Finding Design Influence within Roguelike Games

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Abstract

Our work takes the view of video games as a collection of creative ideas, acting as design influence which shapes future games. We examine a popular game genre, roguelikes, from which games found their roots in early stages of the Internet. Our aim is to investigate design influence within the roguelike genre. To achieve this aim, we wrote a script to collect not only data about roguelike games, but also infer the connections between them. We achieved this by using search engines to locate interviews and post-mortem articles, and automated an analysis by frequency of game appearances and their public metadata. To disseminate the results, we employed a series of data visualisations in order to illustrate roguelike influence over the years. Our contribution from this study is twofold: first, connecting roguelike design influence spanning over thirty years using a simple metric, summarised in four different types of visualisations; second, an open-source visualisation tool to investigate design influence in roguelike games, which can be generalised for media studies exhibited on the wider Internet.

Keywords: roguelike games, design influence, design research, influence visualisation, game design, game genres

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In a post-mortem, the creators of *Rogue* (1980) wrote, "We really enjoyed '*Adventure*'. … what we wanted to do was create a game we could enjoy playing ourselves" (Wichman 1997). At the time, tabletop game *Dungeons & Dragons* (1974) was already prevalent among American college gamers and a wild success. In *Rogue*, players venture into a dungeon to retrieve an artifact, overcoming monsters and obstacles along the way. Wichman loved this idea of 'dungeon crawl' so much that he and others brought the concept to life, sparking a series of new video games for decades to come.

External influence is a common theme in emerging gameplay. The case for *Pong* (1972) was a series of complex calculations for its time to bring table tennis to the oscilloscope, extended from the concept of Unix command line tool *ping* (Pias 1973). Tschang and Szczypula (2006) proposed the notion of video games as a collection of creative ideas. In their view, studying video games is done by examining the ideas featured by video games, through which we can understand the origins and processes of game design. Jenkins (2004) stated evolution of game design is no accident; Hagen (2012) argued that "new ideas" are simply ideas used in ways they have never been used before. New designs are shaped by ideas in the past. Karsdorp and van den Bosch (2016) saw storytellings as "the implicit formation of a network of stories, in which links between stories represent pre-textual relationships." Our work builds on *networked* concepts through the lens of video games and the surrounding text scraped online. The section "Research through design: sourcing connections" describes out our research method.

The history of videogames has been laid in many books (e.g. Donovan 2010; Kent 2010; Goldberg 2011; Melissinos and O'Rourke 2012), but none examines the concept of

idea evolution and influence of game design throughout a genre over the course of videogame history. We use the term *genre* loosely as a fluid concept video game categorisation, in this case, we refer to the *roguelike* genre as a collection defined by the Wikipedia community[1]. A brief review of the roguelike genre is discussed in the next section.

The aim of this study is to investigate the evolution of roguelike games within the popular media. Our line of inquiry is constructed to identify design influence. Roguelike genre is one of the most popular game genres of all times, yet the number of games in the genre is relatively small, which makes it suitable for studying design influence. Our design process is also published as a visualisation tool for future game scholars. Before we describe our methodology and findings, we will briefly discuss the history of *Rogue.*

From Rogue to roguelikes

The first version of *Rogue* was distributed via Berkeley Standard Distribution, more widely known as BSD (Wichman 1997), which made it available on computers worldwide. There being no other games like it at the time, *Rogue* grew in popularity rapidly. Later, games began to build on Rogue's mechanics: *Hack* (1982) and later *NetHack* (1987) expanded its monsters and inventories of wonders. *Angband* (1990) offered one hundred levels of randomly generated dungeons. Because of the striking resemblance to their tributing ancestor, the collective genre became known as *roguelikes.*

Across cultural borders, Roguelike games later proved to be successful. Japan saw the release of *Torneko no Daibōken: Fushigi no Dungeon* (English title: "Torneko's Great Adventure: Mystery Dungeon") (1993), and it was popular among Japanese gamers. The name 'Mystery Dungeon' was coined as its series title, inspired by the nature of randomly

generated dungeons. The co-creator, Koichi Nakamura noted *Rogue* as an inspiration from his developer colleague (Parish 2012).

The notion of nostalgia eventually grew mainstream in the Western world as people collected old hardware and created emulators (Garda 2013a) to enjoy the operating systems like Atari, which have not been sold for over a decade by the time. As the development of *NetHack* continued by its community, roguelike deviations emerged. *Diablo* (1996) and its successors were geared with random loot generation systems without enforcing permanent death. The series would last for over two decades with an addictive gameplay. The genre continues to evolve as the name 'roguelike' became an overarching category.

