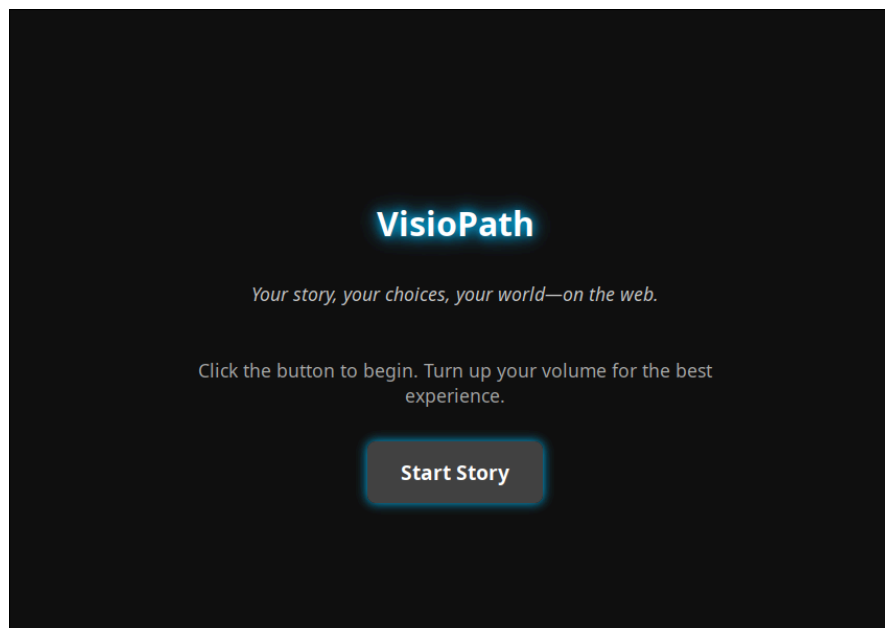**Faculdade de Ciências da Universidade de Lisboa**

Multimedia

—— *VisioPath* ——

Your story, your choices, your world—on the web.

Master's Computer Science
Grupo 08
Sofia M. Lopes
Departamento de Informática, Faculdade de Ciências da Universidade de Lisboa,
fc58175@alunos.fc.ul.pt
João P. Pereira
Departamento de Informática, Faculdade de Ciências da Universidade de Lisboa,
fc64451@alunos.fc.ul.pt
Hugo Ferreira
Departamento de Informática, Faculdade de Ciências da Universidade de Lisboa,
fc64459@alunos.fc.ul.pt
David Curral
Departamento de Informática, Faculdade de Ciências da Universidade de Lisboa,
fc64530@alunos.fc.ul.pt

Abstract

VisioPath is an interactive multimedia application for the web that explores immersive storytelling through branching narratives. Built using React and Next.js, the application supports text, images, audio, and video, allowing users to experience non-linear stories by making meaningful choices.

1. Introduction

VisioPath, Your story, your choices, your world, is an interactive multimedia application that focuses on digital storytelling through non-linear narratives. Developed as part of the second project theme, Interactive Video and Multimedia Immersion, it explores the potential of user-driven stories where choices affect the course and outcome of the narrative.

Interactive multimedia applications have significantly changed the way stories are told and experienced. As Ivan Sanchez-Lopez [5] points out, interactivity is more than a mechanical feature- it introduces emotional, dramatic, and cognitive layers that enrich user engagement and deepen immersion. In this new landscape, stories do not unfold without user intervention, making the audience a co-creator of the experience. In *VisioPath*, we aim to harness these narrative dynamics by combining text, video, sound, and images with branching decision paths defined in a modular format.

2. Theme

Development of a web-based visual novel engine using React, capable of loading and playing interactive stories in which the user has to make different choices leading to different endings, defined by a structured JSON-like file. The application supports multimedia elements such as text, images, video, and sound to create an immersive experience.

3. Objectives

The main objective of this project is to develop a functional and accessible web-based visual novel engine that runs smoothly on modern browsers. The engine is designed to allow writers and developers - including non-technical content creators - to define branching narrative structures by using a simple and flexible JSON-like format. It must support multimedia content, such as background images, videos, sounds, and text to enhance immersion. End users interact with these pre-created stories by making narrative choices that shape the path and outcome of the experience. In addition, the application should offer a clear and engaging user interface designed with best practices in UI/UX and accessibility in mind.

