



Sentiment Analysis in a Web Platform Role-Playing Game

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Abstract: Computational games have been increasingly used not only for entertainment but also for corporate training, with role-playing games being particularly well-suited for these purposes. This study focuses on the implementation and analysis of a web-based role-playing game for hydric resource management called GorimWeb and in the analysis of messages exchanged between players. Various requirements were defined for its implementation, including supporting the playability of the game board, storing and exporting data such as logs and chat, accommodating varying numbers of players, and integrating multi-agent systems. Additionally, the game required a well-structured user interface, good performance, and reliable web availability. An important part in this study was the use of generative artificial intelligence for sentiment analysis of the messages exchanged via chat during the game. This analysis allowed for a deeper understanding of the emotional dynamics and communication patterns between players as they engaged in problem-solving and decision-making processes. The software architecture of the game was carefully designed to support these functionalities. Validation was conducted through two surveys, one before and one after gameplay. The results, combined with the sentiment analysis of the chat messages, allowed us to assess both the user interfaces and the game's impact on player interactions, offering valuable insights into the effectiveness of the game for training purposes.

Keywords: Sentiment Analysis; Role-Playing Game; Web Platform.

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1 INTRODUCTION

Natural Resources Management (NRM) is a field dedicated to ensuring the sustainability and quality of natural resources for future generations by managing and improving the resources available today. This includes overseeing nature reserves, public and private lands, water resources (such as watersheds and oceans), plant life (including forests and urban greenery), and animal life (both wild and domestic). NRM faces three main challenges: (I) optimization and control; (II) management and communication; and (III) data analysis. To overcome these challenges, specialized tools and strategies are required Fuller *et al.* (2007).

Artificial Intelligence (AI), particularly *Multi-Agent Systems* (MAS), employs intelligent agents that can make autonomous decisions based on their perception of the environment. These agents work independently or cooperatively to achieve personal goals that contribute to the overall objectives of the system Lesser (1999). When MAS is used in simulations, it is referred to as *Multi-Agent Based Simulations* (MABS), where agents interact within a simulated environment to explore or predict solutions to complex problems Gilbert and Troitzsch (2005) and Le Page *et al.* (2016). The interdisciplinary nature of MABS and the tools it provides make it particularly useful for designing and simulating problems within the scope of NRM.

Another tool that has been applied in this field is the *Role-Playing Game* (RPG) Perrotton *et al.* (2017), where players assume specific roles (characters) and perform actions that influence the environment and other players in turns. These games can be played using printed materials, orally, or computationally. Some studies (Adamatti, Sichman, and Coelho (2009), Le Page *et al.* (2016), and Le Page and Perrotton (2017)) have utilized RPGs to help workgroups solve problems by having participants take on the roles of their coworkers. This helps players gain insight into their coworkers' perspectives and the motivations behind their decisions. As a result, RPGs have become valuable tools in NRM for facilitating decision-making processes among stakeholders, such as committees.

In addition to these tools, the integration of *Generative Artificial Intelligence* for sentiment analysis may improve RPG analysis in the context of NRM. The application of generative AI to analyze the messages exchanged in the game allowed us to capture the emotional dynamics and communication patterns between the participants. This can help assess how emotions, such as frustration, collaboration, or satisfaction, influence decision-making processes during gameplay. Sentiment analysis provides a deeper understanding of the social and emotional aspects of interactions within the game, providing valuable information on how players respond to challenges and cooperate with each other.

2 THEORETICAL BACKGROUNG

2.1 Multi-Agent Systems

Multi-Agent Systems (MAS) are computational systems in which multiple autonomous entities, known as agents, work independently to achieve their own goals, which collectively contribute to the overall objectives of the system Lesser (1999). Each agent within a MAS operates asynchronously, meaning they function in separate threads without necessarily waiting for other agents to complete their tasks. These agents can be **homogeneous** – all following similar learning algorithms and decision-making processes – or **heterogeneous**, where each agent may have distinct learning methods and behaviors. The independence of agents allows for parallel execution, leading to faster and more efficient problem-solving.

