

# Hallucination Governance and Personal IP Construction: Applied Research on Agent-Knowledge Base Collaboration in Media Content Production (Postprint)

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## Abstract

**Purpose:** The application value of large models in the news domain is becoming increasingly prominent; however, “hallucination” phenomena during text generation—including factual errors and logical inconsistencies—pose a threat to news authenticity and media credibility.

**Method:** By analyzing typical cases and underlying causes of large model “hallucinations,” this study elaborates on how the collaborative mechanism between intelligent agents and knowledge bases can mitigate such hallucinations. Using the practice of “National Business Daily” in building 20+ “super individual” IPs as a case study, the application value of intelligent agents and knowledge bases in media is expounded.

**Result:** Through mechanisms such as knowledge integration, context management, and multi-model collaboration, intelligent agents can effectively supervise and correct large model outputs, thereby enhancing the accuracy, rationality, and timeliness of generated content.

**Conclusion:** Practice demonstrates that the collaborative mechanism based on intelligent agents and knowledge bases not only strengthens the reliability of large model outputs but also generates a new paradigm for personal IP building, offering new insights for the intelligent transformation of media.

## Full Text

### Preamble

**“Hallucination” Governance and Personal IP Construction: A Study on the Collaborative Application of AI Agents and Knowledge Bases**

## in Media Content Production

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### Abstract

**[Purpose]** Large language models have demonstrated significant application value in the news domain, yet they exhibit “hallucination” phenomena during text generation, including factual errors and logical inconsistencies that threaten journalistic authenticity and media credibility. **[Method]** This paper analyzes typical cases and root causes of large model hallucinations, elucidating how the collaborative mechanism between AI agents and knowledge bases can mitigate these issues. Using the case of National Business Daily’s construction of over 20 “super-individual” IPs, we demonstrate the practical value of AI agents and knowledge bases in media applications. **[Results]** Through knowledge integration, context management, and multi-model collaboration, AI agents can effectively supervise and correct large model outputs, enhancing the accuracy, rationality, and timeliness of generated content. **[Conclusion]** Practice demonstrates that the synergistic mechanism based on AI agents and knowledge bases not only strengthens the reliability of large model outputs but also creates a new paradigm for personal IP development, providing novel insights for media intelligence transformation.

**Keywords:** Large Models; Hallucination; AI Agent; Knowledge Base; Media Application

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## 1. Hallucination Manifestations and Harms in Large Models for Media

### 1.1 Typical Manifestations of Hallucination

Large model hallucinations in news production manifest in various forms, often with strong deceptive qualities. Based on three “Large Model Evaluation Reports” published by National Business Daily in June, September, and November 2024, combined with practical newsroom observations, we have identified the following typical manifestations.

**1.1.1 Fabricating Facts or Data** Large models generate text based on probabilistic statistics without direct perception or verification capabilities regarding the real world, leading them to fabricate non-existent news events, invent interview content, or manipulate data. For instance, in the November 2024 National Business Daily Annual Large Model Evaluation Report, the evaluation team found that multiple large models added false information when writing news reports based on given materials, resulting in factual errors regarding time, location, and other details. In one case involving a news report about “Starbucks Coffee Company announcing adjustments to its China leadership structure today, with Liu Wenjuan transitioning from Co-CEO to CEO of Starbucks China effective September 30,” the evaluation team discovered that some models conflated “today” with “September 30,” generating the erroneous statement: “Starting September 30, Starbucks China announced adjustments to its leadership structure.” In another interview report, a large model inexplicably attributed the news event about “BYD and other automotive OEMs requiring suppliers to reduce prices by 10%” to the interviewee’s statements, thereby fabricating interview content.