4. Planning

With the initial research completed, the JSON-based story format defined, the core engine implemented, and multimedia content successfully integrated, the remaining work focuses on refining the user experience and preparing the final deliverables. The next steps include polishing the interface for better usability and responsiveness, improving the visual presentation of choices and transitions, and implementing the accessibility features.

Additionally, a friendly way to create these stories will also be implemented. The final stages will include thorough testing and debugging, performance optimization, and the production of a final demonstration video showcasing the engine in action.

5. Inspiration/ Related Work

- Telltale's games [1].
- Visual Novel Maker [2] - Commercial software with a graphical interface and limited web support.
- Choose Your Own Adventure [3] - Series of Children's Gamebooks, which allow the reader to take on the role of the protagonist and make choices to change the story.

- Ren'Py [4] - A popular visual novel engine, but desktop-based and not built for the web.

6. Target audience

Our target audience consists of people interested in interactive storytelling and narrative-driven video games, and users who enjoy choose-your-own-adventure games and visual novels. Our aim is to bring a sense of nostalgia to people who loved storybooks as children.

7. Planned Features

The application is designed to load and interpret a structured JSON-like file that defines the flow of the visual novel, including narrative text, scene transitions, and branching choices. It allows users to navigate through different story paths by selecting from available options, dynamically updating the content based on those decisions. The engine supports the display of text, background images, embedded video, and sound creating a rich and immersive experience. A simple system for tracking progress or saving the user's place in the story is also envisioned. The user interface is responsive and interactive, adapting smoothly to different devices while maintaining clarity and engagement throughout the experience. We planned to integrate more videos in our application.
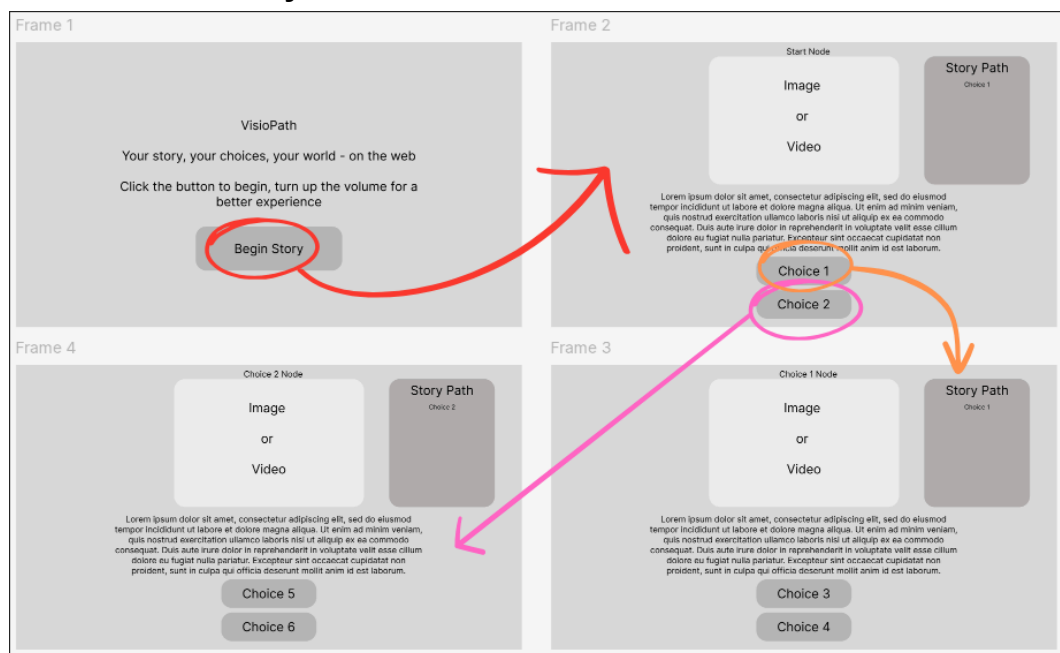
8. Sketches and Storyboards

Figure 1. Storyboard representing the structure of the VisioPath application

This storyboard represents how the user navigates between each scenario. The first frame contains the title, slogan and an instruction of how to begin the immersive experience of *VisioPath*. After clicking the "Begin Story" button marked with a red circle, the user is redirected to the second frame, which contains an image or video, followed by text and choice buttons that change the way the story proceeds. The following frames stick to the same patterns and rules. On the right-hand side of each frame is shown a story tree, which acts as an index, allowing the user to visualize and navigate the space of all the videos in the application.

