they are independent from economic rationale. From the early 2000s, as new types of media have emerged the way that software and algorithms order things (content, relations, news and advertisements) has been further blurred.

Corresponding author: Elinor Carmi. Email: Elinor.Carmi@liverpool.ac.uk

Extra material: <http://theoryculturesociety.org/>

In the past two decades companies such as Google, Facebook, and Twitter have been using the term ‘organic’ to describe the way people, software-objects and relations are ordered ‘naturally’ on their algorithmically-mediated spaces. ‘Social media’ (as described by them) companies’ architecture offers a designated space they call ‘feed’ or ‘search’, where people can engage with the content, objects and other people. Anna Jobin and Malte Ziewitz (2018) discuss the metaphor of ‘organic’ in Google’s search engine, and argue that it serves a two-sided market, which comes to ‘reinforce a belief in results as something “natural” and given’ (Jobin and Ziewitz, 2018). ‘Organic’ then, conceals the algorithmic interventions in the *when* and *where* people do things, informed by economic logic, while drawing an artificial line between this way and ‘paid’ ordering. But these interventions and ordering are not happening in a natural way, and the politics behind the way people are orchestrated is what this paper tunes into.

In particular, this paper examines the way Facebook understands people’s behaviours as rhythms, and orders their mediated experience according to an economic rationale, taking the anti-spam algorithm Facebook Immune System as a case study.¹ I call this ordering practice *rhythmmedia* – the way media companies intervene in *when* and *where* people and their relations are ordered in algorithmically-mediated platforms. In this way, rhythmmedia orchestrates a certain sociality while filtering out what the company considers as anti-social.

In the following sections, I briefly discuss the ‘social media logic’ and how it influences algorithmic ordering. I then outline how different scholars have examined ordering, organization and sorting in digital media with different concepts. In the next section, I show the benefits of using rhythms, and specifically rhythmmedia, to analyse the way people, objects and their relations are ordered through platforms. I argue that rhythmmedia is useful to examine algorithmic (re)ordering that influences people to behave in a specific way. The next section focuses on the Facebook Immune System algorithm and the way it scans (tracks, measures and categorizes) people’s behaviours within *and* outside Facebook to decide and enact which rhythms are legitimate (sociality) and which are not (spam). I then show how people’s behaviours are measured and then traded in Facebook’s Ad Auction system to encourage more engagement. I conclude by showing how rhythmmedia can be fruitful for future research on algorithmic ordering.

Producing the Social in Social Media

Social media offer their services for free because they operate a multi-sided market where people’s behaviour becomes the product (Zuboff, 2015), and is traded between multiple third-party companies, mainly advertisers. Because their business model relies almost exclusively on advertising, the way that people and different software elements are ordered is meant to cater to them. Social media need people to engage

and provide more data about their behaviours, preferences, and relations to create rich profiles and sell them to advertisers. Engagement is the main way that platforms make value that can be (re)packaged and sold to advertisers, and therefore they aim to shape and manage it.

These orderings that try to shape and manage people's behaviours are influenced by what José van Dijck and Thomas Poell (2013) call *social media logic* which 'refers to the processes, principles, and practices through which these platforms process information, news, and communication, and more generally, how they channel social traffic' (Van Dijck and Poell, 2013). Like other media scholars, Van Dijck and Poell tend to describe such (re)ordering as data-stream, data-traffic, data-flow and channelling. However, these terms are used as taken-for-granted without exploring the tempo-spatial composition of such 'flows', meaning, when and where do such flows *become* flows, what does *not* flow or is filtered out of the flow? What stands behind these ordering strategies, and how do they shape the meaning of 'the social'?

The advertising logic behind platform's algorithmic (re)ordering of things (content and software-objects), people and their relations and how they enact a certain type of sociality through rhythms will be the focus of this paper. This is conducted through *rhythmmedia* – the way media companies temporally and spatially (re)order different components in a way that orchestrates a desired rhythm (sociality), while filtering problematic rhythms (spam). Rhythmmedia focuses on the why, how and particularly *when* and *where* ordering is conducted; at what times and which locations on different 'feeds' things get connected or disconnected. Examining the politics behind rhythmmedia shows that the very way we call platforms like Facebook 'social' media is influenced by their own definitions of what it means to be social, and what they think should be filtered out as anti-social.

As a case study I focus on Facebook Immune System algorithm, which is presented as an anti-spam algorithm, to keep the social graph safe. Facebook Immune System enables Facebook to understand people as rhythms (frequency and pace of behaviours, interactions with others, self-expressions, etc.) and create a dynamic database. This ever-growing archive enables Facebook to orchestrate people's rhythms according to engagements the company deems as more profitable on its platform (categorized as sociality). This informs its Ad Auction logic and the way different objects, people and their relations are (re)ordered in what Facebook tries to sell as 'real-time'. In the following section I examine how different media scholars have explored order in social media.

Organizing Media in Different Rhythms

Ordering people and software objects, and intervening in interface design has been discussed across various disciplines. Science and technology

studies scholars, such as Astrid Mager (2012), for example, have emphasized the conflicts in the ordering of search engine results. Mager shows the negotiations of different actors' intervention in Google's search engine results and situates them within a broader context of capitalistic rationale. Adding to this economic logic of algorithmic ordering, Safiya Noble (2018) shows the racial and gendered bias which are engineered into Google's search engine results. Such accounts show how economic, racial and gendered values influence the organization of both human and software objects, and yet they do not focus on how, when and where these ordering are conducted.