**1.1.2 Logical Contradictions or Inconsistencies** When confronted with complex news events requiring logical reasoning, large models frequently exhibit contradictions and broken logical chains. If applied directly to news reporting, this can result in conflicting arguments within the same article or severe factual errors due to lack of rigorous logical analysis. For example, on December 18, 2024, Shenzhen Nanyue Property Appraisal Co., Ltd. received administrative penalties for providing certified data and results beyond its qualification scope. However, some large models erroneously linked this incident to a July traffic accident involving a AITO M7 vehicle in Guangzhou, generating the false logical statement that “this matter is related to the AITO M7 traffic accident.”

**1.1.3 Violating Common Sense or Ethics** Large model outputs often reflect the internal correlations within training data rather than the dynamic, rich, and comprehensive real world. The selection criteria for datasets and their core concept definitions influence generation outcomes and may suffer from reliability issues. Simultaneously, while large models can reflect a “mirror image” of the real world and explain complex logical relationships, they also map and amplify ethical issues such as discrimination and bias present in the real world, potentially impacting ethical values including human dignity, freedom, and fairness. Furthermore, large models based on Western culture and values may embed historical biases and cultural superiority within their training data. When such discriminatory, biased, or ethically problematic content is published by media outlets without review, it can trigger strong negative social impacts or conflicts.

## 1.2 Root Causes of Hallucination

Large model hallucinations are not accidental phenomena but involve multiple underlying factors across several dimensions.

**1.2.1 Data-Level Factors** The corpora required for training large models are massive but often contain biases, noise, or erroneous information. Imbalanced data distribution, as well as excessive or insufficient representation of certain topics, are “inherited” by models during training, leading to subsequent outputs of false or inaccurate content.

**1.2.2 Model-Level Factors** Current Transformer-based generative models rely heavily on training corpora and lack interpretability, making theoretical and methodological research on controlling large model safety critically important. Existing methods cannot guarantee the absence of unsafe content generation, nor does any theory definitively explain what methods can strictly ensure model safety. When models incorrectly utilize knowledge or employ erroneous knowledge, they may produce linguistically fluent responses. Without corresponding mechanisms to verify and correct information accuracy, the more powerful the model’s language capabilities, the more difficult it becomes for users to identify information accuracy risks.

**1.2.3 Lack of Knowledge and Common Sense** Large models primarily rely on statistical patterns for text generation and struggle to effectively invoke external knowledge or common sense for fact verification and judgment. Consequences include major factual errors in specialized domains such as finance, healthcare, and law, as well as outputs that violate basic human ethics and scientific common sense at the social and ethical levels.

### **1.3 Harms of Hallucination to News Communication**

The proliferation of large model hallucinations in news media inevitably produces severe consequences across several dimensions. First, it damages journalistic authenticity and objectivity—the foundational pillars of news—thereby eroding media professionalism. Second, it undermines media credibility and authority, which are built through rigorous fact-checking and professional ethics; frequent hallucinations will inevitably erode public trust. Third, it misleads public opinion and social cognition. As primary information channels, media outlets publishing erroneous content can easily guide public misunderstanding and even trigger social panic or conflict. Fourth, it amplifies the spread of false information and rumors. The high generation capacity and deceptive nature of hallucinations enable rapid and widespread dissemination of false information in cyberspace, intensifying information environment chaos and posing serious threats to social stability and cybersecurity. Research indicates that AI-generated misinformation is more persuasive than human-created false content, and generative AI systems may recycle conspiracy theories and other misinformation found on the open internet. According to NewsGuard’s report, GPT-4 is more likely than its predecessor GPT-3.5 to spread misinformation, excelling at presenting false narratives more persuasively across various formats including news articles, Twitter feeds, health rumors, and well-known conspiracy theories.

## 2. AI Agents and Knowledge Bases: Effective Approaches to Mitigating Hallucination

In recent years, the technical approach based on AI agents and knowledge bases has been recognized as an effective means to mitigate large model hallucinations by providing external knowledge constraints and fact-checking mechanisms. This section explores the functional architecture, construction methods, and collaborative working modes of AI agents and knowledge bases in resolving hallucination risks.

