Cloud Platform-Driven Emergency Decision Intelligence Engineering Architecture: A Postprint

Authors: Chu Jiewang, Wang Min, Guo Chunxia

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Abstract

[Purpose/Significance] Integrating intelligence engineering thinking into cloud platform-driven emergency decision-making aims to render emergency decision-making more efficient and scientific. [Method/Process] By analyzing the requirement characteristics of emergency decision-making and introducing intelligence engineering thinking based on the engineering value model and intelligence system—namely, the three elements of "factual data," "methodological tools," and "expert wisdom"—this study constructs a cloud platform-driven emergency decision-making intelligence engineering architecture. [Result/Conclusion] The cloud platform-driven emergency decision-making intelligence engineering architecture is constructed from four aspects based on functional effects: the requirement layer (aggregating requirements and selecting information), the working layer (mining intelligence and enhancing value), the operational layer (integrating knowledge and wisdom), and the service layer (rapid response and precise services), thereby systematizing and parallelizing emergency decision-making intelligence and providing insights for the practical application of emergency decision-making.

Full Text

Preamble

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Research on Cloud Platform-Driven Emergency Decision Intelligence Engineering Architecture
Chu Jiewang, Wang Min, Guo Chunxia
School of Management, Anhui University, Hefei 230601

Abstract

[**Purpose/Significance**] This study integrates intelligence engineering thinking into cloud platform-driven emergency decision-making to enhance the efficiency and scientific rigor of emergency responses. [**Method/Process**] By analyzing the characteristic demands of emergency decision-making, we introduce intelligence engineering thinking—encompassing three core elements of "factual data," "methodological tools," and "expert wisdom"—into the engineering value model and intelligence system framework to construct a cloud platform-driven emergency decision intelligence engineering architecture. [**Result/Conclusion**] According to functional effects, the architecture comprises four layers: the requirements layer (aggregating demands and selecting information), the work layer (mining intelligence and enhancing value), the operation layer (integrating knowledge and synthesizing wisdom), and the service layer (rapid response and precise service). This engineering and parallelization of emergency decision intelligence provides practical insights for real-world emergency decision-making applications.

Keywords: cloud platform; intelligence needs; emergency incidents; emergency decision-making; intelligence engineering
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Introduction

The 13th Five-Year Plan outlines the need to improve public safety systems, comprehensively enhance workplace safety, innovate social security prevention and control mechanisms, and strengthen emergency response system development. The Chinese government has prioritized emergency management, establishing national, provincial, and municipal emergency platforms. China's emergency management "solution" has also gained international recognition, offering reference models for countries like Brazil and Ecuador. Emergency decision-making constitutes an essential component of emergency management and represents a critical focus of related research. With the advent of big data and cloud computing technologies, modernizing emergency decision-making systems and capabilities has become imperative to enhance the intelligence and professionalism of China's emergency response.

Emergency decision intelligence systems represent rapid-response frameworks, and the engineering of emergency decision intelligence marks the future direction of development. Under conditions of security threats and information uncertainty, emergency decision-making must leverage intelligence to improve governance capabilities and enhance risk perception and prevention capabilities among response entities. This study examines emergency decision-making from a cloud platform-driven perspective integrated with intelligence engineering thinking, thereby strengthening the foresight and scientific basis of emergency decision-making in China.

1.1 Research Progress on Emergency Decision-Making

International research on emergency intelligence management and services includes numerous case studies. The United States established the Disaster Information Management Resource Center (DIMRC) to support intelligence services during disaster preparedness, response, and recovery. Subsequently, the U.S. created the Information in Disaster Shelters Resource Center (IDSRC) to ensure timely intelligence support and trained professionals through specialized courses to assist intelligence services during crises. Between 2004 and 2019, nearly 80 Fusion Centers were established in the U.S. to coordinate public safety departments, law enforcement agencies, and other social organizations to enhance national public security capabilities. The United Kingdom has continuously updated its intelligence strategies, using intelligence to drive global policing reforms in the 1990s while emphasizing its role in public safety decision-making and citizen protection. In 2000, the National Criminal Intelligence Service (NCIS) released the National Intelligence Model report. In 2010, the Home Office published a community safety information sharing report, followed by the Department for Communities and Local Government's 2012 report on fire and rescue issues and checklists for emergency incidents. In 2014, the Department of Health released the "Knowledge Strategy: Harnessing the Power of Information to Improve Public Health" report.

