

Automatic Interactive Documentation for Emergent Story Discovery

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ABSTRACT

There is a distinct pleasure in the discovery of an emergent story while interacting with a digital game. Most game interfaces, however, only allow this to happen in the here and now of play, and do not afford the retrieval of potentially interesting events that might have happened outside the player's view, or that were missed as they were occurring. We present our project's Chronicles interface that automatically documents most of what has transpired in the game world in a form inspired by Wikipedia. This allows players to intuitively explore entities and past events, facilitating the discovery of emergent stories. Because this represents a daunting mass of information, we conceptualize the notion of designed "entry points" to the data, i.e. suggestions and motivations to consult specific content. We also propose a subjective mode, disclosing only the information the player-character is aware of in order to maintain a meaningful economy of knowledge.

CCS CONCEPTS

- **Human-centered computing** → Human computer interaction (HCI); Interaction paradigms; Graphical user interfaces; Visualization; Visualization application domains; Information visualization;
- **Applied computing** → Arts and humanities; Media arts.

KEYWORDS

Emergent narrative, emergent story, encyclopedia, documentation, interactive storytelling

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1 THE PROBLEM OF EMERGENT STORY DISCOVERY

Most people who have played *The Sims* (EA) have a good anecdote to tell. One of my favorites concerns a babysitter leaving the house with the baby in her hands. The baby was never to be seen again, nor the babysitter (as there was no longer a baby to justify requesting

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her services). Beyond the diegetic kidnapping tragedy, witnessing such an unusual turn of events can be a great pleasure: the discovery of a genuine emergent story. The anecdote was savory enough to be shared, including to me, who, in turn, found it worthy to be retold to others. In his Phd thesis, James Ryan names "aesthetics of the uncovered" [10] (p. 527) the particular pleasure of discovering a novel, interesting story amongst what he elsewhere calls "the morass of data that [the game's] simulation produces" [11].

Affording players this delicate pleasure entails resolving two thorny problems: designing systems in which interesting stories have the potential to emerge; and designing interfaces facilitating the discovery of these stories. Here we are interested in the second aspect. Let's assume we have a dynamic social simulation in which interesting stories regularly emerge, how do we make sure players can find them?

The games most lauded for their emergent narrative potential¹ are still first and foremost games—meaning their interface design is focused on affording agency and delivering feedback on what is happening here and now. Most information is delivered through a camera that can only show a limited range of events usually concerning the entities currently under player control. This is good, because the here and now is what players are prompted to react to, but this also restricts the potential emergent stories to the stream of visible content. Interesting proceedings that might be happening off-camera are lost, and anything that hasn't been noticed on the spot is irrecuperable.

In this paper we describe our emergent narrative project Chroniqueur's "Chronicles" interface which allows players to explore everything that has ever happened in the game through an easy to browse, automatically generated wiki. We will begin by discussing *Dwarf Fortress'* Legends Mode [2] and James Ryan's *Diol/Diel/Dial* [12] which constitute our main references and sources of inspiration. Then, we will address the design strategies and affordances of the system.

2 PRECEDENTS OF AUTOMATICALLY GENERATED IN-GAME ENCYCLOPEDIAS

2.1 *Dwarf Fortress'* Legends Mode

When a new *Dwarf Fortress* (DF) world is created, hundreds of years of historical events are generated that contribute to shaping the physical and cultural landscape. These events are recorded and can be discovered through in-game activities or a special "Legends Mode" that functions somewhat like an interactive encyclopedia. This has been recognized as a very interesting resource for the discovery of emergent stories [3].

¹Often cited are *Dwarf Fortress* (Adams), *The Sims* series (EA) and the *Crusader Kings* series (Paradox).

The main issue with DF’s Legends mode is its laborious, keyboard-driven interface which prompted the external development of the Legends Viewer utility that reads the world data (saved as an XML file) and allows exploring the content in a more usable manner [7]. The DF creators have recently announced that the future graphical version of the game would include an improved Legends mode featuring hyperlinks to navigate between documented entities [1].

Our project’s Chronicles interface implements the announced Legends’ Mode facilities of web-like navigation and hyperlinks. However, it does not constitute a separate mode to gameplay but rather is entirely embedded in the main experience and always available. It is also more granular than its DF counterparts which documents mostly higher-level events and not the more minute details of daily dwarven lives. Our Chronicles aspire to document nearly everything.