One of the fundamental challenges in MAS is ensuring that despite the independence of agents, their actions are coordinated in a way that effectively addresses the system's goals. Most problems handled by MAS require distributed problem-solving approaches, where the solution emerges from the interaction and cooperation among agents. As such, MAS must incorporate various organizational characteristics, including **cooperation**, **coordination**, **competition**, **negotiation**, and **communication** (Bordini, Vieira, and Moreira (2001) and Bousquet and Le Page (2004)). These mechanisms ensure that agents can work together when necessary, align their actions towards common goals, resolve conflicts, and share relevant information to enhance decision-making.

Multi-agent systems are widely applicable in fields that require distributed decision-making and problem-solving. In domains such as natural resources management, MAS have been utilized to simulate interactions between various stakeholders, enabling better planning and resource allocation. By representing different entities (such as water management agencies, environmental organizations, and local communities) as agents, MAS can model the complex dynamics of resource usage and decision-making processes, helping to develop sustainable strategies Bousquet and Le Page (2004).

2.2 Role-Playing Games

A *Role-Playing Game* (RPG) is a type of game that exists at the intersection of gaming and theater, as it combines player interaction with character enactment. In RPGs, players are placed in a fictional environment governed by predefined rules and behaviors, and they must assume specific roles to complete a given narrative or storyline Pereira (2003). Unlike traditional games, most RPGs are not competitive in nature, meaning there are no winners or losers. Instead, these games emphasize collaboration, as players must work together to explore the narrative and reach common goals. This collaborative framework provides valuable insights into social dynamics and allows for the direct observation of interactions between players (Adamatti, Sichman, and Coelho (2009) and Barreteau, Le Page, and D'aquino (2003)).

RPGs are widely used in training and educational contexts due to their ability to

simulate real-life situations in a risk-free environment. Through role enactment, players are able to experiment with different strategies and approaches without the fear of real-world consequences. This makes RPGs a valuable experiential learning tool, as participants can engage with complex scenarios, reflect on their actions, and develop critical skills in decision-making and problem-solving. By immersing players in realistic scenarios, RPGs provide a playful yet effective means of learning a variety of subjects, from soft skills such as communication and teamwork to more technical knowledge related to specific fields Perrotton *et al.* (2017).

There are notable similarities between RPGs and MAS, which make both suitable tools for modeling and simulating complex environments. In RPGs, each player takes on a specific role within the game environment, much like agents in MAS assume autonomous roles within a simulated system. In both cases, these roles are governed by predefined rules, and the environment (whether it be a game board or a simulated world) sets the context in which actions take place (Barreteau, Bousquet, and Attonaty (2001)). The sequential nature of RPG gameplay, often divided into rounds or turns, mirrors the stepwise functioning of MAS, where agents act in cycles and influence their environment. This structural similarity allows RPGs to be used as models for multi-agent simulations, particularly in fields like natural resource management, where both collaboration and decision-making among multiple entities are key to success.

The flexibility and adaptability of RPGs, coupled with their ability to reflect complex social interactions, make them powerful tools for not only entertainment but also education and decision-making simulations. Their collaborative and interactive nature allows participants to explore diverse strategies, develop empathy, and foster cooperation, which are critical components in real-world problem-solving scenarios.

2.3 Hydric Resources Management

Water is the most vital natural resource for sustaining ecosystems and populations. It plays an essential role in the life and health of plants and animals and is crucial for social and economic activities within human society Ponte *et al.* (2016). The field of *Natural Resources Management* (NRM) focuses on strategies for managing water, animals, plants, and land in a manner that preserves environmental quality for future generations. Within NRM, the subfield of *Hydric Resources Management* (HRM) specifically addresses the sustainable use and distribution of water, emphasizing its conservation and the equitable allocation among competing demands. HRM is critical in ensuring the availability of clean water for various social, economic, and environmental needs.

HRM encompasses the best practices for utilizing and distributing water resources among various stakeholders, including government organizations, communities, and industries. One of the key challenges in HRM is addressing the social and environmental risks associated with water scarcity, floods, and droughts. These risks necessitate proactive management and the development of preventive measures by authorities to mitigate potential damage and ensure the long-term sustainability of water supplies Tundisi

(2006). Effective HRM requires a comprehensive understanding of hydrological cycles, as well as the social, economic, and ecological factors that influence water demand and availability. Watershed management is a fundamental aspect of HRM, as it involves monitoring and regulating water flow and usage within a given basin. This includes managing water quality, ensuring the sustainable use of water resources, and protecting the natural environment. Effective watershed management requires collaboration between various stakeholders, including governments, communities, and industries, to ensure that water resources are used efficiently and equitably.