### 2.1 The Role of AI Agents in Mitigating Hallucination

An AI agent is a system or program that can autonomously perform tasks on behalf of users or other systems by designing workflows and utilizing available tools. Beyond natural language processing, agents possess broad capabilities including decision-making, problem-solving, environmental interaction, and action execution. Agents can be deployed across various applications to solve complex tasks in diverse environments, from software design and IT automation to code generation and conversational assistants. The core of an agent is a large language model, but while traditional LLMs generate responses based on their training data and are constrained by knowledge and reasoning limitations, agents can access up-to-date information, optimize workflows, and autonomously create subtasks to achieve complex objectives. This tool invocation can be realized without human intervention, expanding the possibilities for real-world applications of these AI systems. Over time, agents adapt to user needs, storing past human-computer interactions in memory and planning future actions.

### 2.2 The Role of Knowledge Bases in Mitigating Hallucination

In artificial intelligence, a knowledge base is a centralized system for storing and organizing information that leverages AI technologies to enhance user interaction. Traditional knowledge bases contain only content, whereas AI-driven systems go further by using machine learning, natural language processing, and other AI technologies to understand user queries, retrieve relevant information, and improve the knowledge they provide. AI knowledge bases not only store static articles or documents but also learn from user behavior and feedback, analyzing patterns in data, predicting what users might be seeking, and even suggesting new content based on gaps in existing information. This creates a more dynamic and personalized experience.

Different types of knowledge bases can be constructed based on knowledge categories. Factual knowledge bases store objective facts and data such as relationships between entities and attribute values, which can be used for fact-checking, including verifying whether entity relationships in news reports are correct. Common-sense knowledge bases store knowledge for common-sense judgment (e.g., “birds can fly,” “water flows downward” ) to detect whether large model-generated content violates common sense. Vertical domain knowl-

edge bases store specialized domain knowledge such as financial, medical, or legal knowledge. In financial media applications, vertical domain knowledge bases can be built containing news events, 人物关系 (person relationships), background knowledge, and other information for hallucination detection in relevant fields. Multimodal knowledge bases are becoming increasingly important as information containing images, videos, audio, and other formats grows and multimodal large models develop, providing more comprehensive information to help agents perform cross-modal hallucination detection.

### 2.3 Synergistic Mechanism Between AI Agents and Knowledge Bases

AI agents and knowledge bases have an inseparable relationship. By definition, possessing knowledge and decision-making capability are two fundamental characteristics of AI agents. Moreover, AI agents can only learn from the knowledge bases they possess, with higher success rates for more standardized knowledge. Recent research has found that by learning from a diverse knowledge base, AI agents can query and learn more flexibly, and the integration of external knowledge bases and databases can be used to mitigate AI hallucination problems.

The collaborative mitigation of large model hallucinations by agents and knowledge bases manifests in several aspects. First, agents provide authoritative data support for large language model outputs through knowledge base integration and verification mechanisms, fundamentally addressing hallucination issues caused by outdated knowledge and unreliable data sources. In news communication, information accuracy is paramount, yet traditional large models typically rely on static training data that cannot meet real-time update requirements. By accessing dynamic knowledge bases, agents can integrate policy documents, industry data, and authoritative reports as the basis for model-generated content. For example, in financial news, agents can extract the latest economic data or policy details from databases in real time and cross-validate them with model-generated content to ensure output accuracy and consistency. Additionally, agents support multi-source cross-verification mechanisms that identify potential errors through multi-dimensional comparison and analysis of generated content, flagging them for editor or journalist verification, thereby reducing the spread of misreporting or false information.

Second, agents possess context management and multi-task chaining capabilities that effectively mitigate hallucination issues caused by logical errors and content incoherence when large language models handle complex news tasks. In news feature reporting, journalists typically need to integrate multiple perspectives and generate content covering background analysis, data interpretation, and trend forecasting, which demands high logical consistency. Agents deconstruct complex news issues into subtasks, such as sequentially generating event backgrounds, core viewpoints, and supporting data analysis.