Japan has achieved remarkable success in building efficient information network systems for emergency management and early warning response. The country implemented information disclosure policies in 2005, encouraged citizens and social organizations to provide information in 2007, and in 2014, the Public Security Commission and Coast Guard emphasized public participation in disaster prevention information collection. In 2017, the Ministry of Internal Affairs and Communications published the "Information and Communications in Japan 2017" white paper, systematically reviewing new technologies, methods, and tools for information collection, processing, and dissemination. Japan regularly organizes expert discussions on disaster prevention knowledge to propose mitigation solutions, making its emergency management system highly efficient.

In recent years, China has progressively strengthened its emergency management strategies, increasingly recognizing the importance of intelligence information. In 2006, the General Office of the State Council issued emergency management plans covering incident-related information and established an emergency information system. In 2007, China proposed building a national emergency platform system. In 2010, the National Meteorological Administration implemented a three-level (national, provincial, municipal) early warning system and information websites. In 2015, the State Council issued operational management mechanisms for emergency systems, standardizing responses to four incident types: natural disasters, public health emergencies, accidents, and social security events. In January 2017, the Emergency Management Office organized cybersecurity information sharing for multi-industry early warnings. In July 2017, the government advanced emergency platform construction to enhance information collection capabilities.

However, China has not yet established dedicated information collection departments or cultivated sufficient intelligence analysis talent. The lack of targeted emergency decision-making support results in broad but low-accuracy predictions, limiting early warning and rapid response capabilities for emergencies. During this period of rapid socioeconomic development, big data environments provide massive data for timely emergency response, but inadequate data organization creates resource and information silos, leading to information scarcity in emergency decision-making.

Chinese scholars have extensively researched the role of intelligence in emergency decision-making. Li Gang et al. [?] explored emergency decision intelligence system construction through top-level design using intelligence and business flows. Li Yang et al. [?, ?] examined the evolution of emergency decision intelligence systems, analyzed their characteristics, and introduced intelligence engineering concepts to build architectures centered on data resources, intelligence fusion, and expert wisdom. Guo Lusheng et al. [?] investigated development paradigms and elements of emergency intelligence needs from a demand perspective. Guo Hua et al. [?, ?] proposed collaborative multi-party models for intelligence-supported emergency decision systems and explored emergency management platform construction. Chu Jiewang et al. [?] analyzed intelligence support across collection, storage, processing, and dissemination stages, suggesting breakthroughs in data processing, knowledge import, and intelligence systems. Tang Xiaobo et al. [?] constructed theoretical frameworks for intelligence work elements, processes, and organizational activities based on Hall's three-dimensional structure and lifecycle theory. Zhang Jianian et al. [?] clarified the relationship between intelligence thinking and big data thinking, demonstrating how engineering thinking integrates into intelligence work through process fusion, conceptual fusion, human-technology fusion, and tool-expert wisdom fusion.

These studies highlight intelligence's prominent role in emergency decision-making and the gradual integration of intelligence engineering thinking. Research on decision intelligence systems and intelligence needs is relatively mature, with increasingly rich cloud-based library system services [?, ?]. However, few scholars have examined cloud platform-based emergency decision intelligence engineering systems. While some have discussed emergency mechanisms in cloud computing environments [?] to refine knowledge systems for emergency decision-making, these remain theoretical explorations without complete system construction. This paper investigates cloud platform-based intelligence engineering architecture for emergency decision-making to enhance process efficiency and scientific rigor through intelligence engineering thinking.