In addition to watershed management, HRM must also focus on preventive actions to address risks such as floods and droughts. Floods, often caused by excessive rainfall or the overflow of rivers, can lead to significant social and economic damage. On the other hand, droughts, which result from prolonged periods of low precipitation, can severely affect agriculture, water supply, and ecosystem health. HRM strategies aim to reduce the impact of these events by developing infrastructure, early warning systems, and sustainable water management practices that promote resilience in affected regions Tundisi (2006).

Overall, hydric resources management plays a pivotal role in maintaining the delicate balance of water supply and demand. Through effective watershed management and proactive measures against risks, HRM seeks to ensure the availability and quality of water resources for present and future generations.

2.4 Generative Artificial Intelligence

Generative Artificial Intelligence (Generative AI) (Zant, Kouw, and Schomaker (2013)) refers to a subset of artificial intelligence systems that can create new content, such as text, images, audio, video, or even code, rather than simply analyzing or categorizing existing data. Generative AI models are designed to learn patterns from large datasets and then generate original content that resembles or follows those patterns. The use of Generative AI for emotion analysis in written dialogues can be a strategic and effective choice for several reasons. Its ability to learn complex language patterns allows for the identification of emotions in a more subtle and precise manner than traditional techniques.

Generative AI (Feuerriegel *et al.* (2024)) has the ability to understand language nuances that go beyond simple words or phrases. Human emotions are often expressed implicitly, through irony, sarcasm, or specific contexts. Artificial intelligence models, such as those based on deep neural networks, can capture these subtleties and associate them with different emotional states, something that is difficult to achieve with rule-based systems. Another significant advantage is scalability. Manual emotional analysis tools require a great deal of time and effort, especially when dealing with large volumes of data, such as dialogues on social networks or customer interactions.

Unlike humans, who may tire or be influenced by subjective biases when analyzing emotions, generative AI maintains a high level of consistency and objectivity. This ensures that emotional analysis is not affected by variables such as the analyst's mood or personal context, resulting in a more reliable assessment over time. Generative AI stands out as a

powerful tool for emotion analysis in written dialogues due to its ability to understand the complexity of human language, quickly process large volumes of data, personalize analysis for specific contexts, and offer consistency and accuracy in its interpretations.

3 GORIM

Gorim is a game developed as a decision support tool for a local management committee. In this *Role-Playing Game* (RPG), participants assume the roles of various committee members, such as businesspeople, farmers, environmental inspectors, NGOs, mayors, and councilors. Given the complexity and quantity of calculations required (e.g., percentages, sales, productivity), a dedicated game engine was designed to handle these tasks (as shown in Figure 1).

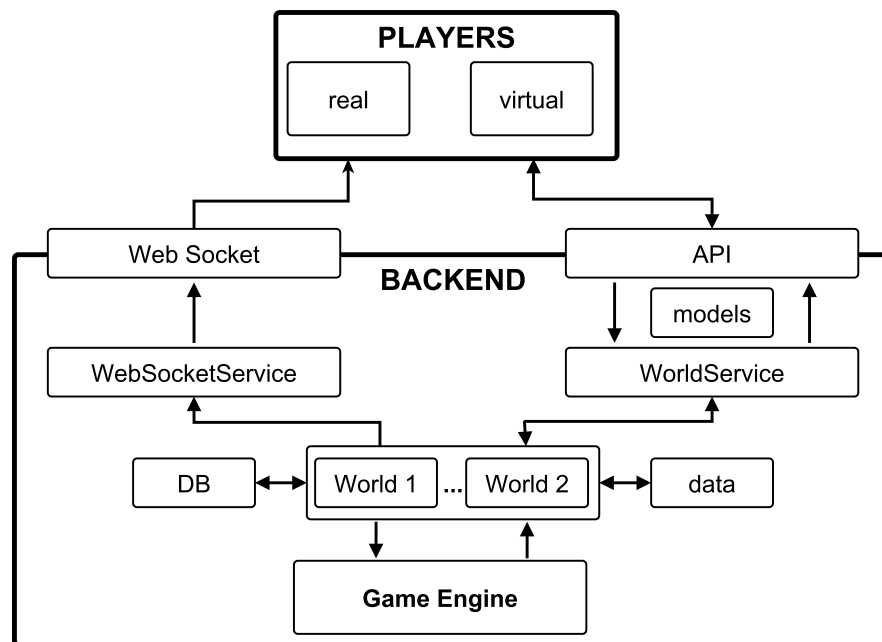


Figure 1: Conceptual view of the backend component architecture.

