

YUFENG HUANG

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Research Profile

AI systems engineer with 8+ years of industry experience in game AI, interactive agent systems, and AI-assisted production tools across major studios (Tencent, ByteDance, NetEase). My work spans the full spectrum of agent intelligence — from traditional behavior trees and utility AI to LLM-driven autonomous agents with personality and memory.

Through industry practice and independent research prototypes, I have developed a focused interest in **human-centered AI agents for interactive virtual environments** — how to build agents that are emotionally intelligent, personalized, and capable of sustaining believable long-term relationships with users.

Research Interests:

- Emotionally aware and personalized AI agents with long-term memory and adaptive behavior
- Game AI and autonomous character behavior in interactive virtual environments
- AI-assisted authoring tools for narrative, dialogue, and agent behavior design
- Evaluation and alignment of agent behavior in interactive settings

Education

Huazhong University of Science and Technology

Sep 2014 – Jun 2017

M.S. in Pattern Recognition and Intelligent Systems • GPA: 3.43

Wuhan, China

- Thesis: *CNN-based Visual Place Recognition in Changing Environments*
- Key coursework: Pattern Recognition, Computer Vision, Machine Learning and Data Mining, Digital Image Processing, Digital Video Processing, Matrix Theory, Stochastic Processes

Huazhong University of Science and Technology

Sep 2010 – Jun 2014

B.E. in Measurement & Control Technology and Instrumentation • GPA: 3.73

Wuhan, China

- Key coursework: Calculus, Linear Algebra, Probability Theory, C Programming, Data Structures, Computer Networks, Automatic Control, Digital Signal Processing

Selected Research Projects

Mimosa — Multimodal Emotion-Aware Virtual Companion System

May 2026 – Present

Independent Research Project

[GitHub](#)

- Built an end-to-end multimodal virtual companion that senses and responds to human emotion through voice and text, building a personalized and adaptive long-term relationship.
- **Multimodal interaction pipeline:** Built a real-time voice and text interaction system with a Live2D avatar frontend, integrating VAD, ASR, LLM-based dialogue (multi-provider streaming), emotion extraction, expression mapping, and TTS into a unified bidirectional pipeline.
- **Personality modeling:** Implemented a Big Five-based configurable personality system with trait-driven conversational style and bounded self-evolution via LLM-based reflection on interaction history.
- **Long-term memory:** Designed an automatic memory extraction module that distills key personal facts from conversations, persists them as structured data, and reinjects them into context for cross-session continuity and personalization.
- **Emotion-aware expression:** Extracted emotion categories directly from LLM responses and mapped them to Live2D facial expressions, enabling the avatar to reflect emotional understanding in real time.

llm-persona-gap — Personality Alignment Evaluation Framework for LLM Agents Apr 2026 – Present

Independent Research Project

[GitHub](#)

- *“Do LLM Agents Act as They Say?”* — A quantitative research framework for measuring the gap between expressed and behavioral personality in LLM-driven agents.
- **Personality conditioning:** Modeled personality as a continuous 4D vector (risk-taking, aggression, cooperation, deception) injected into agent prompts, supporting configurable personality presets for controlled experiments.
- **Dual-channel measurement:** Independently extracted behavioral personality from action trajectories and expressed personality from reasoning text via LLM-as-judge, enabling quantitative comparison between what agents do vs. what they say.
- **Experimental design:** Tested personality-conditioned LLM agents (GPT/DeepSeek) in Leduc Hold'em across 100+ episodes, with and without memory and communication channels.
- **Key findings:** Observed significant misalignment — agents maintained high temporal consistency (~ 0.98) but showed systematic gaps in specific dimensions (e.g., deception: 0.0 behavioral despite non-zero assignment).