1.2 Significance of Introducing Cloud Platform-Driven Intelligence Engineering Thinking into Emergency Decision-Making

1.2.1 Relationship Between Emergency Decision-Making, Cloud Platforms, and Intelligence Engineering J. Herring posited that intelligence needs constitute the starting point and foundation of all intelligence work, while Bao Changhuo argued that needs represent the primary driver of intelligence [?]. Cloud platforms are systems built upon these needs—a system cloud composed of demands generated during emergencies—responsible for providing extensive data resources required for emergency decision-making. Intelligence engineering refers to the systematic engineering process that introduces three elements—data resources, methodological tools, and expert wisdom—to better support emergency decision-making. Emergency decision-making is driven by cloud platforms and incorporates intelligence engineering thinking to make decisions during emergencies. Intelligence engineering supports decision-making by applying engineering thinking to cloud-based demand resources, with both aspects working synergistically to serve emergency decision-making. The decision-making process acts upon cloud-driven intelligence work, with engineering thinking as the guiding philosophy, decisions as the outcome, and cloud as the driving factor. Intelligence engineering ensures the effectiveness of cloud-driven processes through systematic, human-centered, and rigorous engineering design, enabling precise alignment throughout emergency decision-making.

1.2.2 Significance of Cloud Platform-Driven Intelligence Engineering for Emergency Decision-Making In the era of information explosion, the diversity of information creates relative contradictions with intelligence knowledge, making intelligence engineering thinking a necessary trend [?]. He Defang's proposed new research paradigm of "data-driven intelligence engineering" using "cloud services" as a means has emerged. Emergencies are highly dynamic, and every decision in the response process is critical, requiring a high-quality platform to ensure flawless decision-making. Introducing cloud platform-driven intelligence engineering thinking into emergency decision-making transforms the system into a standardized, reproducible, and valuable optimal system formed through relevant experience, common sense, skills, and knowledge, thereby achieving both efficiency and quality while meeting the intrinsic requirements of combining professionalism and popularization in emergency management.

Many emergency decisions are ad-hoc, and data information serves as the fundamental guarantee. Rational and effective organization of emergency information flows is paramount—intelligence is essential for decision-making, addressing the "principal contradiction." The core value of intelligence engineering thinking lies in efficiently extracting high-quality data information and using organization, analysis, and correlation to generate decision solutions matching demands. Cloud platform-driven intelligence engineering aims to develop collaborative, systematic, data-driven, and intelligent intelligence research models for efficient emergency decision-making and innovation-driven development.

2 Value of Cloud Platform-Driven Emergency Decision Intelligence Engineering

Making precise decisions based on different demands according to emergency characteristics represents a key challenge for intelligence engineering. Emergency decision-making analyzes requirements under urgent and dynamic conditions to enhance decision effectiveness. Cloud platform data enables demand classification, and different types of cloud data can be retrieved based on needs. By quantifying data standards and establishing function models, a mathematical or statistical foundation is laid for emergency intelligence engineering modeling, enabling the construction of intelligence demand systems.

2.1 Types of Emergency Decision Intelligence Cloud Requirements

Emergency decision intelligence cloud requirements refer to intelligence needs driven by cloud platforms, highlighting rapid aggregation and efficient response capabilities. Key requirements include content, stage, and technology needs.

2.1.1 Content Cloud Requirements Public safety encompasses four categories: natural disasters, public health emergencies, accidents, and social security events, each requiring different intelligence support. Content clouds must promptly capture relevant information based on specific disaster conditions. For earthquakes, floods, or fires, content clouds can immediately identify relevant information, collect and analyze big data, select data closely related to the disaster from the content cloud, and synthesize valuable intelligence for decision-makers. This evolution involves quantitative change, qualitative-quantitative integration, and qualitative change [?], requiring content fusion based on different characteristic levels to support decision-making. Content cloud storage must define subsets for rapid data retrieval based on incident relevance.

