

Samsung Prism GenAI Hackathon

2025

Pixel Minds

MULTI-AGENT CHARACTER FRAMEWORK FOR IMMERSIVE GAMING



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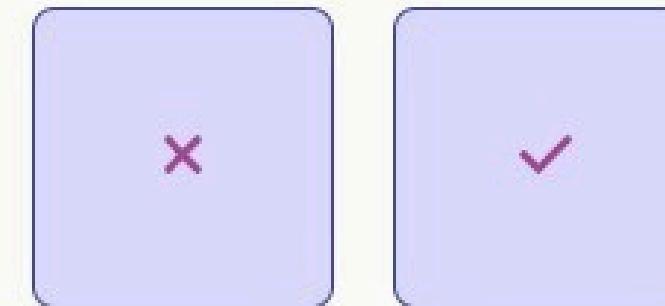
KUMAR



The NPC Immersion Problem

Traditional NPCs

Repetitive dialogue trees, no memory across sessions, static responses, limited environmental awareness



Our Solution

Multi-agent AI system creating truly intelligent, context-aware characters with persistent memory

Our Dynamic NPCs

Context-aware conversations, persistent memory system, real-time world interaction, multi-sensory perception

Innovation Gap

Current NPCs break immersion through predictability and lack of contextual understanding

System Architecture Overview

Multi-Agent AI Coordination

Core framework enabling intelligent agent coordination with specialized roles and real-time communication

Selector Group Chat

- Intelligent agent coordinator
- Real-time decision making
- Dynamic task allocation

Specialized AI Agents

- Four distinct specialized roles
- Prevent knowledge overlap
- Modular capability system

FastAPI Backend

Real-time WebSocket
communication

Dual Memory System

Short-term + long-term recall

Tool Ecosystem

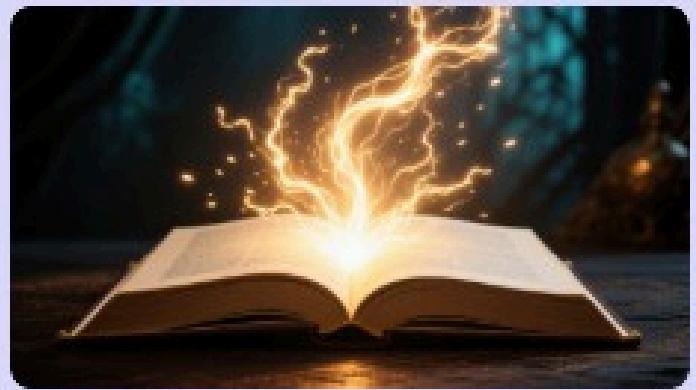
Modular capability extensions

The Agent Dream Team



⌚ Main NPC Agent

- Character embodiment & user interaction
- Personality consistency enforcement
- Perceive -> Decide -> Act -> Change World.



📘 Story Agent

- Lore & narrative context provider
- RAG-based knowledge retrieval
- Backstory integration



💻 CodeAnalyzer Agent

- Game world data expert
- C# script analysis
- Dynamic world state interpretation



● Vision Agent

- Visual scene interpreter
- Multimodal LLM analysis
- Environmental context provider

NPC Agent Deep Dive

```
{  
  "thoughts": "Internal reasoning process",  
  "response": "Character dialogue text",  
  "mood": "Current emotional state",  
  "action": "Game command to execute",  
  "animation": "Physical expression cue"  
}
```

```
SESSIONS = {  
  "session_id": {  
    "team": agent_coordinator,  
    "memory": conversation_history,  
    "mood": emotional_state,  
    "inventory": carried_items  
  }  
}
```

Critical Design Principles

Stays in character with personality tool enforcement, no factual knowledge without specialist agents, structured JSON output for game integration