9.   Design Principles and Design Rationale

The design of the application is guided by principles of simplicity, clarity, modularity, and accessibility. **Simplicity** ensures that the interface remains clean and focused, allowing users to engage with the story without distraction, following Nielsen's first usability heuristic of "Aesthetic and minimalist design". **Clarity** is achieved through readable typography, high-contrast visuals, and intuitive navigation, making the experience comfortable and engaging. **Modularity** is central to the architecture, with reusable React components that support maintainability and future expansion. **Accessibility** considerations are also integrated from the beginning, including keyboard navigation and visual design choices that accommodate a wide range of users and devices.

We applied the fifth heuristic, "Visibility of system state", because the user always knows where they are by looking at the story tree on the right-hand side of the screen. Our project maintains "consistency and standards" by keeping the look and feel of the interface consistent throughout the history. The user can move forward at any time with the "Next button" and back to the beginning with the "Start Again" button, giving them a sense of control and free navigation over the system. This follows Nielsen's sixth rule.

Our application will follow the three levels of good design by Don Norman: **Visceral**, **Behavioral** and **Reflective**.

10. Materials and tools

VisioPath is an interactive web-based storytelling engine that combines multimedia content, user-driven narratives, and a branching visual interface. The application is built using React with the Next.js framework, which provides server-side rendering, routing, and optimized image support through its next/image component. React is used to manage the component state and user interactions, while Next.js helps structure the project efficiently and deliver content quickly.

For audio playback, *VisioPath* utilizes Howler.js, a JavaScript library that simplifies loading and playing audio across browsers. It is used for two main purposes: playing a beep sound during the typewriter text animation and handling optional narration audio for each scene. Video content is supported natively through HTML5 video tags, allowing scenes to seamlessly switch between image and video backgrounds depending on the story node configuration. One of the videos presented at this stage was edited through cutting to better fit the narrative flow and user interaction design.

The layout and styling of the application are managed with CSS Modules, specifically within the StoryEngine.module.css file. This ensures style encapsulation and allows for custom themes, visual connectors in the story tree, and animated UI components. The visual story tree is powered by a recursive rendering strategy in React, based on a custom PathNode structure that dynamically builds and displays user navigation paths as a vertical branching diagram.

Content-wise, the story is defined as a structured object in a separate story.ts file. Each story node can contain a title, image, video, audio, text, and a list of choices that branch to other nodes. This setup allows authors to create complex, nonlinear narratives with visual and auditory immersion.

Together, these technologies enable *VisioPath* to deliver a polished, multisensory storytelling experience that runs entirely in the browser. It is lightweight, extensible, and designed for creative writers and developers who want to build interactive narratives for the Web.

11. Conclusion

VisioPath offers a functional, interactive web storytelling platform with modular architecture, multimedia support, and accessible interface, showcasing its potential for immersive digital storytelling.

Bibliographical references

1. LCG Entertainment. (n.d.). About us. Telltale Games. https://telltale.com/about-us/
2. KOMODO Co., Ltd. (n.d.). Visual Novel Maker. https://www.visualnovelmaker.com/
3. Chooseco LLC. (n.d.). Choose Your Own Adventure. https://www.cyoa.com/
4. PyTom. (n.d.). Ren'Py. https://www.renpy.org/
5. Sanchez-Lopez, I., Perez-Rodriguez, A., & Fandos-Igado, M. (2020). The explosion of digital storytelling. Creator's perspective and creative processes on new narrative forms. Heliyon, 6(9), e04809. https://doi.org/10.1016/j.heliyon.2020.e04809