

# AI-Enhanced Social Robots for Older Adults Care: Evaluating the Efficacy of ChatGPT-Powered Storytelling in the EBO Platform

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**Abstract**—The population of older adults is growing worldwide, and with it, there is a need for appropriate and effective cognitive therapies. Social robots have shown potential as therapeutic tools for older adults, providing companionship, entertainment, and therapeutic support. In particular, storytelling activities promote cognitive stimulation, socio-emotional skills, and simple entertainment. However, conventional storytelling methodologies concerning engagement, personalization, and interactivity exhibit a potential for greater diversity. These traditional approaches often require extensive preparation time, which can limit their feasibility and adaptability in diverse settings. Social robots can help overcome these limitations by providing a more interactive and engaging storytelling experience. In this paper, we present an approach to enhance the storytelling capabilities of the EBO robot, a social robot designed for interaction with older adult people. As a novelty, in addition to integrating the proposed system in the CORTEX cognitive architecture, we offer to include the therapist in the loop and integrate Artificial Intelligence techniques, including a Large Language Model, ChatGPT, to enable the robot to generate natural-sounding and engaging narratives, adjust its interactions based on the cognitive impairments, and align with the interests and preferences of the user. We demonstrate the effectiveness of our approach through a case study involving older adult participants and therapists. Our preliminary results show that the EBO robot, integrating AI techniques, can provide an interactive, customizable, and socially aware storytelling experience that promotes cognitive stimulation, socio-emotional skills, and simple entertainment that is engaging and enjoyable for older adults. Our approach could contribute to developing effective and engaging therapies for older adults using social robots as therapeutic tools.

## I. INTRODUCTION

As the global population of older adults expands, there is a growing demand for effective treatments tailored to their needs. One promising solution is using social robots designed to interact with humans in social and therapeutic contexts, providing companionship, entertainment, and support [1], [2]. Social robots have proven to be particularly effective in providing therapeutic benefits to older adults, with storytelling activities being a novel way to promote cognitive stimulation, socio-emotional skills, and entertainment [2]. However, traditional storytelling methods have limitations regarding customization, interaction, and engagement, in addition to a requirement for significant preparation time. Social robots and Artificial Intelligence (IA) techniques, such as Large Language Models (LLMs), can offer a more interactive and engaging storytelling experience, overcoming these limitations.

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In this paper, we extend the capabilities of the EBO robot, a social robot equipped initially with multiple sensors for interaction with older adults and the ability to display images and facial expressions that identify basic emotions [3]. We also extend the original EboTalk application, an interactive storytelling tool that allows a non-technical professional to build dialogues and stories and associate the robot's emotions and movements with the player's actions [14]. Our approach involves human-player interaction to create a story. The robot, the user, and the therapist collaborate on the narrative, which is further enriched with movements and facial expressions.

To enhance the storytelling capabilities of the EBO robot, we propose to integrate its capabilities into the CORTEX architecture and provide artificial intelligence (AI) techniques to customize the narratives. The CORTEX cognitive architecture has been used in various robotic applications, such as social and autonomous mobile robots [4]. It has proven effective in improving the robots' decision-making capabilities and overall performance. AI techniques can allow the EBO robot to understand and respond to the player's actions, generate natural language dialogues, detect and recognize objects in its environment, and adapt to the player's interests and preferences. In the case of cognitive therapies, the language model can facilitate the personalization of narratives without excessive complexity. In this paper, we integrate the Large Language Model, ChatGPT, into the robot's software architecture to enable it to generate natural-sounding and engaging narratives in real-time, to adapt the narrative to the player's preferences, and to optimize engagement and interaction.

We demonstrate the efficacy of our approach through a case study with therapist and older adult participants. The therapists evaluate the quality and personalization of the generated dialogues and the game's narrative flow. Older adults validate the interaction with the robot using the narrative game. Our results show that the EBO robot, integrating AI techniques, can provide an interactive, customizable and socially aware narrative experience that promotes cognitive stimulation, socioemotional skills and simple entertainment that is engaging and enjoyable for older adults.