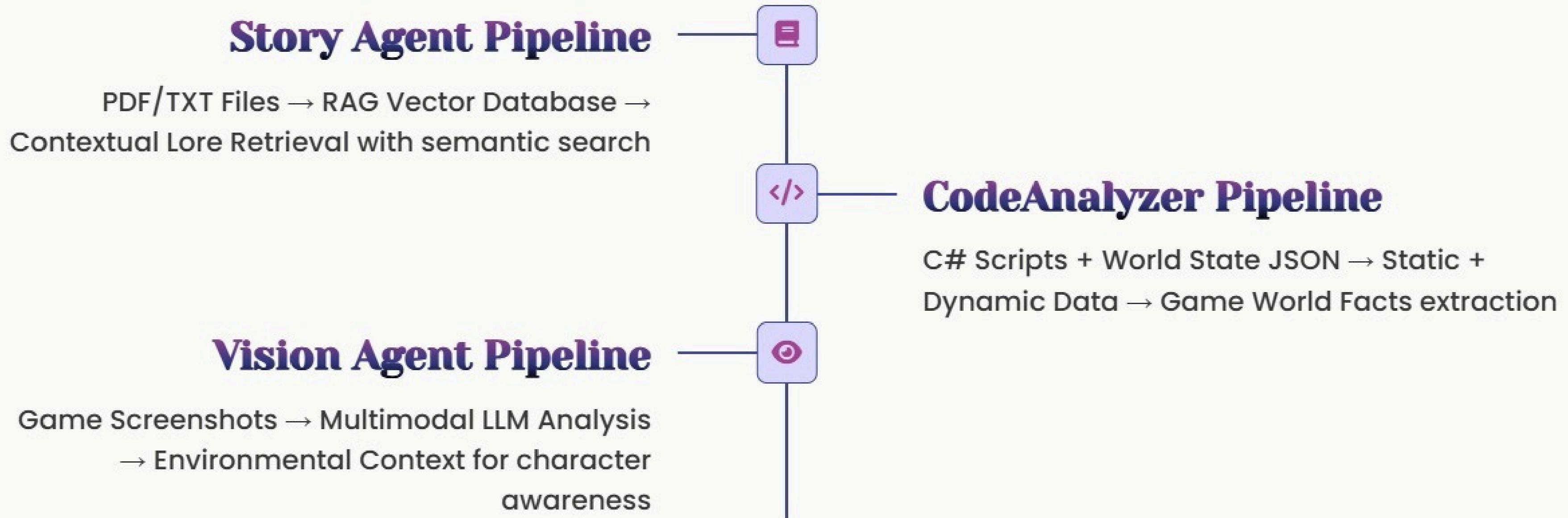
Output Format Structure

JSON format with thoughts, response, mood, action, and animation fields for seamless game engine integration

Safety Protocols

Automatic content filtering and guardrails ensure safe, appropriate character interactions

Specialist Agents in Action



Tools & Memory Ecosystem

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Tool Arsenal

Tool Arsenal

Perception, personality, memory, RAG, code analysis, and world update tools

- Real-time world event awareness & changing of world state
- Character consistency enforcement
- Conversation history recall

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Memory Systems

Memory Architecture

- Short-term session memory and long-term vector database
- Semantic search across sessions
 - Automatic save/load system
 - Persistent character states

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Knowledge Base

System Integration

Modular capability extensions with clean APIs

- Real-time WebSocket communication
- JSON-based game engine integration
- Scalable agent coordination

Backend Infrastructure

FastAPI + WebSocket real-time platform with comprehensive session management and file handling

Endpoint	Method	Purpose	Status
/ws/{session_id}	WebSocket	Real-time character interaction	Active
/initialize	POST	Character session creation	Active
/avatars	GET	Existing character management	Active
/upload	POST	File handling for stories/code/images	Active

Technical Stack & Configuration

Technology	Purpose	Model	Status
AutoGen Framework	Multi-agent coordination	Microsoft	Active
OpenRouter API	LLM provider	X-AI GROK-4	Active
ChromaDB	Vector database	RAG memory	Active
FastAPI	Web framework	Python	Active
WebSocket	Real-time communication	Bidirectional	Active