Contention of naming roguelike genres

The term *roguelike* became blurred as newer games adapted the core mechanics and altered them. In 2008, the community of roguelike developers gathered at the International Roguelike Development Conference in Berlin (Roguebasin 2008). They defined factors which made a game *roguelike*. We list the main two factors: 'random environment generation' and 'permadeath'. That is to say, a roguelike game starts with a new set of environment components, which may be dungeon layouts and corridors, valuable items, and monsters. Also, when player death occurs (for example, tripped and fell into a deep pit), the game records it permanently in save files, classically in the form of high scores. Next time the game is launched, it generates a new environment and new challenges.

There is a niche community online who defines roguelikes conservatively as games that feel like *Rogue*, incorporating more elements such as grid-based, turn-based gameplay (Roguebasin 2008). In the broader media and digital distribution platforms, the term

'roguelike' is more or less a catch-all term for games that provided random environment generations.

Blurring the genre borders further, indie games such as *Spelunky* (2008), *FTL: Faster Than Light* (2012), *Darkest Dungeon* (2016) are no longer turn-based, but instead top-down or side scrolling, and retain randomly generated environments. This new wave of roguelike-like games is known as *hybrid roguelikes* on Wikipedia, also known as *roguelite* as these games may not feature permanent deaths (Hawkes 2013; Cook and Colton 2014). Garda (2013b) coined the term *neo-rogue* to capture a "rediscovery of essentials of the *Rogue* game design … favor the roguelike trend."

The rest of the paper refers to "roguelike" as the a collection of itself and sub-genres, roguelike, roguelite, and neo-rogue.

Influence and motivation in design

Recorded as early as in the thirteenth century, influence was, in astrology, an invisible energy or force emanated from "the stars that acts upon one's character and destiny". *Influentia,* or "in-flow" in medieval Old Latin, describes water flowing into something as a visual metaphor. Oxford English Dictionary defines 'influence' as the capacity to shape "character, development or behaviour" through wealth or charisma, but game creators—programmers, artists, designers, musicians, and so on—often have varying motivations for creating video games.

In the context of our study, the distinction between 'influence' and 'motivation' is important. In psychology studies, influence is perceived by their subjects, whereas motivation is observed by driven actions. Influence is a creative energy that shapes the outcome of an event or action; motivation is the energisation of behaviour that can produce creative

outcomes (Elliot 1997; Thrash and Elliot 2003). In behaviour theory, influence is the external energy that transmits between individuals; motivation is internal to an individual (Thrash and Elliot 2004).

The notion of *influence* is an idea that follow a path of transmission, such as from person to person, or a creative work to person, and so on, often synonymously known as an "inspiration". Influence describes the source of inspiration seen by an outcome. *Design influence*, therefore, describes the source of design inspiration.

Our research aim is to form a design approach to find design influence in roguelike games. Drawing upon Karsdorp and van den Bosch's work on implicit networks, our research objective is to visualise design influence as a network of video games. Design influence is embedded in games and elements of game design. To find roguelike influence, this study follows a research-through-design approach.

Research through design: sourcing connections

Research through design was originally developed to serve research practitioners in art and design, and later formalised by interaction designers and researchers. Its methodology emphasised design as a research methodology, not into the design itself (Frayling 1993). In this mode, we drew ideas from "art, design, science, and engineering, in an attempt to make aesthetically functional interfaces" (Zimmerman et al. 2007) to trace influence in roguelike games. This interface informed us as researchers, and through reflexive and iterative research practice (Grocott 2010) we came to an understanding about roguelike influence. Within the context of roguelike influence, our research problem was framed, "how are roguelike games influenced by one another?"

We based our list of roguelike games of research interest from Wikipedia. Our method found over 1,000 entries which served to be our corpus, which we sourced through a Python script (see Appendix B). Not all games have a page entry, and some games were incorrectly listed as roguelike games due to its open and collaborative nature. After filtering out the list for roguelike games, we had a list of over 80 games, their developers, platforms, and the years in which they were released or published. This number may seem small, but compared to the 'list of every video game made' by a Pastebin community member aliased "DATA_BASER"[2], the list is barely a fraction of the commercial games released. However, for the purpose of developing a design approach to understand design influence, this provided a good starting point.