## II. RELATED WORKS

Social robots have received increasing attention in recent years for their potential to improve the quality of life of older adults through various therapeutic interventions [1], [5], [6]. For instance, Lee et al. [7] reframed assistive robots to promote successful active aging, arguing that these

robots' perception and functionality must align with the desires and needs of older adults to be truly effective. In [8], the authors investigated how a robot could impact older adults' feelings of "being seen", emphasizing the importance of companionship beyond functionality. Moharana et al., [9] focused on community-based robot design for dementia caregivers, highlighting how robots can provide joy and solace in challenging contexts. In [10], the authors presented older adults' lived experiences with long-term social robot use, providing valuable insights into how these devices affect users' daily lives. Finally, Cruz-Sandoval et al., [11] demonstrated the potential of social robots as therapy facilitators in interventions to address dementia-related behavioral symptoms, offering a new approach to the care and support of this population.

One of the most promising applications of social robots is in storytelling, which has been shown to impact cognitive and social-emotional aspects of older adults positively [2]. Previous studies have explored the use of social robots in storytelling activities [12], [13], [14]. For example, Wang et al. [12] proposed an empathic and adaptive framework for robotic storytelling that allows social robots to generate personalized stories. Nichols et al., [13] developed a narrative robot to collaborate with individuals to create unique stories. However, providing too much independence in this exchange proved challenging in maintaining the narrative standard. In our previous work, [14], we presented EBO, a social robot designed to engage in conversations and interactive storytelling with appropriate emotions, movements, and images. In this previous work, all dialogues were previously generated by the therapist.

Recent advances in artificial intelligence have enabled social robots to become more interactive and socially aware in their storytelling capabilities. Integrating AI techniques such as natural language processing (NLP), LLMs, and affective computing has allowed social robots to tailor their stories to users' emotional states and preferences [15], [16]. For example, Costa et al. [15] use facial expression recognition to study the relationship between the story's emotional lines, the robot's facial expressions, and the listener's emotions. Augello et al. [16] propose an architecture for their storyteller, NarRob, that uses gestures and emotion recognition to guide the interaction. AI language models have also been used in [13], providing a large-scale language model tuned on a dataset of writing prompts and short stories.

However, most existing social robots for storytelling therapy cannot co-create stories with users naturally and intuitively. In addition, many current social robot solutions using AI need to be more advanced and integrated into an architecture that allows the robot to use higher-level skills and adapt to context. The EBO robot addresses these limitations by incorporating AI techniques with a human-in-the-loop approach to co-creating stories with older adults [14]. Some authors have used language modeling to create interactive narratives [17]; however, our approach goes further by integrating it into a natural therapy with a social robot. Our EBO robot combines the CORTEX cognitive

architecture [4] into its current solution. It equips it with high-level social skills through software agents implementing different actions to modify narratives. Finally, it uses an LLM, GPT3.5, to enhance the storytelling capabilities of a robot by providing it with an extensive repository of human-like language models and a rich knowledge base. The proposed dialogue management system enables the generation of stories conversationally. The EboAITalk application allows caregivers to customize the stories and associate the robot's emotions and movements with the player's actions. Through this approach, the EBO robot can engage users in a cooperative and interactive storytelling experience tailored to their preferences and abilities.

### III. OVERVIEW OF THE PROPOSED ROBOTICS SYSTEM FOR COGNITIVE THERAPIES

This section presents an overview of the proposed robotic system for cognitive therapies using the EBO robot and includes the therapist in the loop. Fig. 1 describes the system presented in our thesis. The system is designed to provide interactive and socially aware storytelling therapy for older adults with various cognitive impairments. It is integrated into the CORTEX architecture and offers several software agents that implement IA techniques.

The proposed system includes the therapist in the loop, allowing him to customize the narratives and associate the robot's behaviors (*e.g.*, facial expression and movements) with the user's actions. All in a very basic and easy way, without requiring programming or robotics knowledge. This feature, provided by the EboAITalk agent and saved in CORTEX [4], ensures that the storytelling therapy is tailored to the individual needs and preferences of the older adult user, making it more affective, personalized, and engaging. The therapist designs the narrative as a classic text adventure game (*i.e.*, narrative game), with different scenarios that unfold throughout the story. Each scene includes location, characters, props, and potential actions, among other components. EBO robot then collaborates with the player to construct the story using information from the CORTEX architecture and a set of software agents. The therapist can provide additional prompts and cues to guide the user's input, ensuring the session remains focused and effective.

The following subsections briefly describe the EBO storytelling robot, the CORTEX cognitive architecture, and the proposed methodology for interactive narrative.