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Core AI Models

100%

System Reliability

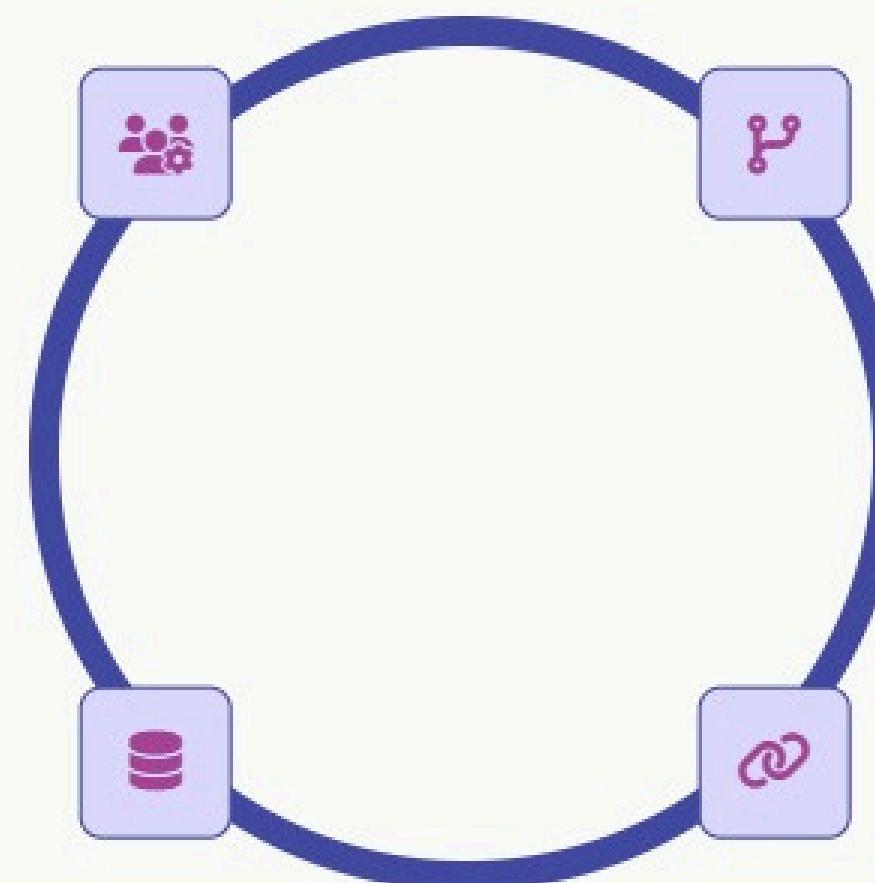
Innovation Highlights

Multi-Agent Specialization

Clear role separation prevents knowledge contamination while ensuring character authenticity and factual accuracy

Closed-loop Agency

NPC can permanently alter the game world's state using specialized tools that have lasting consequences, based on AI decisions.



Structured Output System

Game-engine ready JSON formatting with action/animation system for rich character expression

Dynamic Context Integration

Real-time mood and inventory tracking with visual + data context fusion

Future Roadmap



Short-Term (3 months)

Enhanced error handling, performance optimization, extended animation library, and improved validation systems



Medium-Term (6-12 months)

Multi-character interaction systems, advanced emotional modeling, and procedural story generation capabilities



Long-Term Vision

Full game engine integration plugins, AI-driven quest generation, and cross-game character portability

Value Proposition

For Game Developers

Modular, extensible NPC framework with reduced scripting overhead

- Dynamic character behavior system
- Reduced development complexity
- Scalable architecture
- Open-source framework

For Players

Truly immersive character interactions with persistent relationships

- Emergent storytelling possibilities
- Persistent NPC relationships
- Context-aware conversations
- Rich character depth

For the Industry

Opens new genres of interactive storytelling with reduced development costs

- Enhanced player engagement metrics
- Reduced NPC development costs
- New storytelling paradigms
- Cross-platform compatibility

Thank You For Watching

Ready to transform NPC interactions? Questions and feedback welcome!