

Samsung Prism GenAI Hackathon

2025

# *Pixel Minds*

MULTI-AGENT CHARACTER FRAMEWORK FOR IMMERSIVE GAMING



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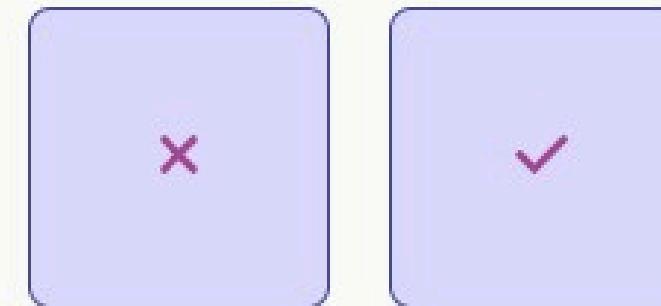


ANKUSH  
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# The NPC Immersion Problem

## 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

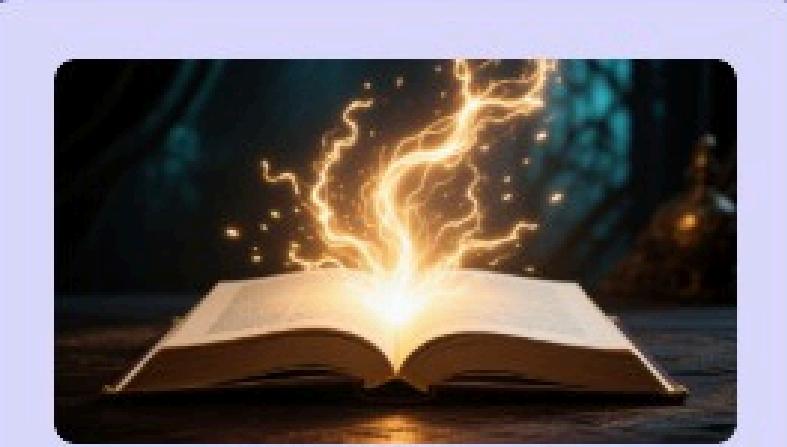
Modular capability extensions

# The Agent Dream Team



## >Main NPC Agent

- Character embodiment & user interaction
- Personality consistency enforcement
- Game engine integration



## 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

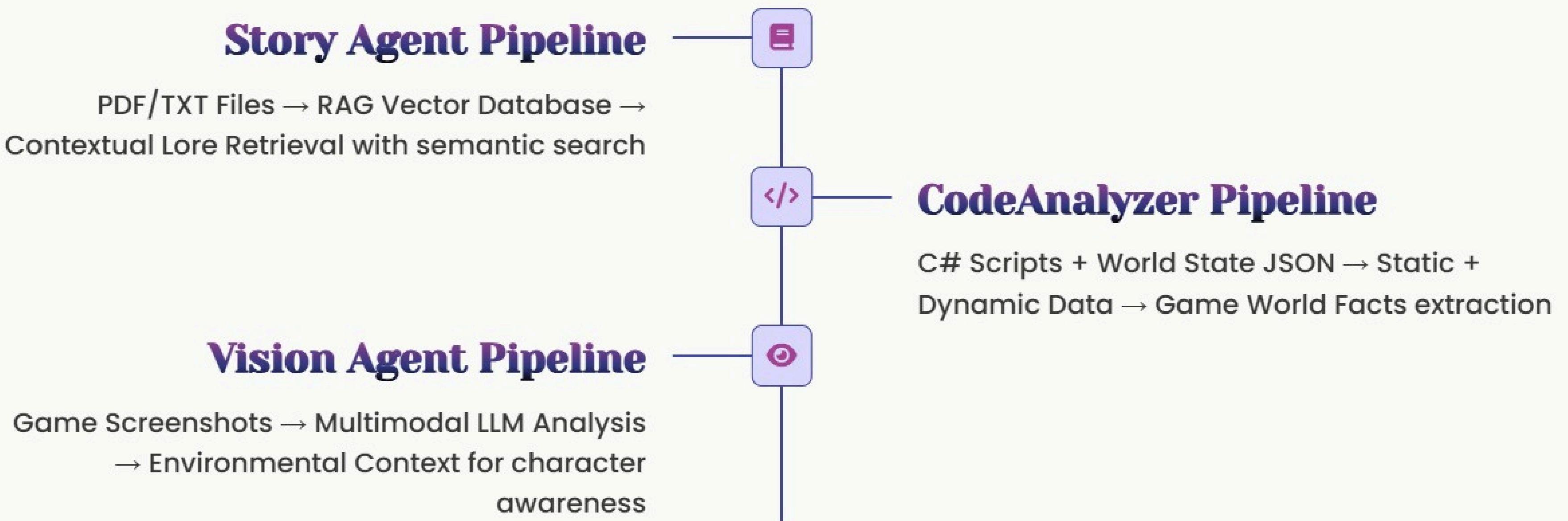
## Output Format Structure

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
- 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

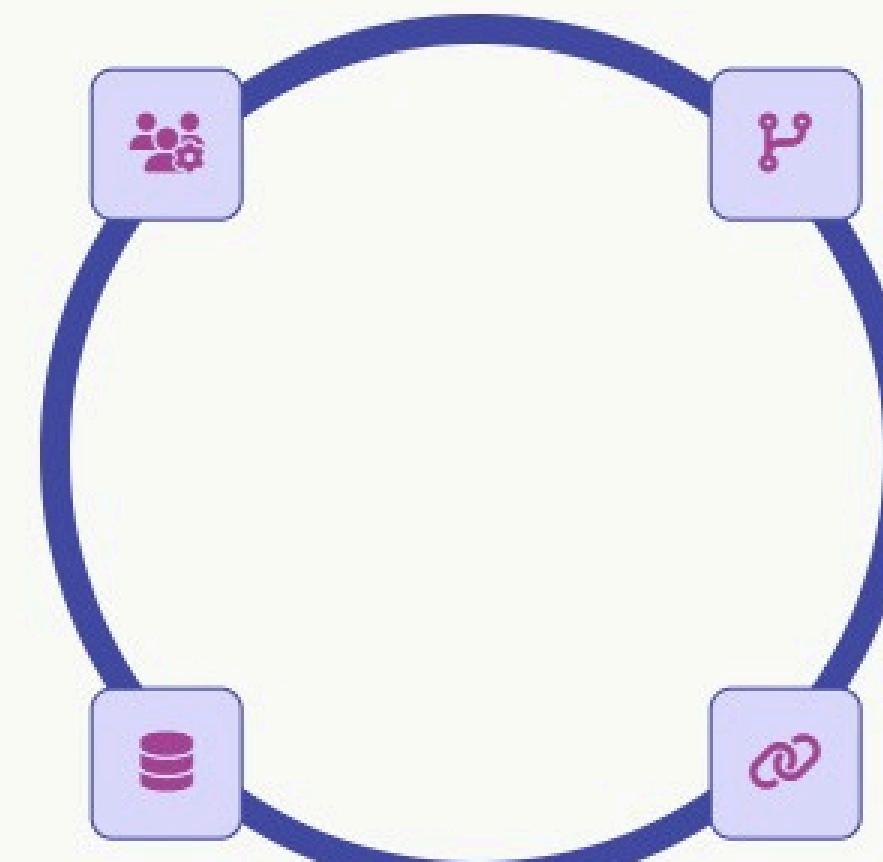
# Innovation Highlights

## Multi-Agent Specialization

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

## Robust Persistence

Complete session state management with file-based storage and automatic cleanup



## 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!**