Our script implements the following data collection process. To trace design influence with over eighty roguelike games, we turn to the collective, rich pool of knowledge commonly known as the Internet. There are countless articles and websites published to date about games, reviews, interviews, postmortem articles, developer diaries, community questions, and so on. We sourced articles from DuckDuckGo (http://ddg.gg), a free, popular search engine to collect articles of interest. The automation for searching roguelike articles saved a tremendous amount of time.

Our script found articles published in established game journals like *Gamasutra* and articles published by the game developer themselves. Results that are not text-based, such as Youtube videos, were excluded from this study, as the complexity to process video or audio was beyond our resources. All results that were not in English were also excluded, but we would like to expand this study to include other languages, and influence of cultures like the

Japanese culture. Within the web pages we collected, sidebars and comments were also excluded to focus on the main article body.

Keyword spotting (Cambria and White 2014) is a naïve algorithm that simply detects the presence of key phrases and counts their frequency of appearance. In our study, we are interested if there are other game titles mentioned in the articles, and keyword spotting serves our purpose well. Our hypothesis is simple: if two game titles are mentioned together in the same article more often, they are likely to be more similar to each other.

Taking into consideration the year the game was made, we can infer the direction of influence through time. A game from the past can influence another in the future, but the reverse is impossible. Therefore, we can say a game likely has design influence on another game, if they are mentioned together often online, and we know it came before. To be precise, our program does not know if the two games truly are connected, but the frequency of titles coming together is a good approximation from our exploration. Our study hopes to serve a foundation for more precise discussions, and dealing with a large quantity of games.

Initially, we laid individual games in a force-directed layout[3], but the number of overlapping lines proved to be too erratic for reading. After listing the components (game title, platform, developer, release year) separately, we realised that the graph could be organised chronologically. This realisation led to the layout of the design influence diagram, which we began to explore the connections across time between roguelike games.

Roguelike influence diagram

Figure 1 is the influence diagram of *Angband* (1990) and its design influence inferred by the method above. Drawing arcs from game to game connects across time is reminiscent of Heinlein's science fiction work with time travel. The horizontal axis is the

year of release, and the arcs denote an influential relation between two games in those two

years. The titles of the relations are not visible in influence diagrams for the sake of clarity,

but later visualisations of the same data include titles. Thicker arcs are influences related to

the game in focus; thinner arcs are the rest of the dataset. For an interactive version of all the

diagrams, our full generated data set is published at

http://spaxe.github.io/roguelike-universe/.

We chose to draw arcs above if the other game title is *in-genre*, as in a roguelike

game; or below for *out-of-genre*, as in all other genres, such as platformers, role-playing

games, first-person shooters, and so on. This separation allows us to differentiate games that

primarily have influence within the roguelike genre itself. Figure 2 shows two examples of

primary in-genre influences. These games are more likely to be representational games in the

roguelike genre, as their primary influences are from within the genre itself.

Conversely, Figure 3 lists two examples of primary out-of-genre influences. These

games are more likely to be in the neo-rogue category, or a hybrid roguelike game. They tend

to take elements from other genres, such as in the case of *FTL: Faster Than Light*, spaceship

resource management and real-time movement control schemes. These games tend to be

more refreshing and draws new audience into the roguelike genre. Additionally, the influence

diagram shows the past and future relations. The vertical line denotes the year the game in

interest was made. This line divides relative time into the past and the future to its left and

right. With the four quadrants visually separated, we developed the *genre-influence matrix* as

a supplementary legend for reading the influence diagram.

Genre-influence matrix

For games that feature more upper-left quadrant arcs, they are both representative of their own genre, and take influence from within the genre itself. On the other hand, games that feature primarily bottom-right quadrant arcs are more influential of future games out-of-genre. We name this diagram *genre-influence matrix*, shown in Figure 4, a companion legend to read *influence diagrams*. Many games lie somewhere in between the spectrums, and it is useful for game scholars at a glance to see where each game falls within.

Taking Figure 2 for example, *Torneko no Daibōken: Fushigi no Dungeon* on the left is an influential game in-genre which, considering all the Mystery Dungeon series and sequels, did pretty well. *Ancient Domains of Mystery* was both representative and influential in roguelike genres, with a couple of influences out-of-genre. The genre-influence matrix presents a quick glance of where the influences are from.

