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Enabling Serendipitous News Discovery Experiences by Designing for Navigable Surprise

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Abstract

We formulate a user-centric approach to promoting serendipity in news recommender systems that leverages user familiarity with the algorithmic language of recent social media (in particular, TikTok) to nurture news discovery. We conceptualise serendipity in recommender design as the capacity of the system to produce ‘navigable surprise’, defined as the experience of encountering novel, diverse, relevant and unexpected information under conditions of immediate (i.e. real time) and bounded (i.e., item-oriented) agency. This conceptualisation builds upon the notion of ‘reliable surprise’, to explicitly incorporate the temporal agency available to users in their repeated interactions with the system. This agency allows users to constrain the degree of “anarchy and chaos” when encountering novel and unexpected information, affording them the capability to “expect the unexpected” by engaging in the groundwork and observation required to perceive an encounter as serendipitous. To realise navigable surprise within news recommender design and situation, we propose a combination of short-term interest modelling with consumption-based (implicit) user signalling. As such, we consider the centrality of short-term interest modelling to serendipity in recommender design; concerns that have conventionally been addressed separately within the literature.

Keywords

serendipity, user agency news recommendation, social media,

1. Serendipity in NRS

In an age of personalization, the pursuit of serendipity within news recommendation architecture serves the important purposes of guarding against algorithmic convergence and bias [1], and stimulating more engaged and receptive readerships by satisfying their ingrained desire for novelty and surprise [2]. Furthermore, as an increasingly recognized design principle of the ‘post-accuracy’ paradigm in RecSys, serendipity has been advocated as a means of promoting media pluralism and protecting the fundamental human right of access to information, by sustaining digital environments that promote exploration and chance encounters with diverse information [3]. Moreover – to the extent that cultivating serendipitous experiences for news consumers arguably stimulates engagement as much as it does discovery – it represents a


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‘sustainable’ concept in that it presents with both commercial and normative appeal to news organizations.

However, designing for serendipity within news recommender systems has proven inherently challenging. This is largely due to it being a complex concept that presents with with uncertain ontogenic properties [4]. In other words: it is difficult to be certain of the factors that provide for serendipitous experience. As a result, scholarly work on this topic has taken diverse paths, which can be divided into two main conceptual approaches. The first approach defines serendipity as a compound characteristic of content, operationalized by features such as novelty and unexpectedness [5]. This ‘content-centric’ perspective seeks to enable serendipity by curating item recommendations that strike an optimal balance between these attributes. Next to this, recent contributions have advocated for a more ‘agent-centric’ approach to be adopted. These scholars define serendipity more broadly as a user experience [4] or capacity [3, 6] that can be nurtured by means of a constellation of affordances engineered into recommender systems and their contextual specifications. This conceptual broadening creates new demands of scholarship to explore the effects of a large array of design and implementation features [see: 4] that could potentially play a role in sustaining serendipitous news consumption experiences.

To guide this exploration, in this paper we propose an approach to promoting serendipity in news recommendation architecture that integrates these two approaches. It does so by embedding a consideration of content characteristics within an overarching theory of the role of navigability in generating serendipitous experience. We base this theory in observations of recent trends in social media design, which are best exemplified by TikTok. We conceptualise serendipity in algorithmic recommendation as the capacity of the system to produce ‘navigable surprise’. This is defined as: the experience of encountering *novel, diverse, relevant* and *unexpected* information under conditions of *immediate* (i.e., real time) and *bounded* (i.e., item-oriented) agency. This conceptualisation transports the well-known notion of ‘reliable surprise’ [2] into the RecSys era by explicitly incorporating the temporal agency available to users in their repeated interactions with the system. This dynamic agency allows users to constrain the degree of “anarchy and chaos” [2] experienced when encountering novel and unsought after information, affording them the capability to “expect the unexpected” [7] by engaging in the groundwork and observation [3] required to perceive an encounter as serendipitous. To realise navigable surprise within news recommender design and situation, we discuss the importance of short-term interest modelling and consumption-based (implicit) user signalling. As such, we consider the centrality of short-term interest modelling to serendipity in news recommender design; concerns that have conventionally been addressed separately within the literature.

2. From Reliability to Navigability

Humans possess an innate desire for discovery and surprise, inclinations that recommendation architectures have increasingly sought to leverage in order to prevent excessive algorithmic convergence (i.e, overspecialization or bias) which may lead to user dissatisfaction and ultimately disengagement. This effort has been termed the pursuit of serendipity in recommendation systems. The principal goal of such recommendation is to predict “...an item, which the user had not seen before and would not even look for on their own, but when the user consumes

this item, they enjoy it” [4, pp. 4].