Media scholars have been showing that there are human workers who conduct interventions in the algorithmic ordering of social media, called commercial content moderators (Roberts, 2016; Myers-West, 2017; Gillespie, 2018 [AQ1]), whose actions are hidden from average users. Such moderators conduct rating, sorting, removing, filtering, deleting, and suspending people and information, according to social media companies' economic rationale. As Roberts says, it depends on these companies' 'need for monitoring and brand protection around the clock, every single day' (Roberts, 2019: 2). The result of their work is people's experience on platforms, and it has been portrayed as the 'natural' ordering of algorithms. As Tarleton Gillespie argues, moderation is a commodity; it is 'part of how platforms shape user participation into a deliverable experience' (Gillespie, 2018 [AQ2]). Although these scholars focus on how different interventions affect users, they do not ask why people engage with things in particular times and spaces, and how that affects those people's mediated experience.

Examining the logic of such interventions, José van Dijck and Thomas Poell's *social media logic* (mentioned above) outlines four main elements – programmability, popularity, connectivity, and datafication. The two most relevant elements for this paper are *programmability*, which is how platforms 'influence the flow of communication and information activated by such a platform', and *connectivity*, which is the way platforms 'always mediates users' activities and define how connections are taking shape' (Van Dijck and Poell, 2013). While they point to important developments, Van Dijck and Poell still do not question how some data flows or 'un-flows', that is, how people's activities become mediated or unmediated. How do platforms decide what *are* connections, and *when* do they connect or disconnect? Tackling these gaps, I propose rhythmmedia as a way to examine the politics behind algorithmic ordering on platforms, and below I explain why and how.

Processing Orders through Rhythmmedia

The term rhythmmedia draws inspiration from two concepts – Raymond Williams' *planned flow* and Henri Lefebvre's *rhythmanalysis*. Both have

been writing about power, space and time, and especially intentions behind ordering of these elements. Raymond Williams (1974) shows how television networks and advertisers want to reorganize the way people experience programs and produce a series of time units into one sequence, turning people's experience with television into what he calls *planned flow*. Williams encourages examining the television experience as a whole rather than 'just' the content, specifically how its flow influences the way social life is performed and understood.

As Williams shows, once television programs started to be sponsored by commercial companies they began to have a different kind of flow which integrated ads as part of the television experience. This *planned flow* was meant to feel natural rather than a planned disruption; to blur the lines between content and advertisements but especially to create an uninterrupted mediated feeling. As television evolved, people were able to tune into it 24 hours a day, and be immersed into a *planned flow* that had its own rhythm.

This reorganization of time changed people's experience of the space around them and television, and served the financial incentives of networks and advertisers. As Williams argues, '[s]ome part of the flow offered is then directly traceable to conditions of controlled competition, just as some of its specific original elements are traceable to the financing of television by commercial advertising' (Williams, 1974: 94). This planned flow, as he shows, is ordered to keep us watching television while consuming ads, to engage with it without 'switching off'.

These kinds of interventions in the way time and space are designed to influence everyday life have also been examined by Henri Lefebvre (2004), who provides one of the few interrogations into the concept of rhythm from a sociological rather than a musical point of view. Rhythm as an ordering mechanism, as Lefebvre argues, is far from being natural or spontaneous; there is a project of calculation, of measurement behind it. Lefebvre challenges what seems natural (or 'organic' in this context), and exposes the calculated economic strategy to order bodies, things, objects by redesigning the city in particular ways: '[Social] space and [social] time, dominated by exchanges, become the time and space for markets; although not being *things* but including *rhythms*, they enter into *products*' (Lefebvre, 2004: 6, emphasis in original). As Lefebvre argues here, the spaces where society interacts and their temporal characteristics are rendered as rhythms, and become an object for intervention, producing them in the form of products.

This productive force can be found in a key element of rhythm – repetition. As Lefebvre argues, the repetition of everyday behaviours governed by particular actors' rules and laws is never identical; it creates differences which shape and produce people's experiences and consequently their subjectivities. This is highlighted in his section about the 'media day', which 'never ends, it has neither beginning nor end'

(Lefebvre, 2004: 46). Just like Raymond Williams' *planned flow*, Lefebvre argues that media produces people's experience of time and space; reordering elements to create an uninterrupted feeling of the everyday so people will always be 'tuned in'. Even before the introduction of the internet and algorithms, Lefebvre argued that media companies deny their influence by 'masking their actions' (Lefebvre, 2004: 48). Such interferences are conducted by carefully orchestrating people's everyday rhythms, making them feel as if they are naturally ordered.

Describing media companies' ordering practices, Lefebvre argues that the '[p]roducers of the commodity of *information* know empirically how to utilise rhythms. They have cut up time; they have broken it up into *hourly slices*. The output (rhythm) changes according to intention and the hour' (2004: 48, emphasis in original). Lefebvre's argument here about orchestrating pieces of data to create a specific output – a desired rhythm – according to intention and timing can also be applied to algorithmically-mediated spaces. Rhythm, then, is a specific experience produced by media companies and meant to reorder *when* and *where* people engage with things toward specific economic goals.

'Real-time' Algorithmic Rhythms

Rhythm as a concept in algorithmic ordering has been used by few internet scholars. For example, rhythm and its relation to algorithms has been theorized by Shintaro Miyazaki (2012), who defines it as algorithym: 'elementary movement of matter, bodies and signals, which oscillate in-between the discrete and the continuous, between the symbolic and the real, between digital and analogue' (Miyazaki, 2012). However, algorithym still remains quite opaque about who are conducting such rhythms, and how they orchestrate them. Others, such as Beverly Skeggs and Simon Yuill (2015), also use Henri Lefebvre's rhythmanalysis to understand the relations between different elements on social media as a way to explain what Facebook 'does'. Challenging Facebook's self-description of 'social-network', they point to the tendency of scholars to conduct a static analysis of the social relations that the platform's architecture produces. However, focusing on the notion of 'liveness' and rhythms of life, they neglect to account for rhythms which are framed as 'non-life', spam, or what Facebook would frame as 'disconnections' (John and Nissenbaum, 2019). By doing so, they overlook actions and interactions which are categorized as 'negative' and yet still count and have value, even if just to be removed.

