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AI Pet Companion System - Project Plan Writeup

Overview

The AI Pet Companion System creates a dynamic virtual pet experience through incorporating AI-generated creatures (that at the moment are intended be developed on Anything World) which have unique personalities and behaviors primarily through LLM-driven interaction systems, combined with engineered needs.

The primary innovation for the prototype is in how the system uses LLMs (such as Anthropic's Claude and OpenAI's ChatGPT) to create meaningful pet-player interactions while using simpler engineered systems to represent the pet's basic needs and states. In comparison to most traditional virtual pet games with scripted behaviors, the creature pets in this game will have abilities to adapt and respond to player interactions in ways that are and feel personalized.

Team

The team includes Shanaya Malik, who will focus on generating the creatures, LLM integration, and personality modeling. Matthew Streib and Luan Ta will work as game systems developers, focusing on basic mechanics within the interface design, and visualization. Trinity Wu will work on needs modeling and personality-driven response systems, allowing it to add up to creating visually engaging and meaningful pet-player interactions.

Theme

The project explores the concept of AI as an Adaptive Companion, using LLMs to generate personalized pet personalities and responses. The pet serves as both a companion and a reflection of the player's care patterns, with the LLM maintaining consistent personality traits while adapting responses based on the pet's current state. The AI acts as the personality of the pet, interpreting needs states (hunger, happiness, energy) into personality-consistent behaviors and responses. This approach creates a more authentic and engaging virtual pet experience focused on interaction rather than complex simulation.

Novelty

The primary innovation in our project is the seamless integration of engineered pet needs with LLM-driven personality and response generation. The team intends to implement a needs-based system similar to The Sims, where pets have simple drives (hunger, energy, happiness, etc.) that can be satisfied through specific player actions. The needs and states are then fed into carefully crafted LLM prompts, allowing the model to generate contextually appropriate and personality-consistent responses.

Instead of attempting complex reinforcement learning or evolutionary systems, the LLM will be used as the core engine for personality expression and behavioral variation. For each pet, it will receive a unique personality profile at creation, which forms an implicit part of every prompt, ensuring consistent character while allowing for state-based variation in responses. The utility-based needs system provides a simple framework for prioritizing actions, making pet behavior feel purposeful and grounded while the LLM handles the expressive aspects of personality.

Value

The system provides significant value through its focused approach to virtual pet interaction. For players, it creates meaningful emotional connections through personality-driven responses that feel natural and adaptive. The system demonstrates how relatively simple engineered elements (needs tracking) can be enhanced through LLM integration to create compelling character interactions. For game developers, the prototype highlights a practical approach to implementing LLM-powered characters in games, offering a framework for creating more engaging NPCs with manageable implementation complexity.

Technology

The technology stack includes the LLM system (using GPT and Claude) serves as the engineering engine for personality expression, handling dialogue generation, emotional responses, and action descriptions. For each pet, it has a persistent personality profile that informs all LLM interactions, ensuring consistency while allowing for state-based variation.

The simplified needs modeling system tracks basic drives like hunger, energy, and happiness, similar to The Sims' approach. For each need, it will reduce naturally over time and can be satisfied through specific player actions. The system provides the concrete state information that grounds the LLM's responses in the pet's current condition. The basic utility mechanism helps prioritize the pet's immediate concerns, making behavior feel purposeful and responsive to current needs. This creates a framework where the LLM can generate appropriate responses based on both personality and current state.

For visualization, it will be implement in Unity3D and include focus on conveying personality and emotional states effectively, so that the player can have meaningful interaction with the pet.

Work Plan

Shanaya will initially handle the development and creation of the creature pets (as well as integrating that into a Unity3D environment), as well as help with LLM integration, developing the prompt engineering system that effectively combines personality profiles with current pet states to generate appropriate responses. This would include creating the initial personality generation system and designing the interaction patterns between the engineered elements and the LLM.

Trinity will develop the needs modeling system, implementing the basic drives (hunger, energy, social, etc.), their decay patterns, and the actions that affect them. Trinity will also create the utility system that helps prioritize needs and actions based on current states.

Matthew will focus on core game mechanics and the interaction framework, designing how players engage with their pets and how those interactions affect the pet's needs and generate responses. Luan will develop the visualization system, creating representations for the pets and their emotional states that effectively convey personality while remaining implementable within our timeframe.

The prototype (a combination of both LLM-driven personality system and the engineered needs) will start with basic functionality and iteratively refine the interaction quality, focusing on making the pet's responses feel both consistent and adaptive.