3.1 Game Structure

The game begins with players being randomly assigned one of five possible roles: businessperson, farmer, environmental inspector, mayor, or councilor. These roles are distributed across the two cities in the game, Atlantis and Cidadel. Each round is divided into two phases. In the first phase, the businesspeople and farmers play, while in the second phase, the inspectors, mayors, and councilors take their turns.

The businesspeople can represent four industries: *seeds*, *fertilizers*, *machinery*, or *agrochemicals*, and they negotiate prices with the farmers. For instance, the seed businessperson can sell *vegetable*, *rice*, or *soybean* seeds, while the fertilizer and agrochemical businesspeople offer products in three tiers: *common*, *premium*, and *super*

premium. The machinery businessperson rents machinery packages or a sprayer. Each sale generates **pollution**, representing the environmental impact of the products, and the profits from sales increase the **productivity** of the businessperson, adding to their available funds for the next round. Additionally, businesspeople can choose to sell at *low*, *normal*, or *high* prices, allowing different prices for each client.

The farmer manages six plots of land and decides which ones to cultivate each round. They select one type of seed, fertilizer, agrochemical, and machinery per plot, with each combination affecting both the farmer's productivity and pollution. If no agrochemicals are used in a plot, the farmer can earn a "green seal" from the environmental inspector, granting a 5% tax discount on the productivity tax of that plot. At the end of each round's first phase, both businesspeople and farmers must pay taxes to their respective city halls. Players are assigned to cities at the start of the game: seed and machinery businesspeople to Atlantis, and fertilizer and agrochemical businesspeople to Cidadelá, ensuring balanced tax revenue for both cities. In the second phase, elections are held every two rounds to select the roles of inspector, mayor, and councilor.

The environmental inspector monitors the actions of players from the first phase in their city, imposing fines (*light*, *medium*, *heavy*, or *none*) on players whose activities result in excessive pollution. They also grant or revoke green seals from farmers. Fines collected go to the local city hall. The mayor supervises their city, aiming to control overall pollution levels. They can implement three types of environmental actions: *water treatment*, *waste management*, and *sewage control*, each with specific costs and impacts on pollution. Furthermore, mayors adjust tax rates across different productivity ranges and consider management proposals from the councilors. The councilor advises the mayor, analyzing the effects of actions taken and the money invested while convincing the mayor of their ideas. They also communicate feedback from citizens to the mayor.

The game requires at least six players, divided into four businesspeople and two (or more) farmers, with additional players taking elective positions. Every two rounds, the elections determine new inspectors, mayors, and councilors. If there are more than six players, those without elective roles influence the second phase by discussing issues with their representatives. The players are allowed to transfer "money" to each other. The game ends when global pollution reaches 100%, reducing productivity by simulating environmental degradation (e.g., infertile soil, polluted water and air). As pollution rises, the cost of environmental actions also increases, reflecting the greater effort required to mitigate its effects. Although the game starts with predetermined "money" amounts, manually calculating taxes, sales, and pollution proved impractical, leading to the development of a computational calculation engine. This engine, programmed in Java using agent-oriented programming, automates these processes. After each stage, the engine generates summary files for players detailing their actions, while logs are maintained to track all in-game activities.

3.2 API Web

GorimWeb development started with a focus on the backend for two main reasons: (1) the game engine, as illustrated in Figure 1, plays a fundamental role in the project structure and required early completion, and (2) the API needed to be functional to allow testing and simplify the development of player interfaces.

Figure 1 shows the proposed layered architecture for the application's backend. The API processes JSON requests sent by players, structured according to specific models. These requests are transformed into appropriate formats and forwarded to the `WorldService`. At the start of the game, `WorldService` initializes the required objects and interacts directly with the `Game Engine`. Player actions are sent to `WorldService`, which in turn invokes methods in the relevant classes of the `Game Engine`. Each action is logged in the DB, and summary files in JSON format are generated and stored in the data component at the end of each stage. These summary files are sent to players on request.

