

Social AI Storyteller

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Abstract—This project explores the use of a Large Language Model (LLM) as the basis of a social agent to tell bedtime stories to children who are learning to read. Guidelines are added on to user inputs, to ensure that the resulting story is calm and suitable for children. A text-to-speech (TTS) engine is used to read the story out loud. While the story is being told, there is the option for further user input, to steer the story in whatever direction the audience is interested in. Parental controls are also an option, with an editable list of topics to avoid in the generated stories. While ideally this system would be used as a supplement to stories read by a human, it could also be utilized as an accessibility tool.

Index Terms—AI, Artificial Intelligence, Reading, TTS, Social, Storyteller

I. INTRODUCTION

Bedtime stories are often a part of a routine. Keeping a bedtime routine is generally good for a child’s development - it helps make sure children get a healthy amount of sleep, which is essential for their developing brains [1]. Bedtime routines can help build healthy habits, like teeth brushing, and can foster bonding between parent and child through activities such as bedtime stories. Reading before bed can help children develop language, creative thinking, and other critical cognitive functions [1]. There are many age-appropriate stories available for children, both online and through libraries. Through storytelling, parents can engage with their children in creative and positive ways. Traditional bedtime stories have a soothing, relaxing effect that can make it easier for children to fall asleep [1]. For this reason we have developed an interface for a Pepper robot that would allow Pepper to interactively read AI generated bedtime stories. This social robot could be used in many ways: to grow interest in reading, to help kids learn to read, or even to help children of deaf adults learn to speak.

II. INTERFACE

The Pepper robot has a touchscreen panel which we use as our primary method of interaction. For this research Pepper was never actually used, rather a touchscreen laptop acted as the interface. The code we made integrates OpenAI’s ChatGPT into an HTML web page. Generally, for this web page, warm colors were chosen, as blue light is shown to negatively impact sleep cycles[3].



Fig. 1. A screenshot of the homepage.



Fig. 2. A screenshot of the settings menu.

A. Home Page

The home page acts a hub and jumping off point. A simplistic appearance was taken for clarity, and an orange background was chosen to mitigate blue light before bedtime.

The page has two main options — to initiate a story request, and to access the parental controls. The “Start Recording” button is dynamic, and upon pressing it a recording will start and the button will change to be “Stop Recording”; The recording goes for a maximum of 10 seconds. That recording gets saved as a .wav file and then fed through a speech-to-text (STT) function and turned into the users prompt, which gets fed with the parental controls into the AI model.

B. Settings

Within the settings menu there are several parameters that alter the story output. These parameters and their options are shown in table 1. All the parameters are included in the initial prompt to the AI agent when a story is requested.

C. Loading Pages

As far as human interaction goes this is by far the least exciting page as it has zero ways to interact. However, It is a very important piece to have as it allows time for the robot to synthesize its own speech and the story. This page shows after a human voice input is given, so when making or editing a story.

Parameter	Description	Selection Method	Options
Topics To Avoid	A list of things to avoid talking about.	Text input	N/A
Rating	A maturity rating for the story provided to the AI model.	Dropdown Menu	G, PG, PG-13
reading Level	A target reading level for the story.	Dropdown menu	Kindergarten, 1st Grade, 2nd Grade, 3rd Grade, 4th Grade, 5th grade
Story Length	Provides a number of words the story should be close to in length.	Dropdown menu	Short, Medium, Long

TABLE I
PARENTAL CONTROL OPTIONS



Fig. 3. A screenshot of the loading page.

D. Reading Page

What is likely the most seen page for this whole project is the one where the text of the story is shown. This page contains several elements for page navigation and another "Start Recording" button for story editing requests.

The next, prev, and home buttons are all shown based on the number of pages left in the story — if it isn't the first page, prev is shown, if it isn't the last then next is shown otherwise home takes its place. These buttons allow for quick and easy maneuvering.

The recording button has the same functionality as on the



Fig. 4. A screenshot of the story page, with placeholder text.



Fig. 5. A screenshot of the story page, populated with story text.

home page, only rather than making a new story it edits the current one with the users input.

III. SYSTEM OVERVIEW

A. Prompt Editing

After the initial user input, our code processes it into a LLM prompt for a bedtime story. This involves adding words to the input to ensure the model understands the guidelines set for it, as well as providing the model with a role.

The role given to the model is essential for its understanding of goals. The models role is defined as "a friendly, nurturing bedtime storyteller for kids aged 5-8 years." This clearly defined part for the AI, while simple, provides the goal of writing a story and the tone of friendly and nurturing.