The same issue arises in Esther Weltevrede et al.'s (2014) important criticism of the concept of 'real-time' as a guiding logic to order people and things on social media. Through a device specific approach, they show how *real-timeness* is 'a form of information organization' (Weltevrede et al., 2014: 3), that is created in specific ways, at a specific

'pace'. Although they reveal that social media produce different paces, they focus on the 'liveness' of pace. But further questions need to be asked about the composition of the rhythmic ordering: how specific ordering get categorized as legitimate (and hence 'live') and thus tempo-spatially prioritized, while other rhythms get filtered out. Specifically, there is a need to interrogate what stands behind these platforms' idea of 'real-time' as an 'uninterrupted experience on the platform' (Carmi, 2019: 451) while hiding the decision-making processes and economic incentives driving them.

The concept of 'real-time' can be traced back to the term *real-time processing* and linked to John von Neumann's 1940s' architecture of computers, which separated the computer's processor and storage. As Robert Gehl (2011) argues, this design was a specific orchestration between the immediate which was the 'processor', or CPU, and the 'archive' where the storage of data was kept as a sort of memory. In this way, after people typed their requests, small elements of data from the 'archive' were retrieved and were ordered according to specific instructions to provide a certain output. By the 1960s, computer designers aspired to produce an experience whereby the computer immediately reacts to users in 'real-time'. This design value was meant to create a feeling of instantaneity which conceals the rationale of ordering and procedures in the 'back-end'. As Gehl argues, the way that social media function is to emphasize this 'real-time' experience of the new and immediate, while access to the archives (the data that they assemble on people) is only available to the owners of these platforms.

But 'real-time' in social media is never natural or neutral, and the logic behind the way that data are retrieved from archives at the 'back-end' and ordered in particular times and spaces in the 'front-end' is influenced by various economic incentives. I call this practice *rhythmedia*, which is a concept that examines how media companies (re)order people's experience, the relations between them and the affordances available to them through media. The recursive aspect is important here as it points to the repetition of such actions, the everyday rhythm and its productive force.

These media companies conduct the ordering of people, things and the interface design they engage with according to the knowledge/profiles they create from (processed) listening (Carmi, 2019) to people's behaviour. Processed listening is a practice whereby media companies continuously measure, categorize and record people's behaviours with specific tools and units (e.g. cookies and pixels) and render them as rhythms to produce a dynamic archive. Here the frequency and timing of what people do and where they do it matters as they are important inputs for the creation of their profile. This ever-growing archive consists of people's frequent movements and preferences, which allows the company to establish what are repetitive rhythms that can be profitable and which

ones should be filtered out. The desired rhythms can then be (re)packaged as a product that the ad industry trades.

In this way, there are multiplicities of both the media companies (for example advertising companies, advertising networks and data brokers) and media that they use (social media and websites) and reconfigure. Thus, orderings in the front-end are in constant processes of (re)production, and are influenced by the inputs/rhythms (people's behaviours) that *processed listening* assembles in the back-end (Carmi, 2019). Similar to the CPU and memory described above, media companies conduct *rhythm-media* to retrieve data from the dynamic archive created by *processed listening* and intervene in particular moments and interface design spaces to create a 'real-time' experience with the desire to influence people toward a certain behaviour: the rhythm of sociality.

Using rhythmmedia for examining the politics of ordering in algorithmically-mediated platforms is useful because it attends to multiplicities of different actors, users, spaces, and temporalities. It also attends to their *repetitions*, which are key to training people's everyday experiences towards a sociality that benefits media companies' business model. The power of using rhythmmedia is illustrated in media companies' ability to design an architecture that continuously modifies and shapes *where* and *when* people engage with other people, software objects and content.

When specific users with their behaviours (rhythms) cause conflicts or dissonance with social media's business model(s) they get categorized as spammers and get filtered out (by removing, deleting or decreasing their agency). And this is another benefit of using rhythmmedia, because there is no a priori assumption of what behaviours are included in the ordering. The focus is on the politics and intentions of categorizing and orchestrating 'positive/social/connections' while filtering out/removing/decreasing 'negative/anti-social/spam/disconnections'.

Engineering the Immune System

Facebook operates several algorithms which make up its ordering mechanism. According to Tarleton Gillespie, algorithms are procedures which use input data and process them into desired output by using specific calculations that instruct the steps to be taken. As he argues, algorithms 'are now a key logic governing the flows of information on which we depend' (Gillespie, 2014: 167). But what exactly does 'flow' mean in this context? And what kinds of considerations related to people's behaviour and how content and the interface are ordered are put into action when it comes to algorithms?

Examining such considerations, Taina Bucher argues that the politics of algorithms involve '*how* and under what circumstances different aspects of algorithms and the algorithmic are *made* available – or *unavailable* – to specific actors in particular settings' (Bucher, 2018: 55 **AQ3**).

It is precisely the logic behind making some things available while others are unavailable, and how these shape how sociality can be enacted and understood, that I focus on here. Facebook has already showed its intervention in the way, where, and especially *when* people, their relations and different software features are ordered to create specific profitable orchestrations. A famous example is Facebook's emotion contagion experiment (Kramer et al., 2014), whereby the company showed specific 'negative' posts to some people while showing 'positive' ones to others. One of their findings was what they call a 'withdrawal effect' (a term often used to describe a discontinuation of use of alcohol or drugs): 'People who were exposed to fewer emotional posts (of either valence) in their News Feed were less expressive overall on the following days, addressing the question about how emotional expression affects social engagement online' (Kramer et al., 2014 [AQ4]). This finding shows that Facebook had an incentive to promote more 'emotional' posts as these yielded more engagement. In this way, the company's aspirations to influence how people feel was designed to influence their behaviour; they engineered a specific sociality (more engagement), while filtering out anti-sociality (withdrawal from engagement).