In practice, this is an exceedingly difficult task, since what qualifies an encounter with new and unsought after information as serendipitous (enjoyable) appears at first glance to be paradoxical: it cannot be wholly unexpected, but rather informed by the user’s “...valuable interaction with ideas, information, objects, or phenomena” [8]. Thus, from the user perspective, a serendipitous encounter must be ‘worked for’ but not ‘sought after’; a pleasant discovery that is perceived as being driven by chance whilst in reality a consequence of “...groundwork, observation, and previous knowledge” [3, pp. 152]. In other words, serendipitous experience is contingent on the user’s ability to “expect the unexpected” [7] by engaging in practices that constrain and condition their experience of novel and unsought after information.

The concept of ‘reliable surprise’ [2] centralizes this notion of user agency to the generation of serendipitous experience in news consumption. It posits that consumers ‘tame’ the scope of potential surprise in media consumption, through their choice of (journalistic) media. For example, by reading a particular newspaper, a consumer can reasonably expect limitations to the scope of journalistic content produced under its editorial direction. They are unlikely to encounter fringe or radical perspectives or opinions by reading a mainstream centrist issue. By choosing this newspaper, the reader avoids ‘bad’ or chaotic forms of surprise and thus makes surprise ‘good’ or ‘reliable’ by making use of the opportunities that the journalistic environment provides.

Today, in the context of recommender systems, this agency extends far beyond the user’s initial selection of media and encompasses the evolving and dynamic interactions that they engage in with that media over time. This capacity for shaping the boundaries and conditions of potential surprise through temporal interaction is evident within recent trends in social media recommender design and situation, best exemplified by TikTok’s ‘For You’ interface. Whilst algorithm-driven feeds are nothing new, they have typically constituted a ‘slow collaboration’ between user and algorithm, where personalization occurs over a longer time frame and without a clear user-perceptible relationship between user interactions and consequent recommendations. The main innovation of this interface has been to clarify and speed up the rate of this collaboration between user and algorithm, increasing perceived algorithmic responsiveness and decreasing perceived algorithmic insensitivity [9] by making the user feel more capable of influencing algorithmic outcomes [10]. Because of this, TikTok has proven remarkably effective at engaging users with large quantities of novel content, providing them with a simple and responsive mechanism to navigate through it [11]. Thus, in the context of recommender systems, the capacity of the user to realize serendipitous experience is not only assured by their initial selection of media (i.e. reliability), but also by their dynamic interactions with it.

3. Conceptualizing Navigable Surprise

To reflect this development, we conceptualize serendipity in news recommender design as the capacity of a system to produce ‘navigable surprise’. This is defined as: the experience of encountering *novel*, *diverse*, *relevant* and *unexpected* information, under conditions of *immediate* and *bounded* agency. The first part of this definition deals with content characteristics, whilst

the second part addresses user capability and experience. It thereby strikes a balance between the content-centric and the agent-centric approaches to realizing serendipity in recommender design. Because we consider content characteristics with regard to their role in enabling navigability, we begin with a discussion of the latter, and then return to the former.

Navigability is an essential part of serendipitous experience online. We can imagine serendipity in news recommender interaction by analogy of sea-faring ship. This ship finds itself sailing through heavy fog (obscuring potentially serendipitous encounters). The traditional notion of ‘reliable surprise’ would see the navigator (the user) select the ocean in which to sail (i.e., the newspaper), based on their previous observations of the conditions of the waters found there (i.e., user expectations of the scope of journalistic output). With navigable surprise, we focus instead on the capacity of the navigator to make dynamic course corrections in response to the prevailing conditions encountered in the fog (i.e., temporal interactions with the recommender system in response to encountering surprising content). This navigability allows the user to (i) simultaneously constrain the scope of surprise (by signalling interest or disinterest) as well as to (ii) perform the necessary ground work and observation required to perceive an encounter with novel information found in the fog as serendipitous (as it was their actions ‘at the helm’ that lead them there).

To promote serendipity, this agency should be both immediate and bounded. Immediacy refers to the responsiveness of navigation, both in terms of its real-time nature as well as to the mechanism through which course corrections are made. In terms of the former: the user should be able to react to recommended content at an item level and the system should provide near-instantaneous responses to these signals (in the form of new recommendations). In terms of the latter, the act of navigating (i.e., the mechanism through which the user provides these signals) should be – to the extent possible – collapsed into the experience of sailing the ship (i.e., decisions are subsumed into the act of consumption). Immediacy provides the user with the capacity to ‘feel the rudder’: to navigate through the heavy fog in such a manner that the encountering of information should not feel random and chaotic, but rather based on their previous navigational effort.

This navigational capacity should also be bounded. In other words, the decision horizon should be kept relatively short, potentially only demanding of the user their reaction to individual recommendations. The intuition here is that allowing the user to only make incremental course corrections maintains in them an expectation of being surprised. Conversely, if the decision horizon is extended too far (for example, by asking the user to definitively select for topics such as ‘politics’ or ‘sport’), this is akin to the fog partially lifting, providing clearer sight and expectations over the content to be encountered in the future, reducing the serendipity generating potential of the system.