2.1.2 Stage Cloud Requirements Emergency decision-making comprises three stages: pre-event, during-event, and post-event, each requiring different decisions. Stage clouds are established according to different emergency phases: pre-event (early warning) involves collecting information based on temporal and spatial characteristics to establish early warning systems and prepare for prevention, rescue, and material procurement; during-event (response) requires collecting extensive intelligence to understand disaster conditions and make efficient decisions; post-event (recovery) involves incident summarization, case formation, and satisfaction evaluation. Each stage requires precise, reliable, and effective intelligence, necessitating differentiated responses.

2.1.3 Technology Cloud Requirements Technology clouds are built upon advanced data technology applications in emergency management, providing rapid technical support for decision-making. Emergency intelligence requires technical integration to extract critical information from multi-dimensional, multi-granularity, and multi-scale data using parallel databases, NoSQL databases, data mining, and big data technologies. Cloud computing, mobile internet, IoT, and AI enable rapid intelligence capture and real-time data acquisition. Successful applications can be incorporated into the technology cloud for intelligent information push.

2.2 Cloud-Driven Emergency Decision Intelligence Engineering Value Model

Emergency decision-making employs non-linear thinking through collaborative organization of cloud resources in networked environments. This "matching + networked" non-linear thinking creates greater value [**?**]. Emergency intelligence supports decision-making by organizing and matching various requirements to reduce time and resource costs. Intelligence value acts on cloud platform-based emergency decision-making through value functions, with cloud computing services maximizing intelligence engineering value.

Based on the above analysis, cloud resources are quantified as independent variables in the function, with elements organically integrated to create emergency decision intelligence engineering value. The value function is described as:

$$V = V(x, y, z) \tag{1}$$

$$x = x(x_1, \dots, x_i) \tag{2}$$

$$y = y(y_1, \dots, y_j) \tag{3}$$

$$z = y(z_1, \dots, z_k) \tag{4}$$

Where V represents engineering intelligence value, x represents content cloud resources (i types), y represents stage cloud resources (j types), and z represents technology cloud resources (k types).

Independent variable x evaluates and classifies disasters based on content; y responds according to different stages (pre-event, during-event with initial, peak, and final phases, and post-event); z provides computational and integration technical services when retrieving resources. Variables x, y, and z rapidly retrieve data from the cloud based on demand, and after standardization and quantification, are input into the function to enable scientific decision-making. The intelligence value system is non-linear: when incident types, stages, and technologies are appropriately matched, value is created; otherwise, value is diminished.

The value increment from demand matching is:

$$\Delta V = V' - V_0 \tag{5}$$

$$V' = V(x, y, z, [x_\alpha, y_\beta, z_\gamma])$$

Where x_α, y_β, and z_γ represent specific requirements for content, stage, and technology clouds, respectively, with brackets [] indicating demand matching. ΔV represents the value increment from successful demand matching, V' denotes the effect of matched resources, and V_0 denotes the effect of unmatched resources.

2.3 Cloud-Driven Emergency Decision Intelligence System

Intelligence engineering represents the future direction of intelligence work, driven by a series of requirements. Identifying intelligence needs is the foundation and starting point of intelligence engineering and constitutes a critical component [**?**]. Emergencies are dynamic, urgent, and dangerous. Emergency organizations struggle to make correct decisions within limited timeframes, generating substantial information needs. Failure to properly recognize and satisfy these needs significantly impacts emergency decision-making and may trigger cascading incidents. Therefore, establishing a precise, effective, and rapid cloud-driven intelligence requirement identification system is essential for accurate emergency decision-making.

3 Cloud Platform-Driven Emergency Decision Intelligence Engineering Construction

Intelligence engineering applies engineering thinking to intelligence work, using various engineering techniques to design, develop, and implement new intelligence services to solve problems creatively. Based on cloud platform-driven intelligence decision-making requirements, the engineering emergency decision-making mindset integrates three elements—"data resources," "methodological tools," and "expert wisdom"—to construct the emergency decision intelligence engineering architecture [Figure 3: see original paper].