Third, the dynamic feedback and real-time update functions of agents significantly enhance the timeliness of large models, which is crucial for addressing

breaking news reporting. Traditional large models often cannot reflect the latest developments due to training data lag. Agents can access real-time data interfaces, 抓取 (scrape) latest information from news sources, government databases, or authoritative industry reports, and rapidly integrate it into model-generated content. For example, when policy adjustments occur in the new energy vehicle industry, agents can generate draft reports containing the latest policy interpretations and market impact analysis within minutes, while also marking dynamically updated information to remind journalists or editors to conduct secondary verification, ensuring reliability and authority of published content.

Finally, agents further enhance content generation accuracy and reliability through multi-model collaboration mechanisms, particularly in specialized domains with high professional requirements (e.g., finance, healthcare, or technology). A single large language model may fail to generate completely accurate answers due to limited knowledge coverage or insufficient reasoning ability, whereas agents can simultaneously invoke multiple large models for collaboration, compare output results, and synthesize optimal selections. For instance, in finance, agents can combine market data interpretations generated by different large models and cross-validate them with real-time economic indicators or industry analysis tools to generate more precise reporting content. This multi-model collaboration not only reduces hallucination possibilities caused by knowledge limitations of single models but also provides more comprehensive solutions for complex tasks in news communication.

#### **4. Empowering Practice: National Business Daily’ s Personal IP Construction**

As digital media flourishes, the value of personal IP has become increasingly prominent, emerging as a new focal point of media competition. However, traditional content creation and operation models rely heavily on manual labor, suffering from high costs, low efficiency, and difficulty in scaling and refined operation, making them ill-adapted to the competitive landscape of the new media era. In 2024, National Business Daily (NBD) redefined the paradigm of personal IP development by constructing AI agents and knowledge bases built on large models.

On October 8, 2024, NBD launched over 20 financial media “super-individuals,” marking another significant step forward in its all-staff IP and media intelligence transformation. These personal IPs, specializing in more than 20 financial subdomains including international politics, real estate, corporate affairs, investment, and photovoltaics, leverage AI products such as agents, knowledge bases, the “Yuyan Zhixuan” AI short-video automatic generation platform, and intelligent media asset libraries to enable a single individual to complete the entire workflow from script creation to video production and multi-platform distribution, demonstrating the powerful efficacy of AI products built on large models.

#### 4.1 Architectural Innovation: Construction and Operation Mechanism of NBD's Personal IP Agents

The construction of NBD's personal IP agents is based on large models' powerful language understanding and generation capabilities, supplemented by a collaborative operation mechanism comprising system-level prompts, knowledge bases, external tools, memory modules, and workflows. This architecture's core lies in deconstructing and reorganizing various aspects of content production and operation, achieving process automation and intelligence through AI technology.

**4.1.1 Multi-Module Collaborative Agent Architecture** NBD's personal IP agent architecture consists of several key modules. System-level prompts serve as the agent's "soul," defining AI behavior patterns, role positioning, and task objectives. Through refined prompt engineering, they guide large models to simulate professional thinking logic and expression styles in specific domains and scenarios, ensuring output professionalism and consistency. The knowledge base functions as the agent's "brain," storing structured and unstructured knowledge across various financial vertical domains. Through deep learning of massive data, the knowledge base provides solid knowledge support for content generation. In operation, the agent precisely calls relevant background information, data, and documents from the knowledge base based on creator requests to ensure generated content accuracy and depth.

External tools expand beyond the capability boundaries of current mainstream large models. NBD's personal IP agents integrate rich external tools such as search engines, database APIs, and data analysis tools. By flexibly invoking these tools, agents can obtain real-time information, process data, and execute specific operations, thereby expanding capability boundaries and enhancing task execution efficiency and accuracy. The memory module endows agents with "memory" capacity, enabling them to store and retrieve historical interaction information, including user preferences, historical tasks, and feedback results. Based on this, agents can provide more precise and coherent services according to individual user needs, achieving personalized content recommendation and interaction experiences.