Influence diagrams are suitable for showing one game and its influences, but showing many games at the same time it becomes cluttered to see. To overcome this problem, we take the two dimensions, genre, and time influences to map roguelike games on a two-dimensional plane. The resulted scatter plot, *genre-influence map*, is presented in Figure 5.

Genre-influence map

Points near the top have influence from in-genre; bottom, out-of-genre. In the same way, points near the left are influenced more by its past, while points near the right influence more of its future. For readability, we omitted 20 titles whose labels overlapped. The full data set is available in Appendix B.

These points start at the centre of the map, and for each design influence arc in a quadrant (see Figure 4 for example), we shift the point towards that quadrant (either upper-left, upper-right, bottom-left, or bottom-right). The result was initially crowded in the middle and sparse on the outside, which made reading difficult. To space out the points for readability, we relaxed each point's distance from the centre, and removed overlapping labels manually. Our algorithm always fits the points to the plot boundary.

Rogue is on the most upper-right corner of the genre-influence map, being one of the earliest games to carve the genre itself. Nearly all the games in the upper-right quadrant are classic roguelikes. We were surprised to see the *Mystery Dungeon* series in that space as well. Towards the upper-left there are more modern takes on roguelikes, for instance *Dungeons of Dredmor* (2011) and *FTL: Faster Than Light* (2012). We also see classic-like roguelikes in that space, such as *Super Lotsa Added Stuff Hack - Extended Magic* (2006) and *Brogue* (2009) which were influenced by their ancestor roguelikes, aim to bringing back the retro feel (Garda 2013a). On the bottom half of the map we see more hybrid roguelike and neo-rogue (Garda 2013b) games, taking into elements of resource gathering and building, or inventory management from roleplaying games. Games in the middle appear to be arguably more well-known games, having influences in both in-genre and out-of-genre varieties.

Finally, we plotted the *influence timeline*, as shown in Figure 6, based on the year each game was published. We kept the same horizontal placement, and shifted the verticals. This resulted in a mostly right-to-left, up-to-bottom flow. Because early games that mostly influence within its small genre of games, and newer games are exposed to influences many more varieties, this right-to-left flow fits our expectations. For clarity, we removed influence that spanned over fifteen years between two games, and manually shifted a handful of games

to avoid label overlapping. We also omitted games that did not have any connections for the sake of conciseness. This influence timeline is by no means completely accurate, but our method is suitable for larger samples of games, which come cheaply with little addition of time thanks to software automation and data visualisation.

Limitations

There are some limitations to this approach. For a study on roguelike influence, it would have been unreasonable for a small team to read through all articles related to 85 roguelike games, let alone designing a tool that could compute hundreds more. We chose to use scripting to alleviate the workload, which comes with limitations with soft constraints and hard constraints.

Soft constraints are parameters we have set in place. The script does not compute two titles made in the same year, even if there are multiple articles mentioning both, as it would not be obvious which one is the influenc*er*. For games that are undergoing years of development and releases, such as *NetHack*, we used the initial year of public release, which can introduce minor errors for relating data points. All data computed so far are in English, and games made in Japan, such as the *Mystery Dungeon* series, may have many unexplored links in this study.

Hard constraints are limitations in the nature of the method used. It is impossible to perfectly prove that one game has influence on another unless the creators themselves stated so. We used keyword spotting and the frequency of game titles to calculate the possibility of influence, truncated most of the tail and used only very frequently appearing pairs. By avoiding game catalogues and web pages of a list of video games, and focusing on

interviews, post-mortems, and developer diaries, we can only minimise the possibility of error, and not mitigate it entirely.

Additionally, our plotting and graphing methods, while flexible and scalable, are prone to producing complicated graphs. We addressed this to some extent by removing and shifting some labels in both Figure 5 and Figure 6 to avoid overlapping labels, but further iterations are needed to optimise the graphs' legibility. The lines can also overlap, making it difficult to read so of the connections, such as the centre vertical line in Figure 6. This issue could be improved in future iterations through replacing straight lines with curves.

Conclusion

In closing, we have presented a design approach to understand design influence in the roguelike genre. Our aim is to investigate design influence within the roguelike genre. Using Internet search engines and keyword spotting in online articles, this approach can be generalised for other genres of work in games, and potentially media studies in general.