Industry Experience

Tencent — SGRA Studio

Jul 2024 – Present

AI and Tools Lead

Guangzhou, China

- Led a five-person AI and tools group for *Animula Nook*, a pre-launch interactive virtual-world simulation game, focusing on NPC intelligence, agent behavior, and AI-assisted production workflows.
- NPC agent system:** Designed and built a hybrid NPC AI architecture combining behavior trees, FSMs, utility AI, and LLM-based modules. Each NPC exhibits configurable personality traits, maintains conversation memory, performs autonomous daily routines, and engages in personalized interaction with players. Per-scene: dozens of fully autonomous NPCs; at server scale: millions of NPC entities across the persistent world (10x player population).
- AI-assisted creative tools:** Led development of 10+ LLM-powered authoring tools spanning narrative/dialogue generation, behavior tree generation from natural language, blueprint generation, automated cutscene generation, and more.
- Agent-driven tool generation:** Explored an automated pipeline where an LLM agent autonomously generates production tools end-to-end — from UI design to code implementation to automated testing.
- Infrastructure:** Previously responsible for building the global distributed server architecture supporting 1M+ DAU for shared-world multiplayer.

ByteDance — Nuverse

Jun 2021 – Jul 2024

Senior Software Engineer

Guangzhou, China

- Auto-chess tactical AI:** Built the battle AI system for *Dragonheir: Silent Gods* (launched strategy RPG with millions of downloads) using behavior trees and state machines. Explored RL for hero lineup composition.
- Souls-like boss AI:** Designed complex multi-phase boss AI using layered behavior trees and state machines, modeling player-adaptive attack patterns and phase transitions.
- Narrative NPC AI:** Built an event-driven NPC AI system supporting 1,000+ concurrent NPCs per scene, powering extensive scripted narrative performances in a DnD-themed CRPG.
- Open-world NPC AI:** Developed a utility-based ambient NPC behavior system for an internal open-world ARPG, enabling context-aware daily routines and environmental responses.
- AIGC exploration:** Explored generative AI including concept art generation using diffusion models, text-to-motion generation, and video-based motion capture.
- Production tools:** Built internal authoring tools including blueprint editors, behavior tree editors, narrative editors, quest editors, and dialogue editors.

NetEase Games

Jul 2017 – Jul 2019 & Apr 2020 – Jun 2021

Software Engineer

Guangzhou, China

- Developed gameplay systems (character control, camera, level system, etc.) for an internal open-world MMORPG project.
- Built companion (buddy) AI combining behavior trees and utility AI, enabling NPC allies to fight alongside players with context-aware combat behavior.
- Gained working knowledge of utility-based MOBA combat AI on *Onmyoji Arena*, and participated in exploratory research on RL-based PvP agents.
- Shipped multiple gameplay systems for *Onmyoji Arena* (launched MOBA title), including hero skills, in-game activity systems, and battle pass systems.

Publications

- Y. Huang**, Y. Liu, and J. Liu. “New bionic navigation algorithm based on the visual navigation mechanism of bees.” *Proceedings of SPIE*, 9522, pp. 235–240, 2015. First author, EI indexed. [DOI](#)
- L. Wang, **Y. Huang**, and J. Liu. “Bionic navigation algorithm based on contrast entropy flow.” *China Sciencepaper*, 2015(10), pp. 967–970. Second author. [Link](#)
- Y. Huang** and J. Liu. “CNN-based visual place recognition method.” *Computer & Digital Engineering*, 2018(6). First author. [Link](#)

Technical Skills

Programming: Python, C/C++, C#

AI / ML: PyTorch, Hugging Face Transformers, Reinforcement Learning, LLM Agent Development (LangChain, RAG, Context Engineering, Structured Output, Multi-Provider Orchestration), Multimodal Interaction (ASR, TTS, Emotion Recognition)

Game AI: Behavior Trees, Finite-State Machines, Utility AI

Game Engines: Unity, Unreal Engine, Custom Editors and Authoring Tools

Backend / Infrastructure: FastAPI, WebSocket, Docker, Linux, Distributed Server Architecture