In this section I focus on the logic behind an algorithm that has not received much attention but plays a significant role in the way things are ordered on Facebook – The Facebook Immune System. During October 2011, Facebook celebrated cyber security month by announcing new security measures while revealing their anti-spam algorithm, the Facebook Immune System: 'We call it the Facebook Immune System (FIS) because it learns, adapts, and protects in much the same way as a biological immune system' (Facebook, 2011). According to Facebook's researchers, Facebook Immune System is a machine learning algorithm that scans in 'real-time' all the behaviours performed by users on Facebook *and* outside of it (more on this below), to measure, categorize, record and compare people's everyday rhythms (the temporal characteristics of their behaviours and where they have conducted them). By assembling a dynamic database Facebook is able to understand when, how frequently and where people do things and decide whether this behaviour harms the company.

The Facebook Immune System consists of five mechanisms: Policy Engine, Classifier Services, Feature Extraction Language (FXL), Dynamic Model Loading, and Feature Loops (Floops). The first step is the Policy Engine that applies all the relevant policies engineered into the algorithmic calculations by Facebook on people's actions: 'decision about how and when to respond can depend on business or policy considerations. For example, an action in one region might be more creepy or undesirable than in another region' (Stein et al., 2011: 6). In this way, the Policy Engine (re)orders people, features and their connections to express the local business logic and respond accordingly, for

example, 'blocking an action, requiring an authentication challenge, and disabling an account' (Stein et al., 2011: 3). Behaviours that interfere with the company's business model, then, are categorized as spam and filtered out.

The Classifiers Services categorize people's behaviours according to the Policy Engine's guidelines and updates the system accordingly. The company holds the power to decide which people and actions are desired and which ones are not. The Floops component is the dynamic archive discussed above, which stores and retrieves data about people's behaviours. It is 'a shared memory about past observations and classifications' (Stein et al., 2011: 7). Floops implement three mechanisms – Inner, Middle and Outer – to process (listen and record) people's actions in different time intervals [AQ5]. The Inner Floop counts the amount of times a specific action is made for a defined period of time, '[f]or example, the number of times a URL has been posted on a channel in the past hour' (Stein et al., 2011: 7). In this case, the repetitive rhythms of posting are fed as inputs for classification on whether they harm or benefit Facebook.

The Middle Floop applies more complex operations beyond counting, specifically focusing on IP addresses and URLs, which help Facebook understand where the behaviour comes from and establish whether they are human or bot. The Outer Floop uses the Memcache, which is a distributed memory object caching system meant to speed up the dynamic ordering of algorithmically-mediated platforms. Behaviours across the web are logged daily to the Memcache and, in this way, the Outer Floop understands whether an action was performed by many people across multiple spaces. This enable it to detect harmful rhythms, conducted outside Facebook, and act upon them within the platform by filtering them out.

Repetitive behaviours are key to Facebook Immune System's operations, because they enable Facebook to learn people's preferences and orchestrate the *when* and *where* people and objects will connect or disconnect on the platform according to a rhythm that yields more value. The Facebook Immune System is informed by two main tools: users' feedback and what they call 'global knowledge'. User feedback means processed listening to users' behaviour while they engage on and with the platform. This could be an explicit behaviour such as clicking, sharing, or marking something as spam, *and* implicit behaviour such as deleting a post. Silent actions such as deleting posts have a value for Facebook, even if they are not known by other users, because they let Facebook understand what encourages and discourages specific behaviours.

But measuring people's behaviour within Facebook is not enough to understand people's everyday rhythms, and that is why the company also uses 'global knowledge', meaning 'the system has knowledge of aggregate patterns and what is normal and unusual' (Stein et al., 2011: 2).

To assemble a rich database with more accurate profiles and understand people's behaviours, and specifically repetitions, Facebook listens to people also *outside* its platform. In this way, the platform knows what people do across multiple online spaces and then decides whether a certain repetitive behaviour is harmful or beneficial for the platform, and to define it as normal or unusual accordingly. People's rhythms and repetitions outside the platform inform the *when* and *where* people and objects will be ordered or filtered out within the platform.

Conducting Rhythms of the (Anti)social

Creating the database/archive, then, is paramount for the company to be able to understand how to engineer the social *and* antisocial. Facebook conducts processed listening to people's behaviour within *and* outside its platform, to assemble a dynamic database (with the Floops feature). As I show elsewhere, processed listening is a practice whereby media practitioners are continuously 'monitoring, measuring, detecting, categorizing, and filtering' (Carmi, 2019) people's behaviours to assemble an archive/database that consists of people's repetitions (frequent behaviours, preferences), implicit *and* explicit behaviours and their relations with other people and objects. The company listens to its users' behaviours with their hidden workers, the content moderators, and with their social plug-ins, which are web-cookies and pixels that listen to people's behaviours across multiple spaces and times to create rich user profiles (Carmi, 2017).

