The Case for Public Service Recommender Algorithms

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ABSTRACT

In this position paper we lay out the role for public service organisations within the fairness, accountability, and transparency discourse. We explore the idea of public service algorithms and what role they might play, especially with recommender systems. We then describe a research agenda for public service recommendation systems.

1 INTRODUCTION

In traditional commercial applications of recommender systems, the goal is a straightforward extension of an organisation's overall commercial aims. This leads to a focus on designing and optimising recommender systems that above all else improve overall revenue (via increased purchasing) or in the case of a subscription service, increased engagement (via increased consumption of items, e.g. listens for songs, views for short video). However, for a class of organisations that answer to the public rather than shareholders, a different drive exists: public service. Whilst there is no single definition of what constitutes public service motivations, there are several ways in which the notion of public service enshrines the principles of Fairness, Accountability and Transparency (FAT) and presents an opportunity for novel ways to design recommender algorithms, challenging the orthodoxy of commercial applications of this technology.

2 CONTEXT

Using data to deliver personalised services to audiences has become a key strategic priority for many Public Service Broadcasters across Europe [7]. However the increasing use of algorithmic recommendations and personalisation in Public Service Media (PSM), specifically in journalism, has surfaced concerns about the potential risk these models pose for PSM values like universality and diversity, through the potential to undermine shared and collective media experiences, reinforce audiences' preexisting preferences, and the cumulative risk to PSM of becoming more like a goldfish bowl, rather than a window to the world [1, 17, 19, 23, 25]. However, counter to this is the view that recommender systems could be important in promoting diversity of supply and stimulating exposure diversity [8, 9]. The European Broadcast Union (EBU) describes this challenge as how to deliver recommendations that balance audience interests against existing editorial PSM responsibilities [6]. Sørensen and Hutchinson [23] distill this further into four distinct but related challenges 1) balancing popularity and distinctiveness, 2) diversity of exposure to programming, 3) transparency of the logic driving recommendations and 4) user sovereignty. PSM approaches to recommendations must continue to promote diverse and balanced content that will serve a diverse citizenry and democracy. Furthermore, PSM recommender systems must be subject to due oversight and scrutiny [26] to ensure they do not undermine editorial independence, impartiality [7] and their trusted reputation. They must deliver recommendations that responsibly balance personalisation with the public interest.

3 PSM VALUES AS A FRAMEWORK FOR RECOMMENDER SYSTEMS

The notion that PSM values offer distinct frameworks for recommender systems is underpinning new EBU initiatives to develop distinctly PSM approaches to recommendations[1]. As a public service broadcaster, the BBC's aims and operating principles are enshrined in our public purposes[2] which commit us to impartiality, distinctiveness, and diversity in our output. Issues of Fairness, Accountability and Transparency (FAT) thus inform approaches to recommendation and personalisation as these values are baked into its very reasons for existing as an organisation - in a way that is not necessarily true of commercial organisations. John Reith's famous imperative of the BBC to "inform, educate and entertain" lies at the heart of the BBC mission. Whilst this has evolved over the years, the BBC's unique duty and role in society remains central.

In the domain of recommender systems the Reithian view of PSM commits to providing content which fulfils the public's need for diverse and balanced information, entertainment, and education in a manner which is unexpected or surprising – best expressed by Reith's assertion that "the best way to give the public what it wants is to reject the express policy of giving the public what it wants"[3]. Notions of public service inevitably vary across different geo-political and cultural contexts [8] and a one size fits all model is likely to be unsatisfactory but it is clear that the PSM remit has implications for how we design and evaluate recommenders to ensure principles such as exposure diversity and surprise are maintained.

4 PUBLIC SERVICE ALGORITHMIC DESIGN: WHAT YOU OPTIMISE FOR MATTERS

Why is this significant for recommender systems specifically? The metrics we choose to optimise for are critical. Many commercial providers optimise for engagement and audience figures, for example collaborative filtering (CF) algorithms are often evaluated in terms of how accurately they predict user ratings. If PSM organisations rely on third party recommender systems and off the shelf solutions they are at risk of treating audiences as consumers first, as opposed to citizens [26]. For [12, 24] a "focus on the user as consumer, coupled with accountability measures that focus on performance benchmarks like audience reach, do not live up to

[1] Personalisation for Each Project https://peach.ebu.io/
[2] http://www.bbc.co.uk/corporate2/insidethebbc/whoweare/publicpurposes
[3] Speech by Reith in 1930 [22]

the ideal-type of view of accountability to the citizenry" [12, p. 94]. Taken together, this has prompted calls for PSM to approach personalisation differently [1, 23, 26], including optimising for different key performance indicators rather than relying on off the shelf solutions [26]. To this point Bennet [1] outlines four broad examples of alternative measures of success, namely how PSM: connects audiences to new content; connects diverse audiences to shared content; connects audiences to new experiences and formats; and connects audiences with external publicly valuable content and services. Whilst offering alternatives, this currently lacks the specificity required for implementation [26].

4.1 Optimising for PSM Values

The EBU [7] and the BBC [4] are conducting research and development into recommendation algorithms based on PSM values that optimise against metrics deemed important for PSM. Audience satisfaction is important in delivering public value as to achieve legitimacy PSM require mass appeal [5, 26]. However, there are other criteria that need to be taken into account, such as broader notions of universality [25] and exposure diversity [8]. Diversity speaks to communication policy goals that in a democracy, citizens need access to a range of balanced information to make decisions [10]. PSM commitment to diversity extends to recommender systems as they come to play important roles in exposing content to audiences. They must explicitly avoid narrow, even if highly accurate, recommendations based on assumptions about an individual's personal tastes and interests and rather maintain a capacity to surface a broad range of content. Furthermore, a Reithian PSM approach to recommendations must enshrine diversity in the broader societal sense - as our public purposes compel us to "reflect, represent and serve the diverse communities of all of the United Kingdom's nations and regions".[3] This speaks to the importance of promoting publicness [26] collectivity, and cultural diversity - as well as just "exposure diversity".