#### A. EBO: an interactive and socially aware storyteller robot

The EBO storytelling robot, developed by the RoboLab research group at the University of Extremadura, is an interactive and socially aware robot designed for cognitive therapies with older adults [14], [3]. As shown in Fig. 2, the EBO robot is a differential platform capable of acquiring information from its environment and expressing emotions and images on its screen.

To maximize user acceptance, a co-creation methodology was followed for the external shape, resulting in a plastic

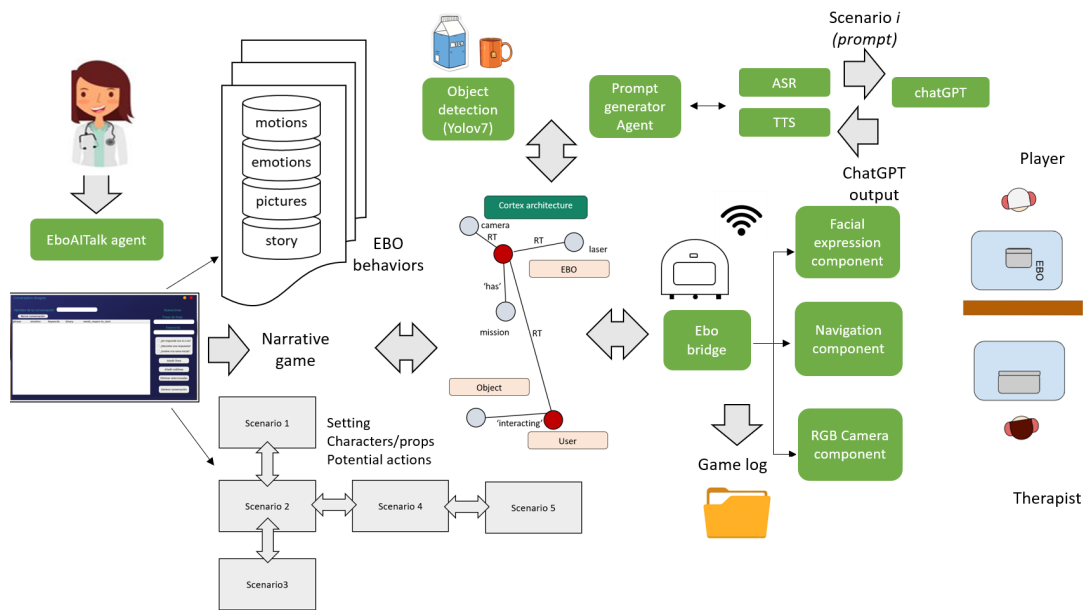


Fig. 1: Overview of the complete system for cognitive therapy with the older adults. Our proposal uses EboAITalk to bring therapists into the loop. EBO is integrated into the CORTEX architecture [4], which allows it to use different AI software agents. All sessions are stored for later analysis.

housing less than 15 cm in diameter and weighing less than one kilogram. The EBO robot's components include a Raspberry Pi 3B+ that hosts the system for controlling the other hardware components, a speaker and microphone for interacting with people, a camera for capturing visual information, a screen for displaying images such as emotions, and laser sensors that provide distance information from objects around the robot.

Integrating the CORTEX cognitive architecture into the EBO robot is a significant advancement in developing our proposal. Distributed cognitive architectures such as CORTEX are designed to provide intelligent robots with more human-like reasoning capabilities, allowing them to interact more effectively with humans and their environment. By implementing CORTEX, the EBO robot's social capabilities are significantly enhanced, enabling it to recognize and respond to a wide range of social cues and emotional states in its human counterparts. This distributed approach to robot software design also allows for more efficient and scalable development, as complex tasks can be distributed across multiple software agents working in parallel. The main software components include those that control the robot's physical devices and those responsible for generating emotional expressions, providing human-robot interaction capabilities, and displaying visual information on the robot's screen. These components are connected to the EBO Bridge agent, which accesses the CORTEX working memory.