Workflows serve as the agent's "action guide," defining task processes and execution logic for each content production stage. Through pre-designed workflows, agents can automatically complete a series of tasks including topic planning, material mining, manuscript writing, text review, publishing, and operation, achieving process standardization and automation.

**4.1.2 Operational Logic of Personal IP Agents** NBD's personal IP agents receive requests or tasks from IP creators such as journalists and editors as input. First, they understand task backgrounds and objectives through system-level prompts. Second, knowledge base and external tool modules are activated to provide relevant data, documents, and external capability support. The memory module reviews historical information to provide references for personalized

services. Finally, based on preset workflow designs, the agent conducts task planning and execution, continuously learning and optimizing through feedback mechanisms during operation to enhance performance and adaptability.

## **4.2 Practical Exploration: Agent Applications in NBD' s Personal IP Development**

NBD has extensively applied agent technology in developing personal IPs for journalists and editors across more than 20 subdomains including international politics, real estate, corporate affairs, investment, and photovoltaics. By constructing agents based on vertical knowledge bases and workflows, NBD has achieved automation, intelligence, and personalization of content production and operation.

**4.2.1 Deep Cultivation of Vertical Domains: Constructing Specialized Knowledge Bases** For each subdomain, NBD has constructed exclusive knowledge bases covering well-known listed companies and enterprise lists, corporate financial data and annual reports, selected research reports, industry depth reports, news media coverage, basic information on corporate brands and hot products, third-party consulting and research institution data, and competitive analysis. These knowledge bases provide solid data foundations and professional support for agents' in-depth content creation in specific domains.

**4.2.2 Refined Agent Capabilities: Multiple AI Assistants Collaborating** Based on different usage scenarios, NBD has developed multiple AI assistants with specific functions, including persona Q&A assistants, topic-finding assistants, material-digging assistants, manuscript assistants, creative-idea assistants, and learning-excellence assistants. These AI assistants achieve automated execution of specific tasks through optimized prompts, small-scale knowledge bases, and search enhancement plugins. For example, persona Q&A assistants can accurately answer user questions based on preset personal IP personas and knowledge bases, maintaining persona consistency and professionalism. Topic-finding assistants can intelligently recommend topic directions by combining industry hotspots, user interests, and knowledge base content, providing inspiration for content creation. Material-digging assistants can efficiently collect materials and information from knowledge bases and internet sources based on selected topics. Manuscript assistants can aid in manuscript writing, polishing, and editing, generating text content in different styles for various platforms and audiences. Creative-idea assistants can provide creative ideas, punchlines, and headline suggestions to enhance content appeal and dissemination power. Learning-excellence assistants can analyze competitor content, learn their strengths and successful experiences, and provide references for one' s own content creation.

**4.2.3 From Automation to Intelligence: Workflow Construction and Optimization** Initially, NBD constructed basic business workflows centered

on prompt optimization, small-scale knowledge bases, and search enhancement plugins. In the future, NBD plans to enable mutual invocation between AI assistants, combine them with large-scale knowledge bases, integrate web crawler plugins, and connect to self-selected large models to build more sophisticated and complex business workflows, achieving a leap from automation to intelligence.

### **4.3 Future Outlook: Intelligent Middle Platform Empowering “Super-Individuals”**

NBD’s practice demonstrates that the human-AI collaborative model based on agents enables every ordinary journalist and editor to become a “super-individual.” By constructing an intelligent middle platform that integrates vertical content capabilities and AI application capabilities, each editorial staff member can be equipped with multiple AI assistants, forming an exclusive agent matrix. In this model, editorial staff primarily focus on strategic work such as account operation, commercial monetization, and matrix dissemination, while tactical tasks including topic planning, material mining, idea generation, text processing, knowledge accumulation, competitor learning, audio-visual broadcasting, vertical media asset management, and generation-distribution are collaboratively completed by the agent matrix. This will greatly improve editorial staff work efficiency, enabling them to truly become “super-individuals” with full-process content production and operation capabilities under the support of the intelligent middle platform.