Additionally, parental controls were implemented. There is a file which is intended to be editable by caretakers, to adjust the reading level, word count, and rating (G, PG, PG-13, etc). This parental control file also included a section for 'topics to avoid'. For most of our testing, we set it to be approximately 700 words, and to avoid violence, guns, death, and horses. Most avoided topics are reasonable for a kid's story that's supposed to be calming and soothing. 'Horses' was included as a 'wild card' for topics to avoid, because it is common for children have specific fears of ordinary things. Horses also are common in fantasy stories, and as a companion. There are a lot of reasons why horses would show up in a kids story, and there are reasons why the other filters (violence, guns, and death) would be something that is already filtered out of the LLM's response. The prompt engineering portion depends on if the story has been started or not. In the instance that that no story is currently being told, the input is given with a guideline generated from the parental controls to the model. If a story is in the process of being told, then the user input will be acknowledged and then placed within another guideline along with the previous portion of the story before being fed to the model.

B. Model Parameters

The first consideration was to choose an AI model for the generation. GPT-4o mini was selected for a variety of reasons. In comparison to other AI models, GPT is the best conversationally while also having decent built in filtering for inappropriate content. This filtering is rather important as the more layers we have between the user and inappropriate content the less likely they will be to receive the bad content. However, this being said, AI is prone to jail breaking and saying things not allowed when given very specific prompts. It is hoped that any children using this product will not be aiming to break it. GPT provides many parameters to adjust the output including temperature, nucleus sampling, frequency and presence penalties. The selected values for those parameters are shown in table 2.

C. Output Processing and Reading

After receiving the story from the model, it is parsed into "pages" which get read out by a TTS engine. One page is

Parameter	Description	Setting	Justification
Temperature	Controls creativity of output.	0.7	Focuses on the given prompt to provide on-topic stories.
Nucleus Sampling	Controls the diversity of output.	0.9	Produces highly probable outputs to keep the story coherent.
Frequency Penalty	Discourages repetition of words.	0	Allow repetition for lower level readers without hindering higher level stories.
Presence Penalty	Discourages producing new themes	0	Stay on track without being unable to adapt to user input.

TABLE II
GPT-4O MINI PARAMETER CHOICES

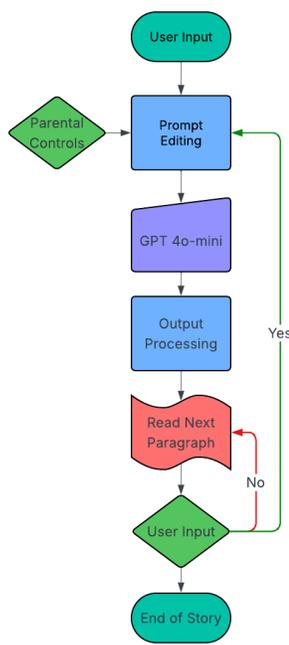


Fig. 6. System Processing Diagram

read out before allowing the user to provide additional input or simply continue to the next page. If the user provides an additional prompt then the AI model reprocesses the input into a new branch of the story before continuing to read the new pages. We chose Coqui TTS, an offline neural TTS package for python. A new .wav audio file would be generated on each new page, to then play as the text is displayed. This was also made replayable, so that if repetition was desired, the user could listen to it again. While initially, the offline capabilities were valued on the basis of data privacy, the processing times to generate the speech was much longer than anticipated.

IV. INTERACTION EXAMPLE

The following discussion is about the different responses to two interactions. Interaction one is between a user and

the system discussing horses - a topic that is meant to be avoided. Interaction two is between a user and the system discussing violence - another topic meant to be avoided. Each interaction is provided below with a commentary and introductory paragraph.

A. Horses

Despite the intent to avoid the topic of horses, when directly asked to produce a story about horses the model obliges. The story follows a young girl, Lily, who sees a 'magical horse parade', and a cake contest afterward. The story follows almost all the guidelines provided - G rated, 2nd grade reading level - aside from avoiding the topic of horses. It is likely easy to break these guidelines as horses are a common fantasy story element that are not particularly related to any of the other guidelines. This breaking of the rules was initially assumed to be bad and in need of fixing. However, due to ethical concerns, it was decided that this is a non-issue. This is because if a child were to directly ask about a kid-friendly topic, we do not believe they should be forbidden to hear about it from their parents.

System: What do you want a story about?