### B. CORTEX: a cognitive architecture for integrating IA agents

The CORTEX cognitive architecture is a framework that provides guidelines for the design, modularization, and representation of a robot's activities and information [4]. In this

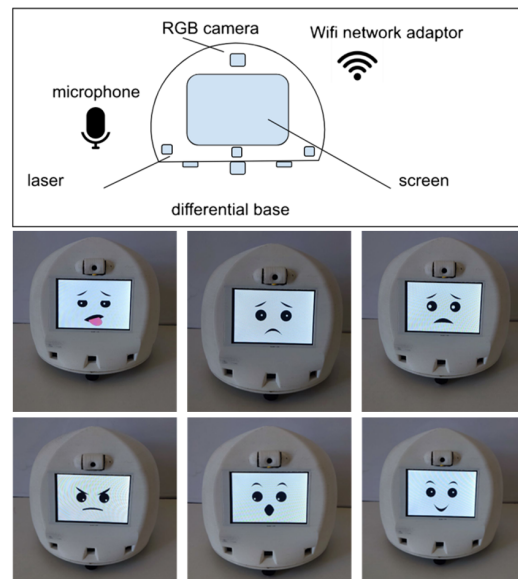


Fig. 2: The Ebo storytelling robot. Device schematic and the facial expressions associated with basic emotions.

architecture, agents perform specific tasks and cooperate and coordinate by writing to a working memory structure called the Deep State Representation (DSR). The information stored in this working memory represents the robot's knowledge, and it can be known in advance, obtained from sensor data, or the result of agent execution. DSR is a directed graph with vertices representing metric or symbolic data and edges representing geometric or logical predicates. Vertices or nodes are ontology concepts, and edges are relationships between them.

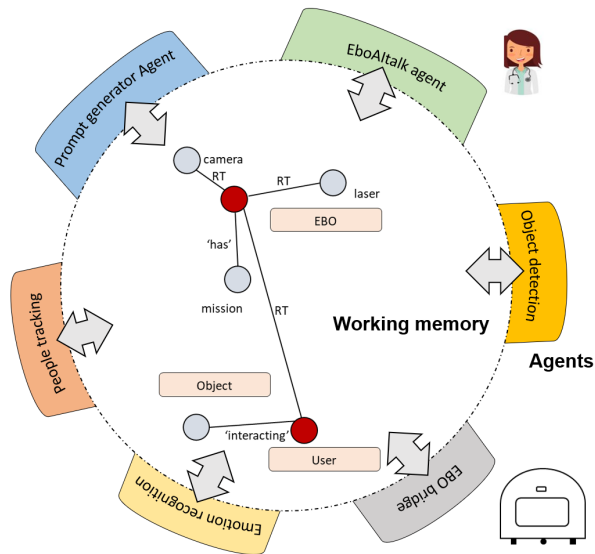


Fig. 3: CORTEX architecture for the proposed system. The working memory (DSR, Deep State Representation) is the basis of the architecture, where a set of agents perform specific tasks by writing/reading in it.

The CORTEX cognitive architecture provides a flexible and modular approach to integrating AI agents into our robot’s decision-making processes. Using the DSR framework, agents can share information and coordinate their actions to achieve the therapy. Figure 3 shows the CORTEX framework used in this article. The working memory holds data from: i) the state of the robot, using our implementation of the EBO bridge; ii) the older adult (player) and the basis of the narrative game, through EboAITalk; and iii) the environment in which the therapy takes place, including objects, facial expression and pose of the player during the game. From all this information, personalized dialogs are generated through the Prompt Generator Agent. Next, we will describe the agents involved in the proposed EBO Storyteller system:

- Object Recognition Agent. The object recognition algorithm can be used in storytelling robots to enhance their interaction and engagement with the environment and users. YOLO (You Only Look Once) [18], allows EBO to detect and recognize various objects (and people) during play, which can be incorporated into the story (adding this information in the DSR). For example, suppose the robot tells a story about an everyday activity, such as making coffee. In our case, YOLOv7 [19] can help identify the cup, milk carton, and other objects in the therapy and incorporate them into the story more effectively and engagingly. Fig. 4 shows an example of a human-robot interaction where different objects can be used for the user. On the bottom left, the algorithm detects a cup and includes it in the working memory.
- Emotion Recognition Agent. The emotion recognition algorithm, based on the DeepFace framework [20], can be used in our storytelling EBO robot to enhance its

<b>Initialization prompt</b>	I’m interested in playing a text-based narrative adventure with you, described through various scenes in a JSON file I’ll supply, featuring distinct locations, characters, goals, and possible actions. Please craft an engaging, empathetic, and personalized narrative from the ‘start’ scene, offering me two choices each time in question form. If I’ve omitted any details, feel free to improvise. After completing the game and achieving the goal, summarize the game in a question.
<b>ChatGPT response</b>	Sure, I’d be happy to help you with that! Please provide the JSON file containing the scenes, and I’ll get started on crafting the narrative adventure for you.
<b>Scenario one (severe cognitive impairment)</b>	You are in a room with your dog. What would you prefer to do, Juan? You can watch TV or go out the door.
<b>Scenario one (without severe cognitive impairment)</b>	As you sit in the room, you can feel the warmth and comfort of your home surrounding you. Your little dog is by your side, wagging its tail as you watch TV together. The show you’re watching is interesting, but you can’t help but feel the urge to move and explore the rest of your home. If you choose to go out the door, you’re not sure where it may lead you, but the excitement of the unknown is tempting. What would you prefer to do, Juan?