2.2 Diol/Diel/Dial

Diol/Diel/Dial [12] is, in James Ryan’s own words: “an explorable hypertext encyclopedia of a virtual world generated by a simulationist text adventure called *Islanders*, also by the artist” [10] (p. 350). We draw from this piece the model of the auto-generated digital encyclopedia documenting all (or at least, most) entities of the simulated world. We also borrow the project’s notion of “chronicle”—that is the chronological description of events linked to an entity, embedding a historical trace on top of the static description of the object at the time of documentation. Like DF’s Legends’ mode, Diol/Diel/Dial is divorced from the interactive experience of simulation—a document to be explored after the fact, not while in action.

Intuitive navigation, in-game integration, and exhaustive documentation were our design goals for the Chronicles interface. Diol/Diel/Dial initiated the encyclopedia metaphor, we chose to pursue that path further by drawing inspiration from Wikipedia itself.

3 USABILITY INSPIRATION FROM WIKIPEDIA

Wikipedia, the online Encyclopedia, is certainly the most immediately familiar reference for an interface to a massive knowledge base of a world (our world). As such, it represents a perfect standard for the design of the in-game documentation of a generated world; an interface that would require as little learning as possible.

In our Chronicles interface, every important entity has its own page (see Figure 1, on the left). Whenever an entity is referred to in another page, it is presented as a hyperlink leading to its own. Pages include:

- A title
- A lead section summarizing the entity
- A table of attribute-values pairs (akin to Wikipedia infoboxes)
- An image (if available)
- A list of subsections
- Subsections and their content
- A timeline (if available)

The main departure from the Wikipedia standard is the splitting of content in subsections made available through tabs. This allows for generally smaller pages, but also special layouts. An important example is the “timeline” subsection that separates an entity’s list of events by year which can be browsed with a horizontal scrollbar (see Figure 1, on the right). We have also implemented some of Wikipedia’s more general functions, as well as borrowed the web browser functionalities that users expect to be available when navigating the encyclopedia.

- A home page
- A search bar
- Back and Forward buttons
- A history of previously seen pages

We have conducted two small user tests (10 participants in total) in which we asked players to find specific information about game entities, such as “does this person have any siblings” or “can you tell me what this person did when they were 20 years old?”. The first test highlighted a few issues: the subsections, for example, were initially presented as a dropdown menu and were often missed. Presenting them as persistent tabs proved to make them much more visible. The second test generally confirmed the familiarity and ease of navigation of the second Chronicles iteration and did not highlight major issues.

As we developed this interface and populated it with data provided by our project’s simulation framework, we discovered the textual interface allowed us to add another layer of content generation.

4 DETAIL GENERATION

Chroniqueur is simulation-based, meaning that events are causal, not randomly picked. In the above figure, we can see that a Luna was adopted in her fourth year. This is immediately explained by her previous event, the attendance of her mother’s funeral. Clicking on the mother’s name would reveal that she died of an accident while scouting the territory for edibles in order to provide for herself and her children. She has children because she had previously met a life partner, but that partner died and this is why a “complete stranger” adopts Luna, etc. While this simulation is the backbone of the world, it obviously doesn’t model the whole spectrum of human life and leaves room for flourishes and flavor details. The Chronicles descriptions faithfully reflect the truths of the simulated world, but they can be creative when it comes to filling in blanks.

Our Blabbeur text generation system [9] allows the authoring of grammars that can be generative while also taking into account contextual parameters. The original details appearing only in these descriptions can play an important role in players’ discovery and interpretation of emergent stories. For example, one can read some ominous foreshadowing of the death of the character’s father in the randomly generated accident descriptions of Figure 2’s timeline.

5 ENTRY POINTS TO THE CHRONICLES

In his self-critique of Diol/Diel/Dial James Ryans notes that the work doesn’t quite succeed at eliciting narrativization from readers who are simply overwhelmed by a “gargantuan tome of nearly 100M words” [10] (p. 355) which seems, without curation, to be “just