The backend was built using JAVA Spring Boot. The `Game Engine`, represented in Figure 1, remains consistent with the version used during Gorim matches. In addition, a web socket was implemented to enable real-time chat functionality in the player interface, with all messages logged in the DB. Players can send suggestions, budget proposals, and responses through this chat feature.

3.3 Player's Interfaces

The player interface was developed using Angular and organized into modules, where each potential window in the interface is a separate *module*. Each module comprises several elements, including a *component* (processing class), *service*, *model*, *interface* (HTML, SCSS, or CSS files), and *subcomponents*. These subcomponents are separated from the main class of the module because they contain distinct behaviors or require different calls to the back-end. Each subcomponent operates with its own *service*, *interface*, *component*, and occasionally, its own *subcomponent* and *model*. The *services* are responsible for retrieving and sending data between the back-end and the *component*. They are also used to transfer data internally from one *component* to another. For instance, when an `environmental inspector` fines a `businessman`, an internal *component* passes the fine to the main *component* in the supervisor *module*, where it is saved until the player either cancels the fine or the stage ends. Once the stage is completed, the main *service* in the *module* sends this information, along with the green seal list, to the backend.

Figure 2 presents the component diagram illustrating how the frontend operates. The `MODULE` represents any of the implemented modules, except for `WORLD`, which is a set of common subcomponents shared across different modules. For example, when a page (e.g., `farmer`) is accessed, the main class of the `MODULE` initializes all necessary subcomponents for the page's functionality. In addition to the primary modules (e.g., `businessman`, `farmer`), there are auxiliary modules, such as `ALTERNATIVE-SECOND-PAGE` (which offers an alternative window for players who are not elected to a role in the second

stage but allows them to chat, ask questions to city managers, etc.), HOME (the initial game screen where players can join a game or create a new one as the master), GAME-OVER (the final screen summarizing player actions), MASTER (where the master controls the game by starting new stages or ending it), and WORLD.

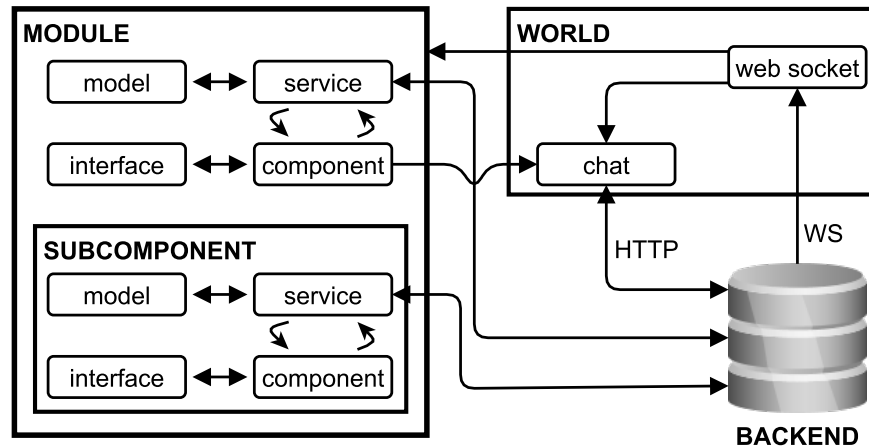


Figure 2: Component diagram of the *frontend*.

With these components, the graphical user interface (GUI) for players was implemented. The Businessman's interface, presented in Figure 3, is structured as follows: (1) the header component is imported from the WORLD module; (2) the button that activates the sidebar (SIDEBAR from WORLD) comes from the SELLING-BOARD subcomponent; (3) buttons are provided to switch the main view of the page, toggling between “*Make a Quote*” (resulting from the ORDER-PRODUCT subcomponent) and “*Price Tables*” (which displays necessary tables for the player's role, such as fines and product prices, originating from TABLE-VALUES, imported as a subcomponent of WORLD); (4) there is a section to transfer money to other players (from the TRANSFER component in WORLD); (5) fields allow the player to request a quote by specifying the recipient, product, quantity, and desired prices; (6) the button to submit the quote is also part of the ORDER-PRODUCT subcomponent; and (7) the chat feature. The button in (6), which sends a quote to a farmer, transmits the request via a REST API to the server, which then forwards it to the farmer. When a response is returned, a web socket sends the event (containing the response) to the SELLING-BOARD subcomponent. This subcomponent lists the response and triggers the ALERT service (from the WORLD module) to notify the player of the new response. Figure 4 illustrates the code structure of the businessman module.