TABLE I: ChatGPT offers two different descriptions of the game scenario based on the cognitive impairment level, with an initial configuration provided by the therapist.

ability to perceive and respond to the emotions of older people during the game. For example, if the algorithm detects the user is boredom or disinterested, EBO could switch to a more beautiful or exciting part of the story. This information is written in the DSR as a specific node and linked to the older adult. On the bottom right in Fig. 4, the emotional information estimated by the DeepFace algorithm is shown.

- Prompt generator agent. This agent generates prompts from the CORTEX working memory information and sends them to chatGPT. Previously, chatGPT had been initially configured to let the robot know that a conversational game was being played, indicating what type of information would be sent and how the story should be developed according to the user. The agent reads the information from the graph, with additional information detected by the agents described above, and that can configure the prompt. Table I shows an example of the initial configuration and two different responses offered by chatGPT, depending on the older adult’s level of cognitive impairment.
- EboAITalk agent. This agent connects the therapist to the CORTEX architecture for writing data to the shared graph and reading potential needs during the game. It is explained in more detail in the following subsection.

### C. Interactive narratives: therapist in the loop

The EboAITalk agent is our tool for developing interactive narratives for the EBO robot. Implemented in Python, it

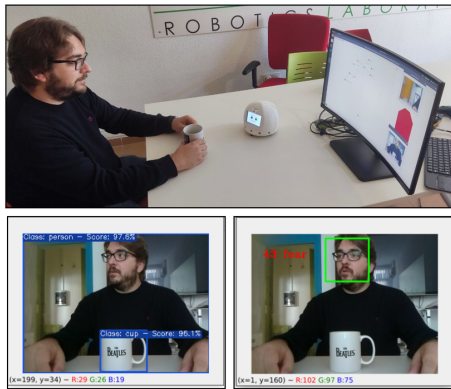


Fig. 4: A therapy example where the user interacts with EBO; The results of the DeepFace are shown in the figure.

allows therapists to generate a conversational game that the robot can use to interact with humans during cognitive therapy. The interface is user-friendly, requires no knowledge of robotics, LLMs, or programming languages, and generates a narrative flow in a JSON format that the robot's code can read. EboAITalk adds specific movements and emotional states to the robots along with the narrative flow.

Our interactive narratives are based on the classic text adventure genre of video games prevalent during the golden age of 8-bit gaming. In these games, players interacted with the game world primarily through text-based input, and all possible actions had to be expressed in natural language. Each action creates a new narrative, and each player's story is unique.

To realize this idea, our storytelling EBO robot becomes an interactive social robot with goals as diverse as cognitive or socio-emotional stimulation (*e.g.*, Activities of Daily Living, ADL). A Text-To-Speech (TTS) system narrates the content of the descriptive text and the user/player's options for action. An Automatic Speech Recognition (ASR) algorithm then listens and processes the user's actions. This interactivity creates new descriptions and situations that generate the final story, which differs for each user. The robot can change its facial expression and convey basic emotions depending on the user's actions.

The interactive storytelling process consists of several steps. First, the therapist interacts with the EBO robot through the EboAITalk application, which creates a JSON file containing the narrative flow, locations, characters, and possible actions. This narrative flow generates the storyline of the game. Second, this information is stored in the CORTEX shared memory. The therapist's description creates a prompt that considers variables such as the type of cognitive impairment (MMSE) [21]<sup>1</sup> and whether the user has interacted with an object. This prompt is sent to ChatGPT

<sup>1</sup>The MMSE is a brief 30-point questionnaire to assess cognitive function and screen for cognitive impairment. It evaluates orientation, memory, attention, and language to help diagnose and monitor dementia and other mental disorders. A score of 24 or higher (out of 30) typically indicates normal cognitive function.