There are two implications emerging from this study. First, influence is an often-spoken-about point in a design discussion, but rarely a topic of scholarly investigation. Second, influence is differentiable from motivation, as influence is an external energy which shapes another event's outcome. Motivation is, in relative terms, an internal energy to an individual driving that event of creative process. There have been many works on motivation and games (e.g. Arya et al. 2013), but only little scholarly work on influence in at least two degree distances. We hope our work contributes a new angle to game studies through the lens of design influence.

Roguelike games are multifaceted in their own right. Elements of game design such as mechanics, gameplay, storytelling, immersiveness, and challenges are not yet part of our

investigation, but we wish to include them as we are able. As part of the effort in creating

design tools for game studies researchers and open research, we have open sourced our tool

described in Appendix A and B. We hope to see users adopting our tool and providing us

feedback to iteratively improve upon our tool.

To visualise roguelike design influence, we have proposed the design influence

diagram as a visualisation and design tool for game designers and researchers. This diagram

shows position quadrants of in-genre, out-of-genre, past, and future influence quickly. It is

complimented by the genre-influence matrix, which expresses the type of influences in the

diagram. For a view of all titles in the spectrums, the genre-influence map scatters the titles

onto the landscape with an automatic fitted view. Lastly, the influence timeline arrays each

title up-to-bottom and draws the influence lines for a clear, in-genre view of connecting

influence between games.

Future work includes user studies in using our proposed design tool to evaluate its

effectiveness and inclusion of more variety of keywords, such as player emotions and

descriptive adjectives. Broader domains other than roguelike genre can also be used to

evaluate our tool. Our work is persistent on the Internet for future scholars to adopt and use

freely.