To conduct a rhythmmedia with a desired rhythm of sociality, the company needs more data to know who can harm its business model, categorize them as spammers and take measures to reduce/eliminate/filter them out. According to Facebook's researchers there are three main types of users who aim to harm the company: compromised accounts, fake accounts, and creepers. The main methods to detect them is by understanding their rhythms and deciding what are anomalies according to the platform's business model (Policy Engine). For example, to show how time and frequency play important roles in detecting compromised accounts, Facebook's researchers provide a timeline of a phishing attack. They show peaks of repetitive behaviours conducted within a short period of time which they interpret as excessive rhythms and categorize as abnormal behaviours. Such behaviours are categorized as 'non-life' (bots), spam and deviant and consequently removed from the platform; their rhythms are filtered out as anti-social.

However, *creepers*, which is also the name that was given to one of the first computer viruses in the 1970s (Parikka, 2007), is a group mostly unknown to people. This is because *creepers* are, in fact, 'normal' users who are not using Facebook according to its 'intended uses'; they harm the company's business model. Therefore, *creepers* need to go through

‘education’, which, among other things, means tweaking the algorithm to intervene in their experience to behave in ways that benefit the company, according to what they define as social.

To track and identify these *creepers*, Facebook Immune System algorithm tunes into *all* types of behaviours, some which do not receive visible cues such as likes. Because Facebook makes profit from people’s rhythms, it does not make actions such as ‘disconnectivity’ (unfriending, unliking, hiding) or looking at a friend/page profile available. As Nicholas John and Asaf Nissenbaum show in their analysis of 12 social media APIs, ‘the pattern of excluding disconnectivity data from APIs is indicative of an overarching logic’ (John and Nissenbaum, 2019: 8). This logic means that the company does not want users to be ‘educated’ and know about ‘negative’ rhythms that do not bring value, and hence defines them as ‘anti-social’. Such ‘negative’ actions are nevertheless still valuable for Facebook as they inform the company about the rhythms of people and what motivates or discourages their engagements.

Listening to such silent actions was also revealed in a research by Facebook researchers that shows that they measure and record people who delete their posts *before* posting them, which they call ‘self-censoring’ (Das and Kramer, 2013). The article reveals that Facebook developed the Audience Selector feature to ‘combat’ these self-censoring users to persuade them to share more (desired rhythm), because their lack of ‘proper’ use of the platform decreases its value:

Understanding the conditions under which censorship occurs presents an opportunity to gain further insight into both how users *use* social media and how to *improve* SNSs to better minimize use-cases where present solutions might unknowingly promote value diminishing self-censorship. (Das and Kramer, 2013: 1, emphasis in original)

In this way, Facebook uses the Facebook Immune System algorithm to listen to people’s everyday rhythms, helping them detect what behaviour should be categorized as ‘negative’ (according to their business model) and hence anti-social. Precisely because people’s rhythms bring value to the platform, if they do something to harm the business model, then the company makes sure it will be categorized as ‘negative’ and consequently reduced, removed or eliminated as possible options of behaving on the platform.

Facebook understands users as rhythm; the pace of their typical/habitual activity of clicks, likes, but also pausing, deleting and unfriending are valuable because they can be (re)packaged as a commodity to be sold to advertisers who want to intervene in specific moments. It is not only the *when*, but also how many times – *repetitions* have a value. This is how the company convinces advertisers to take part in its Ad Auction system.

Advertisers can know *when* users will behave in a desired way (e.g. more engagement rather than deleting or unliking) and sell that moment to advertisers.

Bidding Time

How does Facebook Ad Auction system work? In an article that examined how ads get ordered on Facebook's newsfeed, Facebook ads product management director, Fidji Simo, says that '[t]he value for advertisers is a combination of how much they bid for their ad as well as the probability that their ad will achieve the objective the advertiser sets for it – whether that's a click, a video view, an impression or anything along those lines' (Lynley, 2014). There are two important points here – the importance of bidding in how things will be ordered, and the goal of advertisers to influence people's behaviour through this ordering. Bidding on Facebook through Ad Auction is a key element in the way that Facebook's newsfeed ordering works and it consists of a combination of three main factors: advertisers' bid, estimated action rates, and ad quality and relevance (Facebook Business, 2017).

The Ad Auction system also shows how Facebook continues and develops another digital advertising trade tool – Real-Time-Bidding – and turns it into its own version. Real-Time-Bidding, which was developed in 2010 by the advertising association Interactive Advertising Bureau (IAB), was itself a development of Google's automated advertising system AdWords in 2000. This system enables advertisers to bid to appear in specific space (at the top of search results) and time (according to people's search term at that moment) (Mager, 2012: 771). These high-speed trading systems, which run at the back-end of platforms, cater to advertisers who, since the dot-com bubble crash, became the main funding source for social media platforms.

The ad matching system of 'real-time-bidding', as Andreou et al. (2018) argue, 'examines all the ad campaigns placed by different advertisers in a particular time interval, their bids, and runs an auction to determine which ads are selected' (2018: 3). Time and repetitions are important because they are inputs calculated to determine the 'ad relevance' to a particular profile/audience. Then the system orders the relevant ad at 'the right time' at the top of users' (news)feed, with the desire to influence people's behaviour. It is also meant to put pressure on advertisers to bid higher. As Antonio Garcia Martinez explains the process:

Facebook has a piece of ad real estate that it's auctioning off, and potential advertisers submit a piece of ad creative, a targeting spec for their ideal user, and a bid for what they're willing to pay to obtain a desired response (such as a click, a like, or a comment). Rather than simply reward that ad position to the highest bidder,

though, Facebook uses a complex model that considers both the dollar value of each bid as well as how good a piece of clickbait (or view-bait, or comment-bait) the corresponding ad is. (Martinez, 2018)

‘Auctioning’ real estate in relation to a desired response is precisely what rhythmmedia is about – orchestrating the right time and space to influence behaviours. A ‘desired response’, though, means only ‘positive behaviours’ such as liking or commenting, but not unliking or hiding, and therefore the ordering will cater to that. Furthermore, considering ‘clickbait’ in the bidding process shows that the ‘withdrawal’ conclusion from the contagion emotion experiment from 2014 informs the company’s algorithmic ordering. It means that Facebook prioritizes emotional ‘ad creative’ to push people towards more engagements. In addition, with the Facebook Immune System and the dynamic archive it continuously produces, Facebook knows what would encourage people to engage more according to their past behaviours.