to generate a text string stored in a JSON file. Third, the user responds to the robot's prompts by interacting with objects or speaking, and the ASR algorithm processes the user's input. Fourth, the robot uses the user's responses to create a new narrative flow, descriptions, and actions while modifying its emotional state and facial expressions accordingly. All of this is based on information from CORTEX provided by the EboAITalk agent. Fifth, the robot narrates the story, incorporating the user's input and generating new situations and narrative paths. This process continues until the story ends or the user or therapist decides to end the interaction. Figure 5 provides a schematic of how EBO therapy would be conducted. On the left, the JSON that creates the prompt-generating agent is displayed. This JSON is formulated using information supplied by the EboAITalk agent and the DSR. The remainder of Fig. 5 illustrates the narrative flow until it reaches the target, incorporating information gathered through an ASR (in our case, Whisper) or from working memory itself.

#### IV. EXPERIMENTAL RESULTS

##### A. Adaptation of ChatGPT-generated dialogues to different MMSE levels

In this subsection, we describe the evaluation of the adaptability of ChatGPT-generated dialogues to different levels of the Mini-Mental State Examination scale. To carry out this evaluation, we enlisted the help of 40 occupational therapists with expertise in the care of older adults. They were accustomed to working with new technologies in their therapies, were aware of the purpose of the study, and filled in their informed consents.

The therapists received a couple of dialogues generated according to the above-mentioned procedure, which simulated a personalized interactive narrative adapted to the MMSE. The objectives of both games were to complete an activity of daily living (for example, preparing orange juice). One dialogue was created for a person with severe cognitive impairment. The other dialogue, for an MMSE equal to or higher than 24. ChatGPT generated these dialogues using information from the EboAITalk agent initially set up by the therapists. In addition, a demonstrative video was accompanied to help them understand the dialogue generation process and its use in therapies<sup>2</sup>.

The occupational therapists were provided with questions to guide their evaluation. Each dialogue was rated individually on a Likert scale from 1 to 5 in the assessment. Therapists rated the robot's ability to produce natural and fluid dialogues with an average score of 3.64 out of 5, and its capacity to adapt dialogues to the MMSE of participants received an average score of 3.69, indicating a solid adaptability trait. Furthermore, the highest accolades were for the robot's potential in promoting cognitive functions training, receiving an average score of 4.26, underscoring the therapists' belief in its efficacy for cognitive rehabilitation.

<sup>2</sup>Readers can watch a subtitled version of the demonstration video at <https://www.youtube.com/watch?v=cw8n-FLzWx4>.