Endnotes

1. Wikipedia has an ongoing effort to document a complete list of roguelike and hybrid roguelike games in one page:

   https://en.wikipedia.org/wiki/Chronology_of_roguelike_video_games

2. The original list of every video game collected by DATA_BASER can be found at

   http://pastebin.com/EuxZMbWT

3. An example of a force-directed layout is found in the D3.js gallery:

   http://bl.ocks.org/mbostock/4062045

4. The Twitter conversation between my colleague Andrew Rock and myself:

   https://twitter.com/andrew_rock/status/555715758722801664

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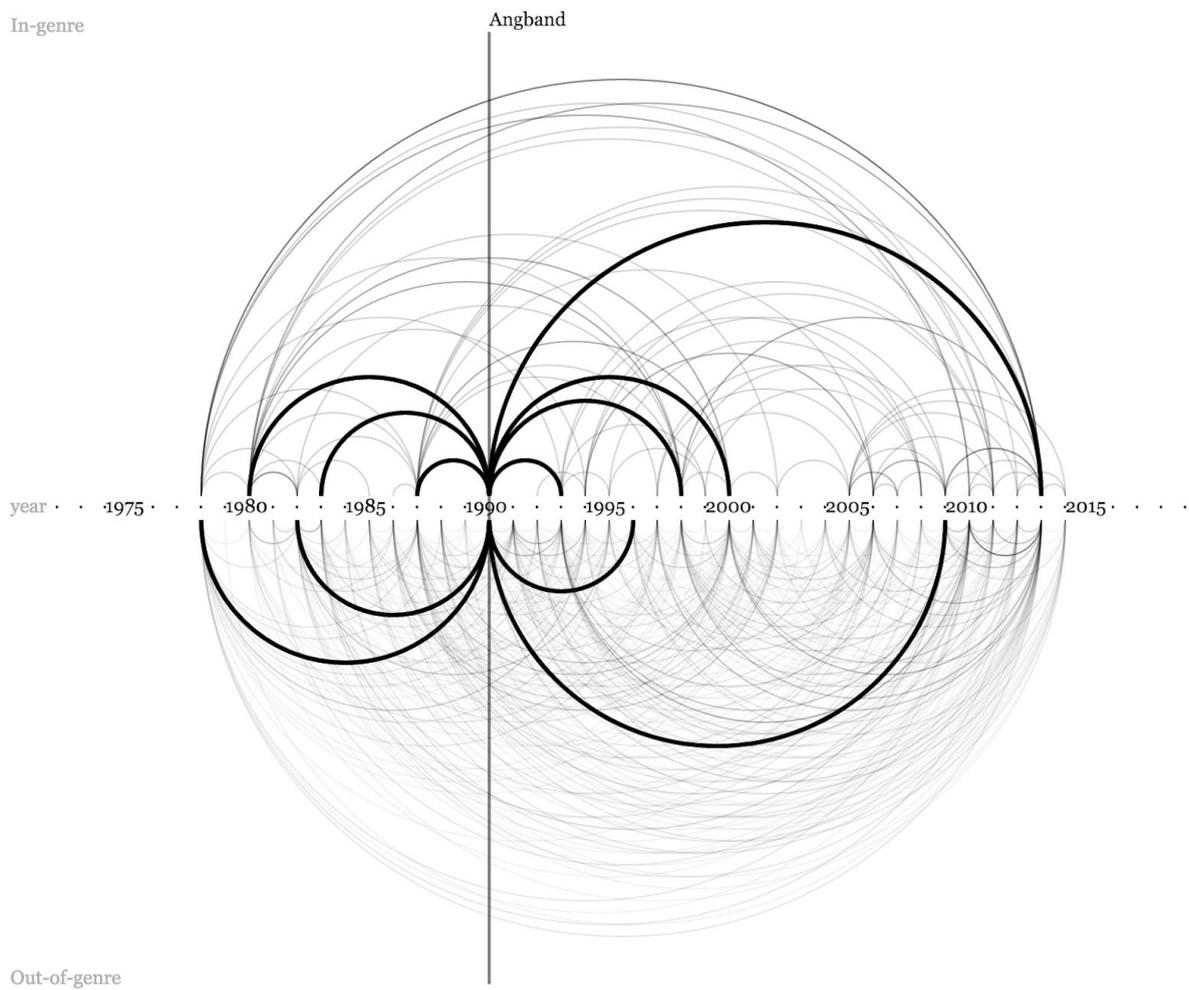
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Figure 1: Angband (1990) design influence diagram generated by our study.
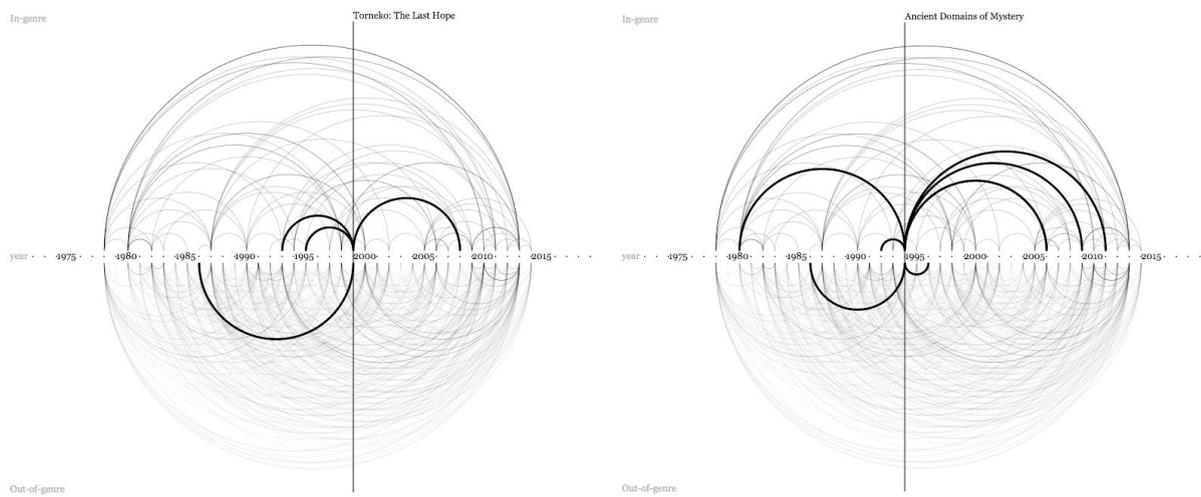
Figure 2: Torneko no Daibōken: Fushigi no Dungeon (1993, left) and Ancient Domains of
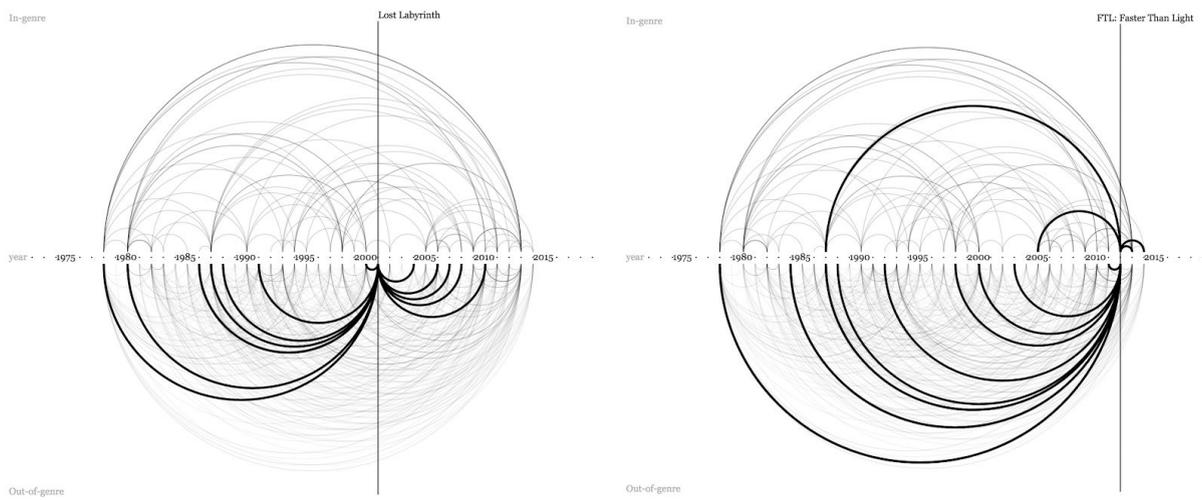
Mystery (1994, right)