Having considered the importance of navigability in enabling serendipitous experience in news recommender interactions, we now address how content characteristics service this phenomenon. The central challenge in producing serendipitous recommendations lies in the delicate balance of identifying content that is not only *novel* (i.e., previously unseen) and *diverse* (i.e., reflective of a variety of topics, perspectives and voices) but also genuinely useful to the user (i.e., positively evaluated). Determining, in advance, whether a recommendation will be deemed useful by a user is highly challenging and has resulted in consideration of many domain-sensitive content characteristics [12, 5]. Of these, we consider two to be of particular importance

in enabling navigable surprise in news recommendations: relevance and unexpectedness.

Relevance measures the extent to which content aligns with the user's known interests. It is essential to evaluating the likelihood of whether novel items sourced from a diverse pool of candidates is likely to be useful to a user. Typically, this is measured in terms of the similarity of an item to those items with which the user has interacted previously. In the context of navigable surprise, it is important that a balance is struck between an appreciation of the user's long-term news interests (for example, general categories such as politics or sport) and their short-term (or contextually defined) interests, such that the system is responsive to their navigational effort. For example, a news article that may not be relevant with reference to a user's long term interests may become temporarily relevant (and therefore potentially serendipitous) to the user if it addresses a current event or topic that the user has very recently shown an interest in. Ensuring that *relevance* is sensitive to short term drift in user interests is thus essential to ensuring the *immediacy* of user agency in navigating recommendations (i.e. 'feeling the rudder').

However, estimating the usefulness of novel and diverse news recommendations based on relevance alone may be insufficient for sustaining serendipitous encounters if recommendations become too predictable. Predictable recommendations may render the act of navigation unsatisfying to the user, since they might sense that the system is simply reinforcing their existing preferences, limiting their ability to discover new news topics, themes and perspectives. This ultimately harms the *boundedness* of user agency, as they come to exercise too much perceived control over the scope of potential surprise. To limit this dynamic, serendipitous recommendations – in addition to being novel, diverse and relevant – should also be *unexpected* to the user. One way of achieving unexpectedness within news recommendations is by surfacing items that contain unexpected combinations of latent concepts [13], with the aim of introducing users to unanticipated and potentially intriguing intersections of journalistic content. This serves to ensure that recommendations do not become predictable, and consequently that user agency over the direction of future recommendations remains bounded, maintaining the serendipity generating potential of the system.

4. Designing Navigable Surprise

We posit that navigable surprise may be realized in news recommendation architecture via a combination of short-term interest modelling and consumption-based (or implicit) signalling interface design. Increasingly, news recommender systems combine information about the short-term preferences of users along with that of their long-term interests [14, 15]. This ensures that recommendations remain responsive to more fleeting and contextually defined news interests alongside more stable or habitual ones. Foregrounding a short-term recommendation loop is essential for realizing navigable surprise, as it ensures that the system is responsive to user signalling in near real-time. This technical capacity affords the user the capability to experience novel and unsought after news serendipitously by expressing immediate and bounded influence over subsequent algorithmic recommendations and thus locally constraining the potential scope of surprise.

In addition, the navigational efforts of the user should be realized by means of a consumption-

based or implicit signalling user interface design. Observers have noted that the ‘secret sauce’ of TikTok is not its algorithm in isolation per se, but rather its contextual specification: the way in which it is embedded within the overall user experience [11]. Providing positive or negative signals to recommended items is often as simple as consuming (or not consuming) them, with a single swipe providing a quick escape from undesired content. This provides immediacy by collapsing decision-making into the act of consumption, as well as boundedness by keeping the decision focused at the item level. Importantly, whilst TikTok provides the clearest example of implicit signalling design, there are other implementations that achieve similar signalling outcomes whilst adhering to more traditional digital news formats, for example, the recently released news aggregator app, Artifact [16].

5. Relevance and Directions

Designing for serendipity in news recommendation architecture presents as an immense challenge due to the ontological uncertainty about which system affordances matter most for providing users with the capability to experience novel and unsought after journalistic content as enjoyable. With the aim of reducing this uncertainty, in this short paper we have offered a conceptualization of serendipity in news recommender design as ‘navigable surprise’, which considers the dynamic agency available to the user in their repeated interactions with the system.

Such an approach to architecting serendipity in news recommendation carries the potential benefits of leveraging learned behaviours from recent social media environments to drive news exploration and discovery by nurturing idle curiosity and reducing the burden of news choice. This could be of particular importance in addressing the need to change the opportunity structure of online news to stimulate inadvertent news exposure among those who unintentionally read little to no news [17]. However, the potential downsides of such an approach to news consumption, such as the potential for increased passivity [18] and algorithmic dependence [19], also merit further consideration. Future theoretical and experimental work should seek to excavate and evaluate the ways in which users interact with such a system and ultimately its utility in provisioning for serendipity in news consumption practices.

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