4 TESTS AND SENTIMENT ANALYSIS

This Section outlines the outcomes of the test conducted with GorimWeb, based on feedback gathered from the players, as well as a sentiment analysis of the participant group, extracted from the messages between participants through the game chat.

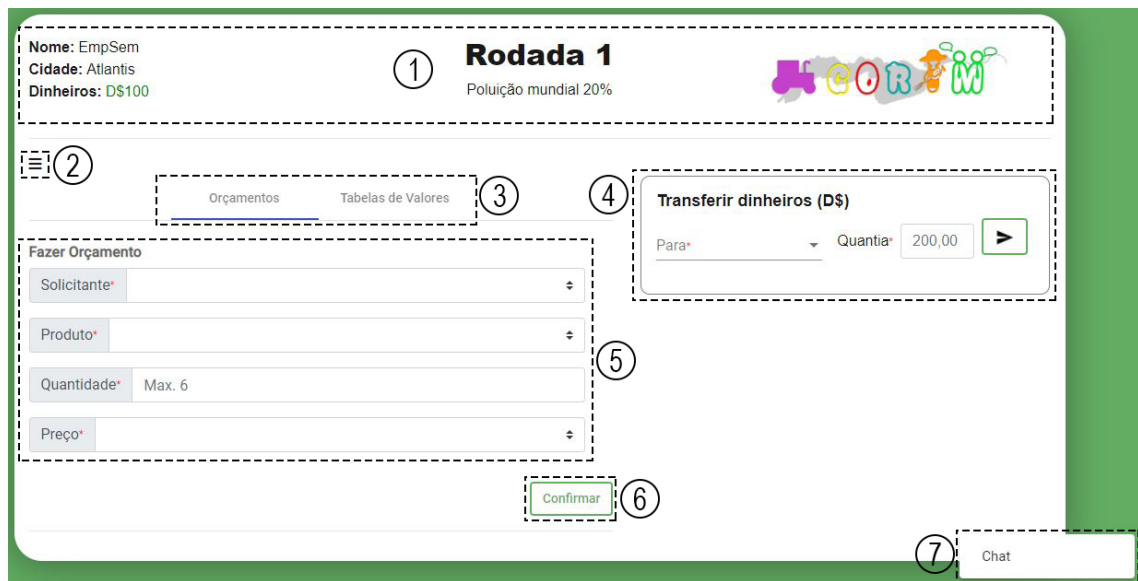


Figure 3: Businessman Interface (businessman).

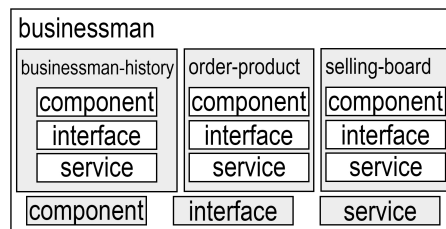


Figure 4: Block diagram of the businessman module.

The test group consisted of six individuals, none of whom had played Gorim before. However, two players had some prior knowledge of how the game operated. The game session lasted two hours (or 7200 seconds), and a total of 660 messages were exchanged during the session. Of these messages, 390 were sent to or received from the game master (196 sent by the master, and 194 received from the players).

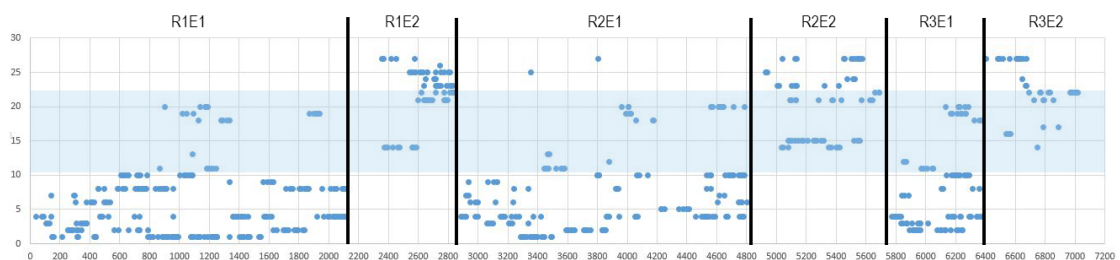


Figure 5: Messages dispersion over time (in seconds) from the group start.