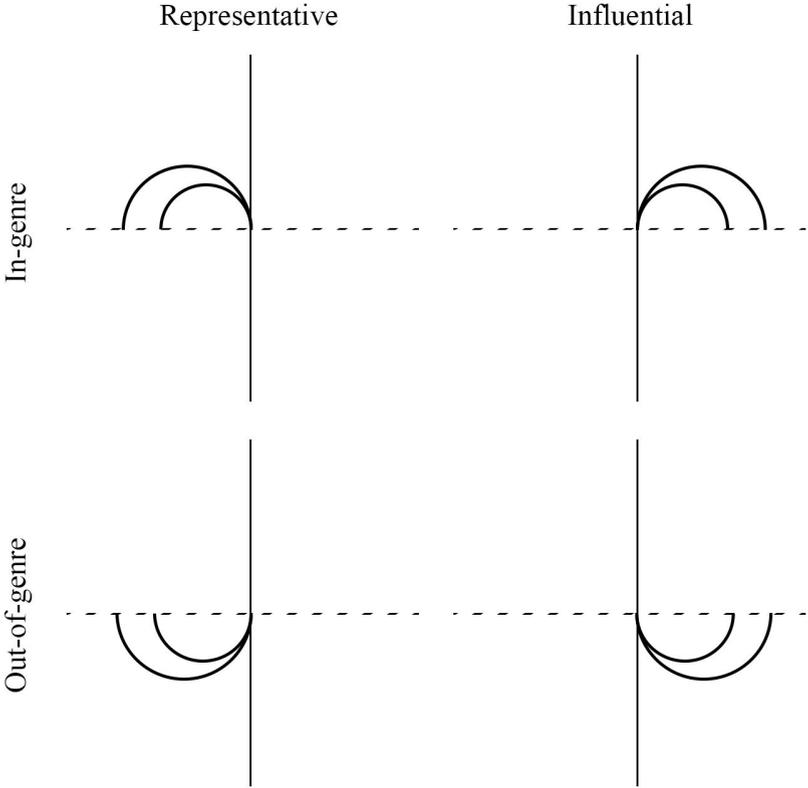Figure 3: Lost Labyrinth (2001, left) and FTL: Faster Than Light (2012, right)
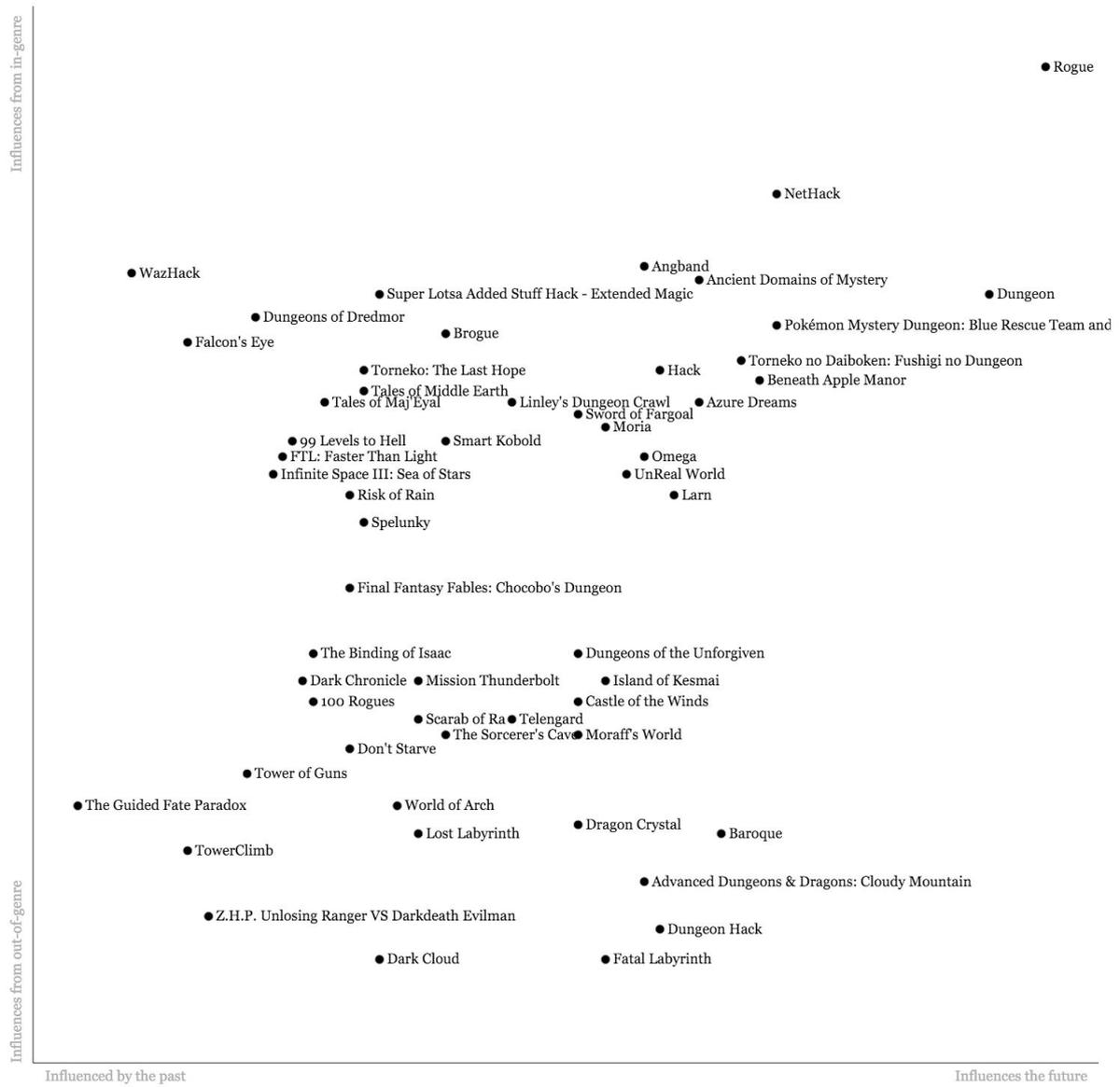
Figure 4: Genre-influence Matrix

Figure 5: Roguelike genre-influence map

Appendix A

Roguelike Universe

Our visualisation tool, collectively named *Roguelike Universe,* is open source and available on GitHub for anyone to download and use:

https://github.com/Spaxe/roguelike-universe.

For the complete list of influence diagrams for all 85 roguelike games and over 1,000 article entry examined in this study, the interactive diagrams are available as part of Roguelike Universe webpage: http://spaxe.github.io/roguelike-universe/.

The Boolean structure used to collect relevant web pages in this study is as below:

```
"<game title>" AND <developer> AND game AND (interview OR
mortem OR history OR develop)
```

Appendix B

Corpus and source data

We made our data source available for free on GitHub in *Roguelike Universe* as listed in Appendix A. This is useful for other scholars to examine, adopt, as well as providing data for reproducible research. On GitHub in the repository, the following files are our sources:

- **data/Data Collection.ipynb** - Python script used to scrape the Internet for relevant articles
- **data/games.json** - a comprehensive list of video games
- **data/roguelikes.json** - roguelike games included in this study
- **data/corpus.json** - article content extracted by our script used in this study
- **data/roguelike-relations.json** - a list of computed relations using our methodology