### **4.4 Technical Path: Balancing Open-Source and Commercial Platforms**

Agent construction requires stable and reliable technical platform support. NBD currently utilizes commercial platforms such as Coze for rapid prototyping and testing, while actively evaluating the feasibility of various open-source platforms to seek long-term stable and controllable solutions. NBD’s future technical path includes constructing business workflows that support mutual invocation between AI assistants, combining large-scale knowledge bases, integrating web crawler plugins, and connecting to outstanding domestic large models to continuously enhance agent capabilities and application scope. The practice shows that the human-AI collaborative model will propel the in-depth transformation of media intelligence.

## **5. Conclusion**

This paper focuses on the application of large language models in the media domain, particularly the challenge of “hallucination” phenomena to journalistic authenticity and credibility. It proposes and demonstrates a solution centered on AI agents and knowledge bases, especially through case analysis of NBD’s construction of an intelligent system for over 20 “super-individual” IPs, leading

to the following conclusions.

### **5.1 Constructing an Anti-Hallucination Intelligent System**

The deep integration of AI agents and knowledge bases provides a practical and effective technical path for addressing large model hallucinations. Knowledge bases inject facts and common sense into large models, external tools and real-time verification mechanisms enable models to perceive reality and correct biases, multi-model collaboration achieves complementary advantages, and dynamic updates ensure knowledge timeliness and continuous agent evolution, thereby guaranteeing the authenticity, accuracy, and reliability of generated content. Through knowledge constraints, real-time verification, multi-model collaboration, and dynamic updates, an “anti-hallucination” barrier is collectively constructed.

### **5.2 AI Agents Revolutionizing Personal IP Development Paradigms**

AI agent technology not only solves the hallucination problem of large models but also revolutionizes personal IP development paradigms. Through the collaboration of system-level prompts, knowledge bases, external tools, memory modules, and workflows, agents achieve automation, intelligence, and personalization of content production and operation. A single individual can complete the entire workflow of traditional IP development, achieving a full-chain leap in content production efficiency and effectiveness, enabling personal IPs to evolve into “super-individuals” empowered by agents.

### **5.3 Professional Knowledge Bases Constructing Vertical Barriers**

NBD’s construction of exclusive knowledge bases for over 20 subdomains is the key support for agent effectiveness. These knowledge bases not only cover corporate information, financial data, depth reports, and news coverage within industries but also integrate third-party data and competitive analysis, building profound vertical knowledge barriers. This provides solid data foundations and professional support for agents’ in-depth content creation in specific domains, ensuring the accuracy, professionalism, and authority of generated content.

### **5.4 AI Assistant Groups Building Intelligent Ecosystems**

NBD’s development of AI assistant groups based on different application scenarios achieves automation of specific tasks through refined prompt engineering, small-scale knowledge bases, and search enhancement plugins. These human-defined assistants—including persona Q&A assistants, topic-finding assistants, material-digging assistants, manuscript assistants, creative-idea assistants, and learning-excellence assistants—not only perform their respective duties but also collaborate with each other, forming a highly efficient intelligent ecosystem. In the future, constructing more sophisticated workflows to enable deep collabora-

tion between AI assistants and large-scale knowledge bases will further enhance overall agent effectiveness.

### 5.5 Human-AI Collaboration Driving In-Depth Media Intelligence Transformation

NBD' s practice demonstrates that the human-AI collaborative model based on agents represents the inevitable trend of media intelligence transformation. By constructing an intelligent middle platform that integrates vertical content capabilities and AI application capabilities, empowering every editorial staff member to become a “super-individual” will reshape media production relations and organizational structures. This strategic layout not only enhances the overall competitiveness and influence of media institutions but also leads the media industry toward an intelligent future. As AI technology continues to evolve and large model applications deepen, AI agents and knowledge bases will undoubtedly play increasingly important roles in the media domain and broader industries.

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