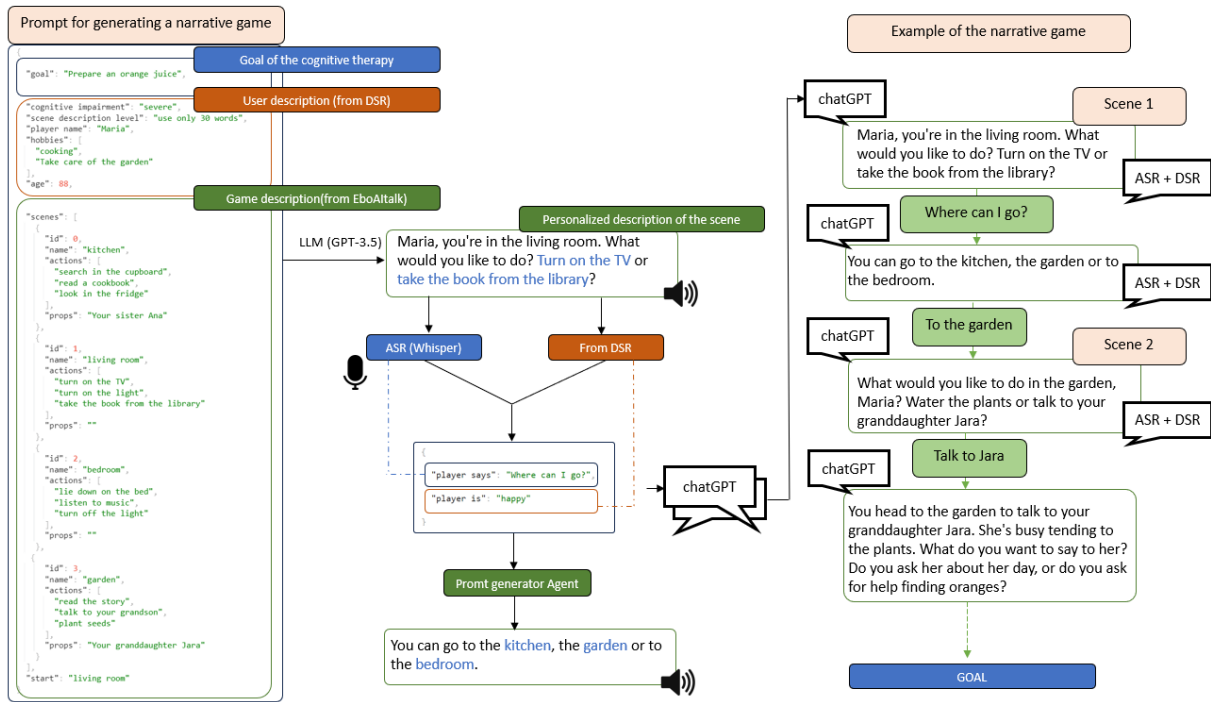


Fig. 5: The figure illustrates the cognitive therapy process with the EBO robot, showcasing the initial JSON structure of the prompt-generating agent based on EboAltalk and DSR data alongside the narrative progression leveraging ASR/TTS or working memory.

Question	Average
Dialogue natural and fluid	3.64
Adapts to cognitive impairment	3.69
Facilitates interaction without confusion	3.43
Incorporates emotional validation	3.63
Adapts speech speed	3.57
Includes questions promoting conversation	3.93
Facilitates a sense of autonomy	3.62
Consistency of the dialogue	3.60
Guides conversation to relevant topics	3.83
Effective for cognitive functions training	4.26
Effective for executive functions training	4.14
Effective for social skills training	3.76
Effective for ADL training with related stories	3.93
Effective for improving quality of life in institutionalized individuals	3.95

TABLE II: Assessment of Using a Robot in Therapies for the Elderly by Occupational Therapists

Similarly, the robot's effectiveness for ADL training with related stories was highly regarded, with an average score of 3.93. These scores, significantly above the midpoint, highlight considerable confidence in the storytelling robot's contribution to enhancing cognitive engagement and rehabilitation outcomes for older adults. Nevertheless, while these results paint a promising picture, they also signal the importance of continuous improvements, especially in enhancing emotional validation and social skills training, where the necessity for personalized and relevant dialogues becomes evident. All the results are shown in Table II and drawn as box plot in Fig. 6.

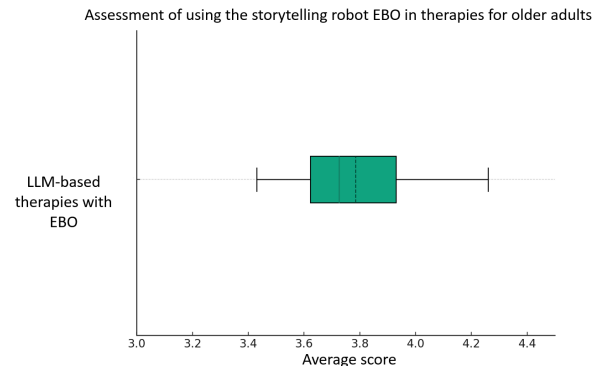


Fig. 6: Distribution of average scores for assessing using our storytelling robot EBO in therapies for older adults.

### B. Evaluation of the System with Real Users

Based on the MMSE scores, we conducted experiments with five volunteer participants from the day center Aztide, located in Cáceres, Spain, diagnosed with varying degrees of cognitive impairment. Each participant played two conversational games with the EBO robot, which used ChatGPT to generate personalized and engaging narratives related to daily activities in real-time. The system also incorporated YOLOv7 and DeepFace algorithms to recognize basic objects and the user's emotions, but we do not use them directly in our tests. Figure 7 shows a snapshot of the experiment. It is important to note that two of these users were already familiar with EBO and had previously worked with it in their

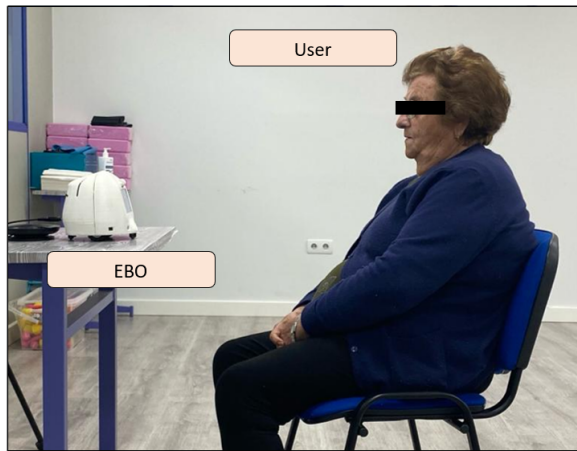


Fig. 7: Interaction tests between an older adult and the EBO robot in a daycare center in Cáceres, Spain.

care centers [3].