3.1 Data Resources

Big data is crucial for smart emergency management. Emergencies involve numerous unknown factors, creating severe decision-making environments. Traditional collection and analysis methods are inadequate for massive data volumes, necessitating efficient, precise demand processing, heterogeneous data integration, data correlation, and value aggregation. Emergency intelligence requires collecting highly relevant data resources and derived information (online public opinion, interpersonal communication, etc.), categorized into: (1) static data resources, including geographic information, emergency archives, and knowledge bases; and (2) dynamic data resources, including damage assessment reports, emergency material data, rescue teams, and online public opinion. These diverse and complex data resources require deep integration according to intelligence engineering principles before application.

3.2 Methodological Tools

Information technology and analytical algorithms are focal points and developmental weaknesses in the intelligence field. In the IT era, focus has shifted from "T" (technology) to "I" (information), making information content processing increasingly critical. In emergency decision intelligence engineering, processing collected data through content handling, fragmented association, knowledge extraction, and formalization constitutes the main workflow. Data collection uses web crawlers, sensors, and Agent technology; data storage and integration employs REST and NoSQL databases; data analysis utilizes Spark for offline processing and Storm for real-time analysis. Implementation relies on cloud services, mobile applications, and Web technologies. The intelligence field emphasizes R&D investment in data technologies, attracting interdisciplinary talent to develop cloud-suitable tools using engineering thinking. Intelligence analysis methods and tools become combinable and configurable like standard screws and nuts to accomplish complex tasks.

3.3 Expert Wisdom

Emergency decision intelligence requires not only factual data and methodological tools but also high-level domain expert wisdom. Experts possess solid theoretical foundations and practical knowledge, demonstrating keen insight, professional judgment, and precise decision-making capabilities for emergency response. Experts provide knowledge for emergency knowledge bases, extract critical intelligence, and prioritize intelligence needs [?]. Emergency intelligence demands integrate wisdom from emergency domain experts, data scientists, information management specialists, intelligence experts, and technical experts to form a networked collaborative open system. This enables advanced emergency intelligence groups to receive relevant information via mobile devices for rapid, effective decision-making during emergencies. Selecting information, acquiring expert knowledge, and coordinating expert wisdom constitute major engineering efforts. Under intelligence engineering thinking, collaborative participation of expert group wisdom becomes particularly important for maximizing effectiveness in emergency decision-making systems.

4 Cloud Platform-Driven Emergency Decision Intelligence Engineering Implementation

The rapid response implementation architecture requires solid data foundations, mature processing technologies, and scientific analysis methods. The emergency function constructs an intelligence value chain across four layers—requirements, work, operation, and service—enabling emergency intelligence engineering to achieve specialized refinement: (1) aggregating demands and selecting information; (2) mining intelligence and enhancing value; (3) integrating knowledge and synthesizing wisdom; (4) rapid response and precise service. Under the 联动 (interactive coordination) of these four architectures, intelligence engineering forms a full-lifecycle emergency intelligence engineering architecture driven by the intelligence requirement system, incorporating engineering thinking according to intelligence workflows. This embodies the requirement of combining professionalism and popularization in emergency management. With intelligence engineering thinking as the core, mechanism architecture as the linkage, intelligence technology as external support, and continuously enriched cloud resources, cloud platform-driven emergency decision intelligence engineering construction becomes increasingly feasible [Figure 4: see original paper].

4.1 Requirements Layer Architecture: Aggregating Demands and Selecting Information

The CIA has noted that user needs are the primary driver, with intelligence activities centered on achieving interaction with decision-making departments [**?**]. Intelligence generation is driven by requirements. Cloud platform data is standardized and quantified as function variables, forming intelligence requirements that act on emergency decision-making. Within the interactive system of content, stage, and technology clouds, user-demanded data resources can be retrieved anytime. Function calculations identify optimal paths, reducing data retrieval time. Relevant cases, experiences, materials, and tacit knowledge can be transformed into explicit knowledge in the cloud, continuously expanding resources to support intelligence formation. The requirements layer filters valuable information from massive demands, eliminates invalid needs, prioritizes genuine requirements, and forms the foundational architecture of intelligence engineering.