To be able to predict influence on people’s behaviour, ‘estimated action rates’ is an important factor in the bidding process. They are measurements of people’s behaviour with Facebook Immune System, and potentially other algorithms, which indicate how many times, at what times and at what frequency people engage with things and other people. As Andrew McStay argues about programmatic advertising, the goal is ‘interacting with people at moments when they may be most predisposed to acting, clicking or purchasing’ (McStay, 2017: 143). People’s rhythms are informing the rhythmmedia process, ordering the newsfeed to influence their future behaviour towards desired sociality, while removing anti-social behaviour.

To shape people’s experience towards a desired rhythm the company conducts processed listening, measuring their behaviour across multiple spaces to produce an archive with their profiles which then inform how they (re)order the platform’s interface. As Facebook argues, they ‘recommend optimizing for an action that happens at least 15–25 times per week (though more than that is better) for best results’ (this information has now disappeared from Facebook). The company measures how often people are interacting with different things, whether visible, such as liking, or sharing or silent, such as time spent on stories in different time intervals (Backstrom, 2013). In terms of their video ordering, for example, the platform has been measuring not only which video people watch but how long they watch it (Welch and Zhang, 2014). When it comes to stories, the platform measures the time spent on stories (Yu and Tas, 2015) but also takes ‘into account the amount of time people spend on a particular story relative to other content in their News Feed’ (Wang and Zhou, 2015). Here, Facebook shows how the amount of time people spend on things is statistically measured and compared to their

engagement (rhythms) with other things. When the duration and tempo of actions are higher compared to other actions, this is an indication for a preference which can then be commodified and traded in the ad auction.

‘Just understanding time is huge,’ as Mark Rabkin, Facebook’s VP of engineering for ads, says. ‘We want to understand whether you’re interested in a certain thing generally or always. Certain things people do cyclically or weekly or at a specific time and it’s helpful to know how this ebbs and flows’ (Mannes, 2017). As this interview with Rabkin shows, Facebook understands and trades people as rhythms – people’s pace, frequency of actions in specific spaces, the time of the day/week they behave (including those implicit ones such as ‘self-censoring’), and time spent on specific objects (such as videos) compared with others. As Shoshana Zuboff argues on this business model: ‘This is a new business frontier comprised of knowledge about real-time behavior that creates opportunities to intervene in and modify behavior for profit’ (Zuboff, 2015: 84). In this way, the most repetitive actions of people can be monetized and used as an indicator for future desired actions in the bidding.

Such rhythm-based rules then can help produce predictions that can be packaged into products; our past has a cost for our future. We can also see how Facebook constructs specific time-based measuring rules which register a user’s frequent action in relation to another person or object. As they argue, such measurements can ‘control the amount you spend on each audience, decide when they will see your ads, and measure their response. The ad delivery system will optimize delivery for the best-performing ad in an ad set’ (Facebook Business, 2017 [AQ6]). In this way, people’s behaviours and orderings are commodified and traded for the highest bidder.

Importantly, Facebook does not want to provide data to advertisers which can help them understand people’s rhythm in the same way they do – only Facebook has access to their dynamic database/archive. Therefore, the platform offers limited data on ‘negative behaviours’ and disconnectivity as a service that advertisers should pay *and* bid for (John and Nissenbaum, 2019). By educating users to behave in a desired rhythm and educating advertisers to pay more to get a richer understanding about interactions on the platform, Facebook conducts rhythmmedia towards its own definition of sociality: ‘positive’ engagements that yield more value.

Conclusion: Bidding for Our Experience

This paper examines the way Facebook understands people as rhythms to reorder their mediated experience. This has been conducted with a practice I call rhythmmedia, which is the way media companies orchestrate people and their relations (with interface elements and other people) in a

desired rhythm to produce a sociality that yields more value. The platform uses algorithms, cookies and pixels to conduct processed listening inside *and* outside its platform to measure, categorize and store the time and place people do things on the internet to create a dynamic database that can be monetized. The more Facebook knows what people do in particular times and places, as well as the durations, pauses, and importantly – repetitions – it can turn this data into a product. This data is then packaged for companies and advertisers who pay and bid to intervene in specific moments and spaces with the goal to influence people's mediated experience. Sociality, as defined by Facebook, is orchestrated according to what brings value to the platform.

With the Facebook Immune System algorithm, Facebook listens to people's behaviours, whether they are considered positive or negative – everything counts. In this way, the company establishes what types of rhythms can harm its business and thus should be decreased/removed/filtered as possible options of behaving on the platform. The platform only orchestrates people in the desired rhythm, so although all actions count, only the valuable behaviours (such as more emotional or repetitive) will be ordered whilst the 'negative' ones (such as creepers) will be filtered out. In this way, the company establishes what counts as engagement and what type of sociality is worth more.

To educate users towards the desired rhythms, the platform uses several strategies – for example, by designing new interface features such as the Audience Selector. In this way, rhythmmedia nudges people into more engagement and hence more value and profit for platforms. Like its name implies, the Facebook Immune System algorithm maintains Facebook's system from harm by filtering out 'deviant' behaviours to engineer its own definition of sociality. More data, then, is crucial to the operation of rhythmmedia; it shapes the way that all the elements on Facebook are (re)ordered, timed and moved. As Lefebvre argues about the productive force of repetitions, such orchestration is meant to shape people into data subjects that are both the commodities and the consumers.