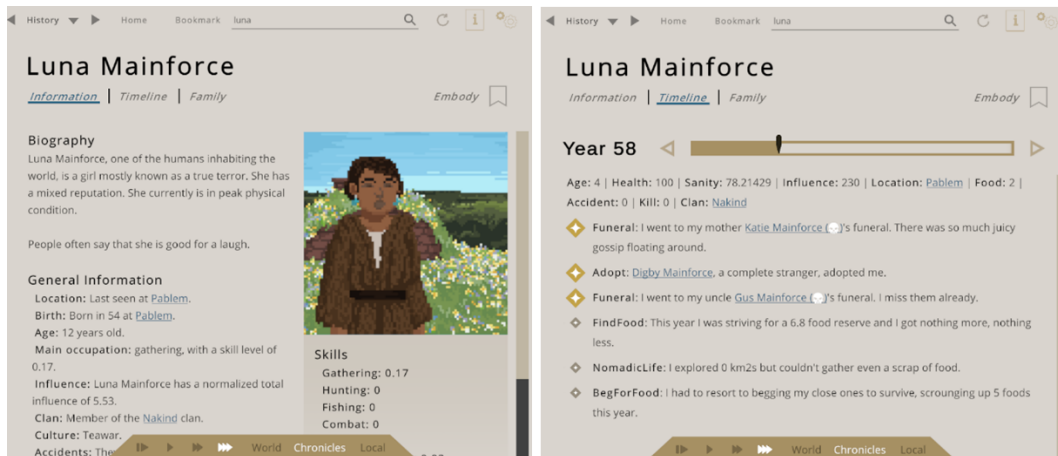


Figure 1: Luna Mainforce’s main page and her events of year 58.

- > **Accident:** I was hanging out on my boat when suddenly I was seized by an intense sense of dread and I lost 24 health.
- > **Accident:** Today is really not my day. I can’t believe that I fell into a hole in the ground and I lost 1 health.
- > **Funeral:** I went to my father [Lam Grossetravail](#) (👤)’s funeral. I cried my eyes out.

Figure 2: An excerpt from a character’s timeline showing generative event descriptions.

one damn thing after another” according to his thesis supervisor Michael Mateas (p. 358).

Taken as is, our Chronicles interface can certainly be the object of the same criticism. It allows access to an immense body of knowledge in which users can easily get lost, not knowing what they should pay attention to; or why they should even care. This led James Ryan to steer his efforts towards automatic curation, theorizing future steps of “story sifting” and “narrativizing”. While this approach has become a promising and active research thread (see [6], for example) the path of automation carries the risk of depriving players from the pleasure of story discovery—the goal we are pursuing.

In a sense, Wikipedia itself is also an unfathomable body of information, much of it being, at least to most of us, “just one damn thing after another”. We don’t approach Wikipedia as a whole; we engage it when looking for something. I would possibly have never read this poet’s Wikipedia page if I hadn’t seen a plaque on a house near my own stating that he had lived there. This proximity and coincidence have made this page interesting and relevant for entirely personal reasons. This is why general approaches to automatic curation can only go so far, when it comes to “interestingness”, one size will never fit all.

The Chronicles are therefore not an end in themselves, they are a resource for players to satisfy a curiosity, find explanations, meaning in things past. We conceptualize these player desires and motivations as “entry-points” to the chronicles.

5.1 Contextual entry-points

Players usually develop interest in games’ fictional characters when they connect to their playful activity. The person who discovered the kidnapping story in the Sims paid attention to this event because it was “their” character, someone they had a connection to. Had they had access to something like our Chronicles, they would probably have been very interested to find out details about that babysitter and what her and the baby were up to after their abrupt departure.

Chroniqueur allows players to “embody” (take control of) any character of the simulation and engage in a wide range of interactions with the world and other characters. As they do this, pursuing their own objectives or trying to accomplish game-provided goals, players develop relationships with specific entities of the world that motivate the perusal of the Chronicles. For example, a character I was embodying participated in a raid and killed a character with the same last name. I looked up who that was and discovered it was my own sister who had moved away a long time ago. Because of this, all my other siblings wanted to exact revenge on me.

5.2 Absolute entry-points

Ryan’s Diol/Diel/Dial is not entirely uncured. Its main page proposes a list of “notorious people” who have been automatically singled out because of some outstanding properties such as “lived the longest”, “had the most children”, etc. Ryan designates these as “portals to potential narrative intrigue” [10] (p. 354), a concept similar to our “entry-points”. Following the lead of the “deadliest murderer”, Ryan in fact discovers an interesting story: after hanging 25 crew members for mutiny, captain Talbert Shumeet dies

in a shipwreck right off the coast of an island ironically named Judgment (p. 355).

While interest can be very subjective, Dimulescu and Dessalles [5] identify a number of general event features with strong interest potential that can be used to search the world for absolute “points of entry”. We qualify these as “absolute” because they are likely to be meaningful or interesting in themselves, notwithstanding context or relative qualities. There is, of course, quantitative deviation (such as Ryan’s “lived the longest”), but also qualitative deviation (a causal chain leads to an unusual event type), coincidences (two characters share many similar parameters), proximity (something happened in a place close to you, or to someone close to you), fortuitous encounters (you meet someone close to you but in a faraway place), etc.