4.2 Work Layer Architecture: Mining Intelligence and Enhancing Value

Valuable intelligence emerges through intelligence work processes: collection, analysis, utilization, and tracking. Intelligence value lies in post-application effectiveness, making the work layer support the entire decision-making process to maximize value. Cloud platforms serve as the foundation, with each work layer level operating via cloud platforms. Intelligence collection, analysis, utilization, and tracking are all traceable in the cloud, with new solutions uploaded immediately for knowledge sharing and expert validation.

4.2.1 Intelligence Collection Intelligence collection forms the foundation of emergency decision intelligence engineering. It requires gathering real-time data, network data, and think tank data generated during emergencies, supported by big data technologies. Tools like software trains, Octoparse, Jisouke, and Octoparse enable comprehensive data collection. Cloud platforms and value function models enhance collection efficiency and targeting. After emergencies occur, intelligent collection methods automatically categorize massive, heterogeneous, fragmented data resources, reducing operational time costs.

4.2.2 Intelligence Analysis Intelligence analysis serves as the intermediate link. Analysis departments conduct preliminary integration of collected data and use software (SPSS, JMP, etc.) for information analysis. Emergency intelligence analysis requires sensitivity and speed. Specialized technical departments should employ intelligent analytical methods for deeper information transformation and organization. Intelligent analysis achieves higher-level indexing, classification, conversion, and elimination, using ontology, metadata, and semantic web technologies to organize networked and digital resources more clearly.

4.2.3 Intelligence Utilization Intelligence collection and analysis enable utilization—the crucial link in emergency decision-making. Utilization involves obtaining effective intelligence for decision-making based on collected and analyzed information. Dedicated personnel must manage intelligence precisely, with efficient and fine-grained intelligence chain connections ensuring correct decisions. Intelligence utilization provides decision-making basis through: (1) all-source information identification and monitoring with priority-based warning reports; (2) real-time intelligence-based allocation of materials, equipment, and personnel for comprehensive disaster coordination, improving utilization rates.

4.2.4 Intelligence Tracking Intelligence tracking ensures full participation throughout emergency decision-making processes, enabling high-energy pre-event warnings, efficient during-event responses, and high-speed post-event consolidation. The real-time dynamic nature of emergencies demands precise, rapid decisions, requiring information 畅通 (unimpeded flow) to minimize decision-induced losses. Decisions may require modification when unexpected situations arise, necessitating real-time intelligence tracking and cloud computing processing technologies for precise alignment. The entire process concludes with summary and evaluation, reconstructing and updating the system based on the emergency response to optimize knowledge bases and improve workflow effectiveness.

4.3 Operation Layer Architecture: Integrating Knowledge and Synthesizing Wisdom

The operation layer functions within a three-dimensional environment of organization, system, and patent. Organization is the core, system provides guarantee, and patent enables expansion. The operation layer works based on the requirements and work layers, using value intelligence obtained from the work layer to proceed.

4.3.1 Engineering Organization Emergency decision-making subjects include government agencies, enterprises, and the public, forming the organizational system of cloud platform intelligence engineering. Future emergency management subjects will also include intelligent robots and systems. During emergency response, decision-making is central, with subjects as the core. Subjects can be categorized by type (government, intelligence units, market enterprises, social organizations), professional field (environmental protection, medical health, traffic safety, material management), and management level (national, provincial, municipal, county). The organizational engineering architecture must align closely with cloud platform demands to develop institutional frameworks and train corresponding intelligence personnel, maintaining effective collaborative networks within dynamic structures.

4.3.2 Engineering System The system architecture combines physical and virtual systems, requiring coordination among government, emergency, social, and simulation systems for comprehensive cloud platform intelligence engineering 联动 (linkage). Emergency decision-making leverages intelligence agencies as consultants, integrating multi-party resources to build innovation service platforms for government, enterprises, and society. Each entity performs its duties within legal frameworks to ensure professional decision-making. System architecture linkage enables inter-departmental communication, breaks institutional barriers, ensures rapid emergency response, and achieves relative information openness.