Presenting rhythmmedia as 'natural' algorithmic orderings helps disguise the ad logic behind them and present people's everyday experience as a 'real-time' experience on their platform. Using the *platform reverse engineering* revealed data that the platform does not want to share with researchers, its users and its advertisers via its API, mainly about how valuable silent and 'negative' actions are for the company's business model. This means that internal documents such as company research can assist in revealing information that companies do not make available through their platforms.

Concealing these ordering considerations helps avoid questions around how this ordering affects the way people understand their subjectivities, politics, news and other topics as well as how they can behave in these territories. For example, in 2015 (Eulenstein and Scissors, 2015)

and 2016 (Backstrom, 2016) Facebook made algorithmic tweaks to prioritize engagements with friends and family, which has significantly decreased people's interactions with credible news outlets. According to Jennifer Grygiel, these interventions, which I call *rhythmedia*, may have influenced people's opinions and voting behaviour in the 2016 US presidential election (Grygiel, 2019). As more platforms come under government scrutiny, revealing *rhythmedia* practices can help citizens demand regulation and change the way such companies order their mediated experiences – to decide the rhythms of sociality for themselves.

Note

1. To understand how Facebook reorders people, objects and their relations, I used four qualitative methods. First, I catalogued different terms of use sections for one year, to examine what kinds of arguments Facebook makes, and how various definitions and explanations change over time. Second, I developed a method I call *platform reverse engineering*. I refer to reverse-engineering of software metaphorically, and read platform companies' research articles to reveal software features, measuring and storing techniques, and design rationale – to analyse and identify its components and functions. I analyse these articles by searching for specific information that can reveal the way the platform develops its functions, including its algorithms and interface design. Facebook operates its own research centre that employs in-house researchers to conduct various kinds of research that is published in peer-reviewed journals. Facebook's research started in 2009, and its archive consists of over 500 articles (<https://research.facebook.com/publications/>). This archive can also shed light on the motives, interests and rationale that stand behind the company's actions. Third, I followed several pages that Facebook uses to announce news about its platform, mainly Facebook's Newsroom, where it shares different statements about its current and new features. For the fourth method I analysed specialist technology websites, which provided in-depth understanding about things that Facebook did not reveal.

ORCID iD

Elinor Carmi  <https://orcid.org/0000-0003-1108-2075>

References

- Altheide, David L. and Snow, Robert P. (1979) *Media Logic*. Beverly Hills, CA: SAGE.
- Andreou, Athanasios, Venkatadri, Giridhari, Goga, Oana, Gummadi, Krishna P., Loiseau, Patrick, and Mislove, Alan (2018) Investigating ad transparency mechanisms in social media: A case study of Facebook's explanations. In: *The Network and Distributed System Security Symposium (NDSS)* [AQ7].
- Backstrom, Lars (2013) News feed FYI: A window into news feed. *Facebook Business*. Available at: <https://www.facebook.com/business/news/News-Feed-FYI-A-Window-Into-News-Feed> (accessed 11 September 2018).
- Backstrom, Lars (2016) News feed FYI: Helping make sure you don't miss stories from friends. *Facebook Newsroom*. Available at: <https://newsroom>.

- fb.com/news/2016/06/news-feed-fyi-helping-make-sure-you-dont-miss-stories-from-friends/ (accessed 15 October 2019).
- Boland, Brian (2014) Organic reach on Facebook: Your questions answered. *Facebook for Business*. Available at: <https://www.facebook.com/business/news/Organic-Reach-on-Facebook>. (accessed 27 August 2018) [AQ8].
- Bucher, Taina (2018) *If... Then: Algorithmic Power and Politics*. Oxford: Oxford University Press.
- Burke, Moira, Kraut, Robert and Marlow, Cameron (2011) Social capital on Facebook: Differentiating uses and users. *Proceedings of the SIGCHI conference on human factors in computing systems*. ACM [AQ9].
- Carmi, Elinor (2017) Regulating behaviors on the European Union internet: The case of spam versus cookies. *International Review of Law, Computers & Technology* 31(3): 289–307.
- Carmi, Elinor (2019) The hidden listeners: Regulating the line from telephone operators to content moderators. *International Journal of Communication* 13: 440–458.
- Chikofsky, Elliot J. and Cross, James H. (1990) Reverse engineering and design recovery: A taxonomy. *IEEE Software* 7(1): 13–17 [AQ10].
- Das, Sauvik, and Kramer, Adam D.I. (2013) Self-censorship on Facebook. In: *Proceedings of the Seventh International AAAI Conference on Weblogs and Social Media* [AQ11].
- Eulenstein, Max, and Scissors, Lauren (2015) Balancing content from Friends and Pages. *Facebook Newsroom*. Available at: <https://newsroom.fb.com/news/2015/04/news-feed-fyi-balancing-content-from-friends-and-pages/> (accessed 15 October 2019).
- Facebook (2011) National cybersecurity awareness month updates. *Facebook Security*. Available at: <https://www.facebook.com/notes/facebook-security/national-cybersecurity-awareness-month-updates/10150335022240766/> (accessed 20 January 2019).
- Facebook Business (2017) About the delivery system: Ad auctions. Available at: <https://www.facebook.com/business/help/430291176997542> (accessed 30 July 2018).
- Gehl, Robert W. (2011) The archive and the processor: The internal logic of Web 2.0. *New Media & Society* 13(8): 1228–1244.
- Gillespie, Tarleton (2014) The relevance of algorithms. In: *Media Technologies: Essays on Communication, Materiality, and Society* 167–195 [AQ12].
- Gillespie, Tarleton (2018) *Custodians of the Internet: Platforms, Content Moderation, and the Hidden Decisions that Shape Social Media*. London: Yale University Press.
- Grygiel, Jennifer (2019) Should Facebook have a ‘quiet period’ of no algorithm changes before a major election? *Niemanlab*. Available at: <https://www.niemanlab.org/2019/07/should-facebook-have-a-quiet-period-of-no-algorithm-changes-before-a-major-election/> (accessed 15 October 2019).
- Jobin, Anna and Ziewitz, Malte (2018) Organic search: How metaphors help cultivate the web. *Policy Review*. Available at: <https://www.hiig.de/en/organic-search-metaphors-help-cultivate-web/> (accessed 15 January 2019).
- John, Nicholas A. and Nissenbaum, Asaf (2019) An agnotological analysis of APIs: Or, disconnectivity and the ideological limits of our knowledge of social