The table IV describes a scene generated by the EboAITalk tool. To measure user satisfaction with the game and the EBO robot, we also used a 5-point Likert scale survey that included questions related to participants' overall enjoyment of the game, their engagement with the robot, and their perception of the quality of the storytelling. We also asked questions related to the personalization of the text generated by ChatGPT, including the story's relevance to their interests and whether they felt the robot understood their preferences. Results are summarized in Table III, which reflect positively on the narrative game, with all questions receiving an average score above 4 out of a possible 5. This suggests a strong reception from participants in several key areas.

The fact that the highest scores were tied to enjoyment of the game and willingness to replay it, with perfect averages of 5.0, indicates a very positive user experience. Such findings could imply that the game mechanics and narrative are well-aligned with user expectations and interests and that the game has a high level of engagement. The narrative and personalization elements of the game were also well-received, with average scores of 4.4 and 4.6, respectively. These scores suggest that the story was involving and that users felt it was crafted with a personal touch, which could result from the proposed adaptive storytelling techniques.

Finally, the comprehension score (4.2) was the lowest but still indicates a generally good understanding of the game. This aspect may warrant further investigation to determine if specific elements of the game could be improved to make it more intuitive or easier to understand, especially for first-time players or those less familiar with such games.

## V. CONCLUSIONS

In this paper, we introduce a method to enhance the narrative abilities of the social robot EBO in therapies with elderly adults. Our method integrates AI techniques into EBO's CORTEX software architecture, allowing the robot to create engaging, personalized narratives in natural sound

Question	Average
Did you enjoy the game?	5.0
Did the story attract you?	4.6
Do you think the narrative had good/high quality?	4.4
Do you think the story was personalized?	4.6
Did you understand the game?	4.2
Would you like to play again at another time?	5.0

TABLE III: Average user responses to the narrative game.

Information from CORTEX architecture	Description (prompt)	EBO's facial expression
<b>1st scenario</b> <i>Location:</i> Entrance; <i>Characters:</i> only you; <i>Actions:</i> "open the door from the street to the garden", "check the photos of the furniture".	You find yourself at the entrance of your home, where this story begins. Sunlight filters through the open door into the garden, inviting you to explore. Which action would you like to do first: open the door from the street to the garden or check the photos on the furniture?	neutral
<b>2nd scenario</b> <i>Location:</i> garden; <i>Character:</i> only you; <i>Action:</i> "pick an orange", "pick a lemon"	As you open the door, the fresh scent of garden flowers greets you with a warm embrace. The sun's rays caress your cheeks as you wander among the plants and trees. To your right, you see a lemon tree laden with bright yellow fruit, and to the left, an orange tree with juicy ripe oranges. Which would you instead do now—pick an orange or pick a lemon?	happy
<b>3rd scenario</b> <i>Location:</i> garden; <i>Characters:</i> only you; <i>Actions:</i> "pick an orange", "pick a lemon"	Carefully, you select an orange from the tree, feeling its smooth texture and fragrant citrus aroma. The sunlight seems to glow even brighter as you hold the fruit. Now that you have the orange, what's your next step: return to the kitchen to start juicing or explore the garden more?	neutral

TABLE IV: Three successive scenes of the game. At the beginning, the therapist defines the objective: to prepare an orange juice. In the third scene, the narrative game already knows that the user has the orange, so it offers to return directly to the kitchen.

in real-time. The narratives are designed to be adapted to the cognitive impairment of the elderly adult and to adjust according to their abilities. We have integrated various algorithms into our system, including YOLOv7 and DeepFace, for object detection and emotion recognition. We have also used ChatGPT for dialog generation, which we have evaluated in this paper. Our experimental results have demonstrated that the dialogues generated by our system are highly personalizable and adaptable to different levels within the Mini-Mental State Examination (MMSE) scale, enhancing the interest of the older adult. They effectively address the specific cognitive deficits associated with each level. We have conducted tests with occupational therapists

and real users in a day center, and the results show that our proposed technique is a promising starting point for more interactive and effective social robot therapies.

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