In Figure 5, the X-axis represents the game time in seconds, and the Y-axis shows the chat rooms opened during the session. The creation of chat rooms depended on whether players chose to communicate with each other. If players decided to contact one another (e.g., a farmer asking another farmer about seed choices), a new chat room was created. If

such communication did not occur, no room would be generated. Each point on the graph indicates when a message was sent, including those exchanged with the game master. Vertical lines represent transitions between game stages, and the shaded horizontal area highlights the interactions involving the game master. A total of 27 chat rooms were opened during the session, and the message distribution over time across different stages is summarized as follows:

- **R1E1** (Stage 1, Round 1): Lasted approximately 35 minutes (until the 2110-second mark), during which 233 messages were exchanged. Of these, 118 messages involved the game master (56 sent, 62 received).
- **R1E2** (Stage 2, Round 1): Lasted approximately 12 minutes (until the 2836-second mark), with 62 messages exchanged. The game master was involved in 47 of these (22 sent, 25 received).
- **R2E1** (Stage 1, Round 2): Lasted around 33 minutes (until the 4801-second mark), during which 168 messages were exchanged. Of these, 93 involved the game master (45 sent, 48 received).
- **R2E2** (Stage 2, Round 2): Lasted around 15 minutes (until the 5691-second mark), during which 65 messages were sent. The game master was involved in 44 messages (23 sent, 21 received).
- **R3E1** (Stage 1, Round 3): Lasted around 11 minutes (until the 6372-second mark), with 95 messages exchanged. Of these, 56 messages involved the game master (30 sent, 26 received).
- **R3E2** (Stage 2, Round 3): Lasted around 11 minutes (until the 7018-second mark), during which 37 messages were exchanged. The game master was involved in 32 messages (20 sent, 12 received).

The results indicate that a significant portion of the communication occurred between the players and the game master, highlighting the importance of the master's role in coordinating and facilitating gameplay. The transitions between stages led to fluctuations in messaging activity, with more messages typically being exchanged during the first stage of each round, as players focused on planning and coordinating their actions.

4.1 Sentiment Analysis

The text-based conversations provided to the generative AI tool were acquired through the exchange of messages via the GorimWeb chat tool between the RPG participants, where participants are engaged in various in-game activities such as farming, buying and selling goods, and even involvement in local governance.

Table 1 presents a categorization of the sentiments found by the AI tool. A more detailed sentiment analysis, incorporating both emotional tone and thematic elements, is described below:

Table 1: Categorization of the Sentiments

Sentiment Category	Description	Example Phrases / Translation
Friendly and Cooperative	Friendly exchanges of goods and services humor, and positive interactions.	“Oi, gostaria de comprar 6 unidades de soja” / “Hi, I’d like to buy 6 units of soybeans”, “Volto hoje mais tarde, uai” / “I’ll come back later today”, “te mandei 100 reais” / “I sent you 100 bucks”, “foi, realizei a compra” / “Yes, I completed the purchase” “Não está aparecendo aqui pra finalizar” / “It’s not showing up here to finish”, “Não recebi nenhum dinheiros” / “I didn’t receive any money”, “Você não pode comprar esse produto, pois já tem ou já orçou 6 unidades deste tipo” / “You can’t buy this product because you already have or have already budgeted 6 units of this type”
Frustration and Confusion	Frustration due to technical issues and confusion about game instructions.	“Agradecemos sua preferência, volte sempre” / “Thank you for your preference, come back anytime”, “Eu que agradeço, estamos a disposição” / “I appreciate it, we’re here to help”, “Posso te mandar 100 e você vota em mim, q tal? :)” / “I can send you 100 and you vote for me, how about it? :)”
Positive Interactions	Thank you messages, recognition, and mutual support.	“Tu pode mandar como favor pras pessoas” / “You can send it as a favor to people”, “Quanto mais produtividade tu tem mais dinheiro tu ganha” / “The more productivity you have, the more money you earn”, “Se saísse um sonzinho quando recebesse mensagem seria bacana” / “If a sound played when receiving a message, that would be cool”
Engagement and Enthusiasm	Active participation and suggestions for improving the game.	“Se você fizer promoção de soja, eu te voto pra prefeito” / “If you promote soybeans, I’ll vote for you for mayor”, “Desvia um dinheiros para se prefeito! vou asfaltar as rua prometo!” / “Divert some funds to become mayor! I’ll pave the streets, I promise!”
Competitive Spirit	Discussions about elections and campaigns within the game, keeping the competitive spirit in a fun way.	