- media. *The Information Society: An International Journal*. Available at: <https://www.tandfonline.com/eprint/ub5aiiy7PxavGEs54X3V/full> [AQ13].
- Kramer, A.D., Guillory, J.E. and Hancock, J.T. (2014) Experimental evidence of massive-scale emotional contagion through social networks. *Proceedings of the National Academy of Sciences* 111(24): 8788–8790.
- Lefebvre, Henri (2004) *Rhythmanalysis: Space, Time and Everyday Life*. London: A&C Black.
- Lynley, Matthew (2014) This is how an ad gets placed in your Facebook news feed. *Buzzfeed*. Available at: <https://www.buzzfeednews.com/article/mattlynley/this-is-how-an-ad-gets-placed-in-your-facebook-news-feed> (accessed 11 September 2018).
- McStay, Andrew (2017) Micro-moments, liquidity, intimacy and automation: Developments in programmatic ad-tech. In: Siegert G., Rimscha M.B. and Grubenmann S (eds) *Commercial Communication in the Digital Age – Information or Disinformation? Age of Access? Grundfragen der Informationsgesellschaft*. Berlin: Mouton de Gruyter, pp. 143–159.
- Mager, Astrid (2012) Algorithmic ideology: How capitalist society shapes search engines. *Information, Communication & Society* 15(5): 769–787.
- Mannes, John (2017) Machine intelligence is the future of monetization for Facebook. *Tech Crunch*. Available at: <https://techcrunch.com/2017/04/21/machine-intelligence-is-the-future-of-monetization-for-facebook/> (accessed 30 July 2018).
- Martinez, Antonio Garcia (2018) How Trump conquered Facebook – without Russian ads. *Wired*. Available at: <https://www.wired.com/story/how-trump-conquered-facebook-without-russian-ads> (accessed 30 July 2018).
- Myers-West, Sarah (2017) Raging against the machine: Collective action on social media platforms. *Media and Communication* 5(3) [AQ14].
- Miyazaki, Shintaro (2012) Algorhythmic: Understanding micro-temporality in computational cultures. *Computational Culture* 2 [AQ15].
- Noble, Safiya Umoja (2018) *Algorithms of Oppression: How Search Engines Reinforce Racism*. New York: New York University Press.
- Parikka, Jussi (2007) *Digital Contagions: A Media Archaeology of Computer Viruses*. New York: Peter Lang.
- Roberts, Sarah T. (2016) Commercial content moderation: Digital laborers' dirty work. In: *The Intersectional Internet: Race, Sex, Class and Culture Online* [AQ16].
- Roberts, Sarah T. (2019) *Behind the Screen: Content Moderation in the Shadows of Social Media*. New Haven, CT: Yale University Press.
- Skeggs, Beverly and Yuill, Simon (2015) The methodology of a multi-model project examining how Facebook infrastructures social relations. *Information, Communication & Society* 1–17 [AQ17].
- Stein, Tao, Chen, Erdong and Mangla, Karan (2011) Facebook immune system. In: *Proceedings of the 4th Workshop on Social Network Systems*, April. New York: ACM.
- Van Dijck, José and Poell, Thomas (2013) Understanding social media logic. *Media and Communication* 1(1): 2–14.
- Wang, Meihong and Zhou, Yue (2015) Taking into account more actions on videos. Facebook newsroom. Available at: <https://newsroom.fb.com/news/>

- 2015/06/news-feed-fyi-taking-into-account-more-actions-on-videos/ (accessed 30 July 2018).
- Welch, Brett and Zhang, Xiaochen (2014) Showing better videos. Facebook Newsroom. Available at: <https://newsroom.fb.com/news/2014/06/news-feed-fyi-showing-better-videos/> (accessed 30 July 2018).
- Weltevrede, Esther, Helmond, Anne and Gerlitz, Carolin (2014) The politics of real-time: A device perspective on social media platforms and search engines. *Theory, Culture & Society* 31(6): 125–150.
- Williams, Raymond (1974) *Television: Technology and Cultural Form*. New York: Routledge.
- Yu, Ansha and Tas, Sami (2015) News feed FYI: Taking into account time spent on stories. Facebook Newsroom. Available at: <https://newsroom.fb.com/news/2015/06/news-feed-fyi-taking-into-account-time-spent-on-stories/> (accessed 30 July 2018).
- Zuboff, Shoshana (2015) Big other: Surveillance capitalism and the prospects of an information civilization. *Journal of Information Technology* 30(1): 75–89.

Elinor Carmi is a postdoc in digital culture and society at the Communication and Media Department, Liverpool University, UK. She is a digital rights advocate, researcher and journalist who has been working, writing and teaching on deviant media, internet standards, cyber-feminism, sound studies and internet governance. Her second monograph, *Media Distortions: Understanding the Power behind Spam, Noise and Other Deviant Media*, will be published in 2020 by Peter Lang.