4.2 Designing for Diversity

Exposure diversity speaks to a broad range of different approaches, measures and conceptions of diversity, some, but not all of which are compatible with the ideals of public service. [8] offer a categorisation of different approaches to (and justifications for) exposure diversity in recommendation systems based on normative perspectives, an individual liberty perspective, a deliberative democracy perspective, and an adversarial democratic perspective. While acknowledging that most existing approaches to exposure diversity in recommendations take an individual-liberty approach, scholars [10, 26] have highlighted novel approaches to exposure diversity which explicitly address democratic goals of personalisation - including designing to counter filter bubble effects [3] and explicitly optimising for social and cultural diversity [21]. Some researchers have attempted to broaden the conception of diversity by devising systems designed for outcomes such as serendipity [15]. Whilst some progress has been made, core challenges remain around the implementation of these values and ideals in practice and importantly how to determine "success" [10, 11, 16]. The algorithmic personalisation of content and criteria for evaluating its success inevitably involves normative choices [2]. For example, any initiative to promote diversity exposure will first have to deal with "the question of what exposure diversity actually is" [10, p. 3] as well as how to measure it. As Van Es points out [26, p. 12] "even if an algorithm is designed with the goal of stimulating "diversity" an assessment of its performance by other measures nullifies these good intentions".

The development of new PSM approaches to measurement to capture richer attributes of the type of items presented to users, conceived over time help ensure that PSM principals are incorporated alongside the focus on reach and the magnitude of user engagement. In particular, potential measures of diversity [7] as well as serendipity, novelty or distinctiveness - offer fertile grounds for further research exploration in a PSM context. Attempts to explore this are already underway [4, 7] but more work is urgently needed. A renewed focus on optimising for PSM values could be enhanced by approaches aimed at helping audiences explore, understand [14] and interact with recommendations, in ways that encourage agency, autotomy and personal growth, for example by incorporating aspirational rather than retrospective behavioural data.

4.3 Designing for Accountability

The principles of transparency and accountability are key to the mission of PSM, traditionally and broadly conceived of as the mechanisms by which PSM are regulated and held accountable. Algorithmic systems in PSM need to be accountable, not black boxes [20]. They must be interpretable, explainable and open to scrutiny in order to be held responsible [12] with the aim of maintaining levels of editorial integrity and public trust. This includes ensuring the workings of PSM recommender systems are transparent and intelligible across technical, managerial, and editorial teams, as well as making sure they are responsibly audited [18], i.e. subject to rigorous testing of how they work in practice and with what impact, showing for example how they determine what content is being surfaced to audiences based on what criteria [18] and to what effect [13]. This will help to ensure recommender systems are working fairly and in the public interest. Where third-party algorithms are used, PSM must ensure the same standards apply. In terms of accountability to individual audience members and the wider public, PSM should consider consulting people about the value of different approaches to recommendations in PSM contexts. Additionally, explanations of how recommendation decisions are being made could be provided [4], revealing how they work and helping to foster understanding of how content is being personalised to them, as well as greater public understanding about underlying algorithmic processes. Building more open and sustainable dialogue with audiences and the public at large, is a proactive approach to the problems associated with many current algorithmic recommender systems, and could be used as a way to encourage agency and autotomy. Though significant challenges remain because techniques are still being developed and best practice is evolving, this should not prevent delivery.

5 MAPPING A RESEARCH AGENDA FOR PUBLIC SERVICE RECOMMENDER SYSTEMS

Translating complex and overarching PSM values into these systems in practice and validating their value to the organisation against agreed upon benchmarks remains an open challenge. Given the potential range of possible metrics, another level of complexity is identifying and indeed integrating metrics, alongside user engagement and accuracy of preference predictions. We identify 10 key questions and areas for research and development:

(1) How do we operationalise PSM values as tangible concepts in specific PSM contexts?
(2) What are useful metrics for which to optimise (e.g. diversity or serendipity), how should the importance of different metrics be balanced in different PSM contexts?
(3) What data (metadata/audience data) should algorithms work on, what are the limits of this data in its current form and how might awareness of this inform new approaches?
(4) How much accuracy loss is acceptable in pursuit of new metrics, e.g. diversity?
(5) How should transparency work - when and to whom is it useful, e.g. regulators?
(6) To what extent should we be transparent about how we are resolving metric and optimisation complexity (the trade-offs we are making)?
(7) How do we design for interpretability and explainability to enable appropriate oversight of how recommenders are making decisions and ensure due accountability?
(8) What do emerging approaches in algorithmic auditing offer us in terms of scrutinising and checking how our recommender systems are working in the real world (i.e. how they are impacting on how audiences discover and engage with content)?
(9) What type/level of explanation will be most useful? Will explanations produced for editorial need to vary from the type of explanations PSM may provide to audiences?
(10) How will we determine the value of different potential approaches? How might new methodologies, e.g. multi-method, comparative, or longitudinal research, explore cumulative effects?

6 CONCLUSIONS

This position paper has presented the case for a renewed focus on public service algorithm design and discussed the potential to advance methodologies for FAT in recommender systems. We identify challenges and opportunities for the design of PSM recommender systems and questions that are ripe for the FATREC community to investigate in order to better align recommender systems in public service contexts with their underlying value frameworks – helping to ensure more publicly responsible recommendations that balance aspects of public value and interest.

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