We intend to use such heuristics to generate yearly Chronicles digests populated with “clickbait”-inspired listicles with such titles as “the ten most. . .”, “you wouldn’t believe these. . .”, etc. We currently only have “unluckiest” and “most dangerous” people lists, and they consistently lead to interesting discoveries.

5.3 Meta entry-points

It is worth noting that the Chronicles also represent an excellent tool to assist the process of simulation design and development. As we introduce new types of events or tweak parameters, we continuously scout the Chronicles to assess the emergent behavior of these changes. This process also regularly yields surprising discoveries (sometimes wanted, sometimes not) that are often worth sharing. While the game’s interface doesn’t currently allow players to make these sorts of changes themselves, we intend to expose many of the simulation’s parameters in accessible configuration files which could lead to modding and eventual related emergent stories. We call this “meta” entry-points as their interest from reasons outside the game’s diegesis.

Having access to all the world’s information is great, but narrative is just as much about withholding knowledge as it is about disclosing it. It quickly became clear during our design and development process that we not only need ways to make information available, but also mechanisms to keep it hidden.

6 SUBJECTIVE CHRONICLES

There is a design motivation behind the separation of DF’s Legends and the game’s other gameplay modes. This knowledge is to be discovered through player actions; frictionless access could reduce its perceived value. Throttling the data also contributes to shaping the player’s subjectivity: it makes sense that the player-characters have a limited knowledge and awareness of their environment. Discovering the world bit by bit is certainly a staple pleasure of digital gaming.

When the player embodies a specific character in Chroniqueur, the Chronicles turn into a “subjective interface” [8], that is a window to the fictional world biased by the embodied character’s knowledge and awareness. Concretely, everything remains the same except that:

- Current status knowledge is set to the last year the player character has had news of that person (for example: last I

heard of them, they had two children, but maybe that is not the case anymore).

- The timeline only shows events the player-character has heard of while all others are redacted (thus signaling what the player doesn’t know; see Figure 3).

Whenever two characters have a social interaction, they share knowledge of events concerning themselves and common acquaintances. This allows the implementation of procedurally generated information-based games [4] prompting players to explore the Chronicles. For example, a player-character wants to find their long-lost sister, but they do not know her current location. Consulting the latter’s timeline reveals that she was last seen in village X. The player follows the lead and interacts with the inhabitants of Village X who can share fresher news as they’ve seen the sister more recently, and so on.

7 CONCLUSION

Regular game interfaces mostly allow the player to notice what is happening here and now. All events happening outside the player’s view or that have happened in the past are generally inaccessible and represent missed opportunities for story discovery. Dwarf Fortress’ Legends mode and the encyclopedia generation of James Ryan’s Diol/Diel/Dial represent valuable examples of interfaces affording players the exploration of a game’s history. Chroniqueur’s Chronicles interface builds upon these by providing an almost exhaustive, in-game, auto-generated encyclopedia; made intuitive by borrowing the design language of the very familiar Wikipedia. While these chronicles are easy to browse, they represent a daunting mass of information for players—just like a regular encyclopedia. The chronicles are made meaningful by providing “points of entry” to the data, that is reasons to look for something in particular, or suggestions of pages that are likely to prove of interest. We are optimistic that while following these leads, players will stumble upon interesting emergent stories they would have missed when focusing solely on their core gaming activity.

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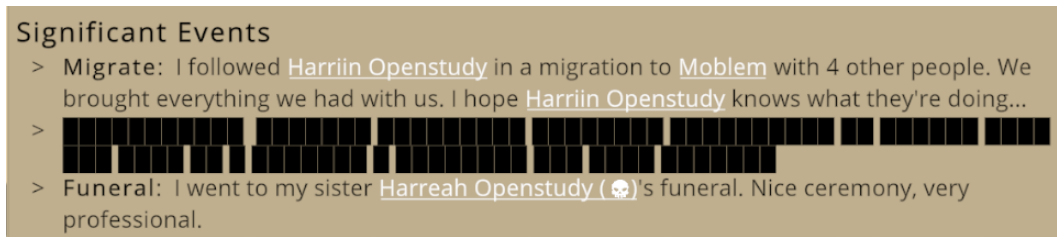


Figure 3: In subjective mode, Marcé Donnechien doesn't know everything his sister has done on year 63.

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