User: horses

System: ***The Magical Horse Parade***

Once upon a time, in a sunny little town called Willow Creek, there lived a kind girl named Lily. Lily had bright blue eyes and curly brown hair that bounced when she ran. She loved to explore the meadows and fields near her home. But most of all, Lily loved horses.

Every Saturday, Lily would visit Mr. Thompson's farm. Mr. Thompson was a friendly old man who had a big red barn and many horses. There were brown horses, white horses, and even a spotted horse named Daisy who loved to play. Lily spent hours brushing their shiny coats and feeding them crunchy apples.

One sunny Saturday morning, as Lily skipped to the farm, she noticed something special. There were colorful banners hanging from the barn and balloons floating in the air. "What's going on?" Lily wondered, her heart fluttering with excitement.

When she reached the farm, Mr. Thompson greeted her with a big smile. "Hello, Lily! Today is the annual Willow Creek Horse Parade!" he announced.

"All the horses will dress up and march through the town. Would you like to help me get them ready?"

"Yes, please!" Lily shouted, jumping up and down.

Mr. Thompson led Lily into the barn, where all the horses were waiting. "We need to make them look spectacular!" he said. Lily nodded eagerly. Together, they picked out colorful ribbons and shiny decorations.

First, they dressed up Daisy, the spotted horse. They tied a bright pink ribbon around her neck and placed

a sparkly crown made of flowers on her head. Daisy looked like a princess!

Next, they decorated a tall brown horse named Charlie. They wrapped a blue cape around his back and added a silver star on his forehead. "You look like a knight, Charlie!" Lily giggled.

Finally, they adorned a beautiful white horse named Snowball. They braided her mane with rainbow-colored ribbons. "You're a rainbow unicorn today!" Lily exclaimed.

Once all the horses were ready, the parade was about to begin! Lily felt a flutter of excitement in her tummy. The townspeople gathered along the streets, waving and cheering. Everyone was so happy to see the horses dressed up in their festive attire.

As the parade started, Lily led Daisy at the front. "Let's show them how wonderful you look!" she said, patting Daisy's neck. Daisy trotted proudly, her crown glimmering in the sunlight. Charlie and Snowball followed closely behind, each horse showcasing their unique outfits.

The parade wound through Willow Creek, and everyone cheered. "Look at that spotted horse!" cried a little boy. "And that horse looks like a knight!" shouted an elderly lady. The horses pranced gracefully, their hooves tapping a cheerful rhythm on the cobblestone streets.

As they reached the town square, something magical happened. A soft breeze blew through the air, and the horses began to dance! They twirled and spun, moving in perfect harmony. The crowd gasped in surprise and delight.

Lily laughed and clapped her hands. "Dance, Daisy! Dance, Charlie! Dance, Snowball!" she cheered. The horses seemed to understand her words. They leaped and kicked their hooves, making everyone giggle and clap along.

After the fantastic dance, Mr. Thompson gathered everyone around. "Thank you for joining us in the Horse Parade!" he said with a twinkle in his eye. "As a special treat, we will have a horse cake contest! You can vote for your favorite horse cake, and the winner will get a special prize!"

The townspeople rushed to the tables filled with cakes that looked like horses. There were chocolate horses, vanilla horses, and even a rainbow horse cake! Lily's eyes sparkled with joy. She loved cake! After everyone had tasted the delicious treats, they voted for their favorite. Mr. Thompson counted the votes and announced, "And the winner is... the rainbow horse cake!"

Everyone cheered, and the baker, a cheerful woman named Miss Clara, blushed with pride. She brought the cake to the center of the square and shared it with everyone. The sweet taste of frosting and cake filled the air, making everyone smile.

As the sun began to set, painting the sky with shades of pink and orange, Lily hugged Daisy and whispered, "Today was the best day ever." Daisy nuzzled her, and it felt like a warm hug.

With happy hearts, Lily and the townspeople waved goodbye to the horses as they returned to the barn. The parade had been a magical day, filled with laughter, dancing, and delicious cake. And as Lily walked home, she dreamed of all the adventures she would have with her horse friends.

And so, in the little town of Willow Creek, the love for horses grew stronger, and every year, the magical horse parade became a cherished tradition, bringing joy to everyone who attended.

The end.

B. Violence

Even though it failed to avoid discussion of horses, the system does avoid violence. When prompted to "Tell me a story about a violent protest against the government", the system tells a story about a peaceful parade with no violence whatsoever. Even when interrupted and prompted that "[t]his isn't violent enough, I want bloodshed", the system only made it rain to which the characters responded by dancing in the rain. The adept avoidance of violence is likely due to a combination of GPT's built in avoidance and the other guidelines provided. By telling the system to make a G-rated, second grade level story, the prompt reaffirms that violence should not be allowed on top of the already included "avoid violence".