Friendly and Cooperative Sentiment

Transactions and Negotiations: The conversations frequently include exchanges of products and services, such as buying seeds, fertilizers, or machines. These interactions are often smooth and friendly, with participants cooperating to meet their objectives. For example, phrases like “*Vou fazer o orçamento / I am going to prepare the budget*” and “*foi, realizei a compra / It’s done, I made the purchase*” indicate a cooperative environment.

Humor and Lightheartedness: Many participants incorporate humor into their interactions, which adds a fun, lighthearted tone to the game. The references to Chico Bento and rural life, such as “*quer casar na roça com eu? / Do you want to get married in the countryside with me?*” or “*passa lá em casa mais tarde comer um salame e um queijo / Stop by my place later to have some salami and cheese*”, inject a playful and relaxed mood, keeping the atmosphere friendly.

Frustration and Confusion

Technical Difficulties: Frustration emerges due to technical issues or confusion about game mechanics. Phrases like “*não está aparecendo aqui pra finalizar / It’s not showing up here to finalize*” or “*mas não recebi nenhum dinheiro, caloteiro / But I didn’t receive any money, swindler*” reflect players’ struggles with the game system. The inability to complete certain actions or errors in receiving funds caused occasional frustrations.

Unclear Instructions: Players express confusion about how to play certain aspects of the game. Visible in questions like “*Me tira uma dúvida mestre, algumas dicas para aumentar meu dinheiro? / Can you help me with a question, master? Any tips to increase my money?*” and complaints about actions not being reflected correctly in the system.

Positive Interactions

Gratitude and Acknowledgement: Despite the challenges, participants frequently express gratitude, thanking one another for transactions or help. Phrases like “*obrigada, nossa empresa agradece o retorno / Thank you, our company appreciates your response*” and “*agradecemos sua preferência, volte sempre / Thank you for your preference, come back soon*” reflect polite and positive exchanges.

Supportive Behavior: The supportive dynamic is further demonstrated when participants offer help or resources. For instance, one player offers financial help with “*posso te mandar 100 e você vota em mim, q tal? / I can send you 100 and you vote for me, how about that?*”, and others provide advice on how to improve gameplay strategies.

Engagement and Enthusiasm

Active Participation: Most participants appear highly engaged, with regular interactions and exchanges of goods, resources, and ideas. Phrases like “*me avisa quando*”

terminar / let me know when you're done" and *"fiz um orçamento dos bons agora / I made a good budget now"* reflect the players' active involvement in the game's mechanics.

Suggestions for Improvement: The participants' enthusiasm is also shown through their suggestions for improving the game. One participant, for instance, suggests a sound notification system: *"se saísse um sonzinho quando recebesse mensagem e atualizasse jogada e proposta etc seria bacana / If there was a little sound when you received a message and updated the play and proposal, etc., it would be cool"*, indicating a desire to enhance the user experience.

Competitive Spirit

Elections and Governance: The competitive spirit comes through in the mock election discussions and campaign promises, where participants playfully engage in local governance. Conversations like *"se você fizer promoção de soja, eu te voto pra prefeito / If you promote soybeans, I'll vote for you as mayor"* and *"desvia um dinheiros para se prefeito! vou asfaltar as rua prometo! / I owed money to become mayor! I'll pave the streets, I promise!"* reflect both the competition and humor embedded in the game.

The conversation reflects an engaged and supportive community with a strong emphasis on cooperation, humor, and light competition. While technical difficulties and confusion around game mechanics occasionally introduce frustration, the community navigates these issues with humor and mutual support.

5 CONCLUSION

This paper presented the theoretical foundation and current state of a project that integrates multi-agent systems, role-playing games and sentiment analysis. Currently, the web-based game is complete and available online, enabling remote gameplay. The sentiment analysis performed during the game's testing phase has revealed a positive and engaged community of players, who balance cooperation, humor, and light competition while navigating resource management decisions. While occasional technical frustrations were observed, players generally responded with support and humor, maintaining a positive atmosphere. These insights will guide the development of non-player character agents designed to simulate human decision-making when there are insufficient players to start a match. By incorporating these findings, we aim to enhance the gameplay experience and ensure more dynamic, adaptable interactions within the simulation.

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