4.3.3 Engineering Patents Patent intelligence provides important technical and methodological guidance for intelligence engineering, enhancing overall robustness and innovation. Patent intelligence can effectively save costs and materials while reducing emergency decision response time [**?**] and precisely tracking specialized intelligence needs [**?**]. Emergency decision intelligence engineering must develop proprietary products based on existing technologies and methods, leveraging patent intelligence sensitivity to enrich cloud systems. The patent engineering architecture establishes specialized patent databases through R&D, application, and utilization phases, providing better capacity for open innovation in emergency decision engineering.

4.4 Service Layer Architecture: Rapid Response and Precise Service

The "data resources + methodological tools + expert wisdom" paradigm guides emergency decision-making, ensuring systematic intelligence services. Based on the requirements, work, and operation layers, the service layer integrates intelligence resources and engineering thinking to construct an architecture that meets emergency decision-making needs and forms optimal decision chains. Cloud platforms inherently provide services, with the service layer extending business operations. The requirements, work, and operation layers all serve the service layer to formulate optimal emergency decisions.

In the era of innovation development, intelligent technologies such as knowledge mining, AI, deep learning, and semantic reasoning impose higher requirements on emergency decision intelligence engineering. Intelligence resource construction must incorporate semantic web and knowledge mining solutions to enhance architecture intelligence—rapidly achievable on cloud platforms. The intelligence engineering architecture evolves toward stronger integration, systematicity, and functionality.

The entire chain operates with high efficiency and precise alignment: the requirements layer extracts corresponding data resources from the cloud platform; the work layer rapidly captures valuable intelligence; the operation layer evaluates decisions based on cloud knowledge feasibility; and the service layer conducts services through cloud distribution centers. The four architectures are both intersecting and clearly divided, layer-by-layer aligned to better formulate emergency solutions, making the cloud platform-driven emergency decision intelligence engineering architecture systematically complete and highly efficient.

Conclusion

China experiences frequent emergencies that pose significant hazards to socioeconomic and humanistic value development. This study analyzed intelligence decision-making cloud platforms from an intelligence demand perspective, advancing emergency decision intelligence engineering architecture construction through the "factual data + methodological tools + expert wisdom" paradigm. However, emergency decision intelligence engineering is a complex undertaking involving diverse environmental backgrounds, subjects, cultures, and operational mechanisms. Faced with variable and difficult-to-control scenarios, further verification and improvement are needed, balancing theory and practice while integrating humanities and technology. Security intelligence and defense intelligence also constitute important focuses for intelligence engineering construction, requiring consideration of relevant factors to build and perfect the intelligence engineering "macro-system."

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Author Contributions

Chu Jiewang: Research framework design and guidance;
Wang Min: Data collection, paper writing and revision;
Guo Chunxia: Topic selection and final paper revision guidance.

Research on the Architecture of Emergency Decision Intelligence Engineering Driven by Cloud Platform

Chu Jiewang, Wang Min, Guo Chunxia
School of Management, Anhui University, Hefei 230601

Abstract: [Purpose/significance] The use of intelligence engineering thinking in cloud platform-driven emergency decision-making aims to make emergency decision-making more efficient and scientific. [Method/process] The paper analyzes the characteristics of emergency decision-making requirements, introduces intelligence engineering thinking—comprising three elements of "factual data," "methodological tools," and "expert wisdom"—based on engineering value models and intelligence systems, and constructs a cloud platform-driven emergency decision intelligence engineering architecture. [Result/conclusion] According to functional effects, the architecture is constructed from four aspects: the requirements layer (aggregating requirements, selecting information), the work layer (mining intelligence, enhancing value), the operation layer (integrating knowledge, synthesizing wisdom), and the service layer (rapid response, precise service). This enables the engineering and parallelization of emergency decision intelligence, providing practical ideas for emergency decision-making applications.

Keywords: cloud platform; intelligence needs; emergency; emergency decisions; intelligence engineering

Note: Figure translations are in progress. See original paper for figures.