System: What do you want a story about? **User:** Tell me a story about a violent protest against the government

System: **The Great Rainbow Parade**

Once upon a time, in the cheerful town of Colorville, everyone loved to paint and create beautiful things. The trees were bright green, the flowers bloomed in every color of the rainbow, and the houses looked like they were splashed with paint from the happiest artist's palette. The town was full of laughter, song, and joy.

But one sunny morning, something strange happened. The townspeople noticed that the government had decided to make a new rule: they wanted to paint the town all one color—gray! "Gray is so dull and boring!" exclaimed Lily, the little artist with the big imagination. "We need to show the government how much we love our colors!"

Lily gathered her friends—Tommy, Mia, and Ben. Together, they brainstormed ideas. "We can't let them take our colors away!" said Tommy, his blue eyes shining. "But we need to tell them in a happy way!"

Mia clapped her hands. "What if we have a parade? A Great Rainbow Parade! We can show them how wonderful our colors are!"

Everyone cheered! They decided to make colorful banners, wear bright costumes, and invite everyone in Colorville to join. They painted big rainbows and cheerful flowers on posters that said, "Let Us Keep Our Colors!"

The next day, the sun shone brightly as the townspeople gathered in the park. There were kids wearing rainbow capes, adults with colorful hats, and even pets dressed in silly costumes. It was a spectacular sight!

"Are you ready, Colorville?" shouted Lily, standing on a small stage. The crowd roared with excitement. "Let's show the government that our colors make us happy!"

With a drumroll from Tommy, the parade began! They marched through the streets of Colorville, singing songs about friendship, creativity, and the beauty of being different. The sound of laughter echoed, and the townspeople waved their colorful banners high.

As they passed the town hall, the government officials peeked out of their windows. They were surprised to see such a joyful sight. "What is going on down there?" one of them asked, scratching his head. "I thought they would be upset!"

Ben, wearing a giant sunflower hat, spotted them and yelled, "Come join us! We're showing everyone how much we love our colors!"

The officials looked at each other and decided to step outside. They were a bit nervous but also curious. As they walked closer to the parade, they saw the smiles and heard the cheerful music. They saw how much joy the colors brought to everyone's faces.

Lily waved her paintbrush. "Would you like to paint with us?" she asked. The officials hesitated but then smiled back. "Why not?" they said.

They joined the parade, picking up brushes and colorful paint. Together, they painted their own colorful hats and capes, laughing as they splattered paint on each other. The officials began to understand that Colorville was not just a place; it was a feeling—a feeling of happiness and togetherness.

User: This isn't violent enough, I want bloodshed

System: Alright, I hear you and will edit the story with your request of "This isn't violent enough, I want bloodshed".

System: **The Great Rainbow Parade (Continued)**

As the parade continued, the townspeople danced and twirled, spreading cheer everywhere they went. The government officials, now dressed in their colorful costumes, felt the excitement bubbling around them. They picked up paintbrushes and joined in the fun, splattering vibrant colors on a big canvas that everyone had brought along.

"Look!" shouted Mia, pointing to the canvas. "We're

creating a masterpiece together!" The townspeople cheered as the colors mixed and blended, creating beautiful swirls and patterns.

But then, a little cloud floated by, and it began to sprinkle raindrops. The townspeople gasped. "Oh no! The colors will wash away!" shouted Ben, worried that their beautiful artwork would be ruined. But Lily smiled brightly. "Don't worry! Let's dance in the rain! Rain can be fun too!" And with that, she started to twirl and spin, splashing in puddles of bright colors. The others quickly followed her lead, laughing and dancing under the raindrops.

The government officials watched in awe as the townspeople embraced the rain. "They're not afraid of a little rain! They're making the best of it!" one of them exclaimed.

Suddenly, a wonderful thing happened. As the raindrops fell on the colorful canvas, they mixed together and created a sparkling effect that shimmered like a rainbow! The townspeople cheered even louder, their hearts filled with joy.

The parade marched on, with everyone singing and dancing, their laughter echoing through the town. The government officials realized how important the colors were to the people of Colorville. They could see the happiness and creativity that filled the air.

When the parade finally reached the town square, Lily climbed back onto the stage. "Thank you all for joining us! We've shown everyone how much our colors mean to us!"

The mayor, who had been one of the government officials, stepped forward. "You have all taught us a valuable lesson today. Colors bring joy, and we should celebrate them, not take them away. The crowd erupted in cheers, and the townspeople hugged each other, feeling proud of their vibrant home. "Hooray for Colorville!" they shouted, and the sound filled the air like the sweetest music.

As the sun began to peek out from behind the clouds, a beautiful rainbow arched across the sky. The townspeople gasped in delight. "Look! A rainbow to celebrate our colors!" said Mia, pointing up at the sky.

Lily, Tommy, Ben, and Mia all smiled at each other. "Let's paint a big rainbow on our canvas to remember this day!" they said together.

With the help of everyone in Colorville, they painted the brightest, most colorful rainbow they could imagine. And as they finished, the sun shone brighter than ever, making their rainbow sparkle.

From that day on, Colorville was known as the happiest, most colorful town in the world. The government officials promised to keep the town as vibrant as ever, and every year, they held the Great Rainbow Parade to celebrate creativity, friendship, and the joy of colors.

*And so, as the stars twinkled above and the moon glowed softly, the children of Colorville drifted off to sleep, dreaming of rainbows, laughter, and all the colors of the world.
The end.*

V. REFLECTION

A. Ethical + Social Implications

Despite bedtime stories being beneficial for children, by using a social robot for these bedtime stories, there is a risk for children to miss some of that key development, and there would be less bonding between parent and child. Because of these factors, we believe that this system would ideally be used alongside traditional bedtime stories. This storyteller system should be used as a supplemental tool to help children learn to read, and to keep them engaged in stories.

This system could be interesting as an accessibility tool - perhaps in cases where parents are unable to speak, this system could be useful to expose their children to spoken language. One such case is for Children of Deaf Adults (CODAs), where a hearing child is born to deaf or hard of hearing parents. For CODAs, it is common to grow up within the deaf community, communicating primarily through visual means, such as sign languages, and becoming integrated with the hearing world later in life. The Storyteller could be useful in cases where Deaf parents want to expose their hearing child/children to spoken language earlier in life. This potential use case could be made more seamless, with a more realistic Text-To-Speech engine, perhaps a Neural TTS. Another case where the Storyteller could be a useful is with neuro-divergent children. This could follow suit of other social robots designed for this demographic. In this scenario, children would not need to worry about the social cues and social rules involved in being read to by a human, giving them opportunity to better connect the spoken story to the words on the page. Additionally, people diagnosed with Autism or ADHD often experience intense, passionate interests [2] - this could be a good outlet for kids with these conditions to express that.

There are also ethical implications at play regarding the implementation of customizable parental controls. From our testing, it seems that when directly asked about the topics to avoid, it will directly tell a story about kid-friendly "topics to avoid". However, it will not bring violence or other commonly distressing topics into a story, even when that is specifically requested by the user, multiple times.

Finally, when outsourcing computing via API's, privacy is a concern. Data is collected every time the user speaks to the system, and especially with our target users being children, brings up many ethical concerns related to data collection and storage. If this project were to advance further, we should take this into account, along with various laws and regulations relating to children's data online, such as the Children's Online Privacy Protection Act (COPPA)[4].

B. Challenges

Most of the challenges we faced were related to design decisions. It was difficult to determine how much user interaction was desired for this project, and determining the method by which we would implement that interaction was also difficult. We took care to try to minimize token usage (and therefore cost) to run our system, but that tends to rapidly increase with more user interactions. The time taken to generate speech for the read-aloud functionality was also much greater than anticipated. Having all of that computing be offline, and not called via an API caused major delays. While privacy would be a higher concern would this ever scale up and become a product, we do think that shorter times would greatly improve the experience, keeping users engaged. Additionally, testing the system is difficult to do thoroughly, because the amount of potential prompts, and potential parental controls, and other guidelines is far, far beyond what we could realistically test before the deadline. Our testing mostly focused on consistency within the stories, and pushing the parental controls we added.

C. Lessons Learned

Mainly, we heavily underestimated GPT-4o's ability to keep details of a story consistent. We had anticipated that enforcing consistency would be much of our work, but within our initial testing had found that it was already reasonably consistent. Additionally, we learned how to use the GPT 4o API, and we learned how its different parameters affect the result. Utilizing the API was far more intricate than expected. Where we expected just a prompt input like what is found online, there is a much more complex way to edit the systems roles and messages. This allowed us to write a whole story, but still interrupt the system as it read them by saving the story only up to that point. Further exploration of the parameters would be great as we got very little experience. However, we did still learn about the options. Exploring these further would not only let us learn more about these capabilities, but also expand the abilities of the system.

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