

# Summary of Research on Artificial Intelligence Innovation and Digital Rural Construction in the Yellow River Basin

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**Abstract:** In the "Outline of Ecological Protection and High quality Development Plan for the Yellow River Basin" approved at the 2020 conference, innovative concepts are integrated throughout the entire process, and the development of the Yellow River Basin will collide with innovation to create new sparks. This article systematically reviews the current research on digital rural construction and explores the relationship between artificial intelligence innovation and digital rural construction. Based on the research on relevant issues in the Yellow River Basin, it is pointed out that in the future, more attention should be paid to the coupling and coordination relationship between artificial intelligence innovation and digital rural construction in the basin.

**Keywords:** Yellow River Basin; Digital countryside; Artificial intelligence innovation

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## 1. The internal definition of digital rural construction

The construction of digital countryside is a new and inevitable product in the era of digital economy. According to the research of Shen Feiwei et al. <sup>[1]</sup> the connotation of digital rural construction can be defined as the organic coordination and integration of digital production, digital life, digital ecology, and digital governance in rural areas through the rational use of networks, information, technology, and talent resources. From the perspective of connotation, the construction of digital countryside includes two layers of meaning: "digital countryside" and "construction". Among them, "digital countryside" indicates that digitization, networking, and informatization should be integrated throughout the development of rural areas during the construction process; "Construction" requires digital transformation between economy, population, ecology, and resources, in order to achieve maximum rational utilization. Digital countryside is a high-quality strategic choice for the modernization and transformation of digital agriculture and rural areas in the era of digital economy.

## 2. Research on the Impact of Artificial Intelligence Innovation on Rural Digital Transformation

The relationship between artificial intelligence and human beings is becoming increasingly inseparable. Under the urging of the digital economy era, the modernization of rural agriculture has further promoted the trend of artificial intelligence going to the countryside, especially in the digital transformation of rural areas, which holds a crucial position. Currently, there are relatively few research results on the impact of artificial intelligence innovation on rural digital transformation both domestically and internationally. Most of the literature focuses on the role and impact of artificial intelligence innovation on regional transformation, mainly reflected in the following aspects:

### 2.1 The impact of artificial intelligence innovation on rural economy

In the development of digital rural areas, artificial intelligence innovation can closely adhere to the core content of digital rural areas. By innovating production methods, production technologies, and production tools, it forces labor to transform towards modern farmers through self innovation, self-learning, and self progress, driving high-quality development of rural economy and accelerating the transformation of rural economy. For example, Guo Chaoxian et al. <sup>[2]</sup> found through their research on "digital+" that the integration of artificial intelligence innovation with agriculture vertically and horizontally can promote the development of rural economy; Li Qiang <sup>[3]</sup> used panel data analysis and found that artificial intelligence innovation has become a new driving force for economic development and promoted the generation of new driving forces, forming a dual cycle model of artificial intelligence innovation promoting economic development and further promoting artificial intelligence innovation in economic development.

### 2.2 The impact of artificial intelligence innovation on rural community governance

In terms of rural governance, artificial intelligence mainly innovates in two aspects: artificial intelligence technology and management models, directly and indirectly supervises and manages rural communities or organizations, establishes a smart network culture, and reshapes the new structure of community governance. For example, Deng Song et al. <sup>[4]</sup> used case analysis and system model analysis methods to ana-

lyze the national digital rural pilot project in Yunnan Province. The construction of internal and external troubled rural areas can be innovated through artificial intelligence, and the construction of internal and external worried rural areas can be embedded with digital technology to achieve a transformation of grassroots community governance models; Niu Yaohong<sup>[5]</sup> summarized that Internet self-organizing small groups play a key role in the process of introducing AI innovation into rural community governance through field research in western villages.

### 2.3 The impact of artificial intelligence innovation on rural ecological design

In terms of rural ecological design, a large amount of research has proven that artificial intelligence innovation can quickly integrate multiple solutions through a large amount of digital information on the network, improve the problem of improper allocation of rural ecological design resources, and accelerate the transformation and upgrading towards resource conservation and green new ecological design models. For example, Cao Shengsheng's<sup>[6]</sup> research found that incorporating new technologies into rural ecological design through artificial intelligence innovation can improve the problem of scattered and difficult integration of various community elements in traditional design, and can effectively promote the integration and complementarity of urban and rural technical data, promoting the digital transformation of rural ecological protection. Wei Cheng et al.<sup>[7]</sup> comprehensively analyzed various scenarios and concluded that artificial intelligence mainly leads to regional design changes by promoting the transformation of structural networking and the extension of form virtualization.

## 3. Artificial Intelligence Innovation and Digital Rural Construction in the Yellow River Basin

Li Yuan<sup>[8]</sup> pointed out that the construction of the Digital Yellow River will become an important support for China to achieve high-quality regional economic layout. In the context of rural revitalization, the digital transformation of river basins should start from rural areas.

### 3.1 Research on Digital Rural Construction in the Yellow River Basin

The inadequate rural infrastructure and insufficient endogenous driving force have become a key constraint on the high-quality development of the Yellow River Basin. The Yellow River Basin must be revitalized in order to become a happy river that benefits the people. Therefore, the construction of digital rural areas in the Yellow River Basin has become a key issue that scholars are currently focusing on. For example, Zhang Yuqi et al.<sup>[9]</sup> found that spatial heterogeneity is an obvious weakness of the Yellow River by comparing the upper, middle, and lower reaches of the region in space. Based on this, they proposed to accelerate the process of digital rural construction, achieve digital connections in the watershed space, and take advantage of the convenience of the digital economy; Dou Yixin<sup>[10]</sup> proposed to promote the digital transformation of the Yellow River Basin by developing the digital economy and implementing various digital projects.

### 3.2 Research on Artificial Intelligence Innovation in the Yellow River Basin

Based on the evaluation of China's artificial intelligence innovation level by domestic and foreign experts and scholars, it can be found that there is a serious imbalance in the spatial distribution of artificial intelligence innovation level in the Yellow River Basin. For example, Kuang Xianglin<sup>[11]</sup> analyzed panel data from 30 provinces and found that the level of artificial intelligence innovation in the upper reaches of the Yellow River Basin is relatively low, followed by the middle reaches, while the level of artificial innovation in the lower reaches is higher; Zhou Chen<sup>[12]</sup> studied the coupling relationship between financing ecology and artificial intelligence innovation capability, and found that the coordination between the two fluctuates greatly in the Yellow River section, which is speculated to be related to the large span of regional financing differences; Wang Jun<sup>[13]</sup> believes that the limitations of artificial intelligence innovation in the Yellow River Basin are related to resource conditions, socio-economic development, and industrial composition.

### 3.3 Collaborative research on artificial intelligence innovation and digital rural construction in the Yellow River Basin

Artificial intelligence innovation serves as a new driving force for the digital economy, and the construction of digital villages also relies on the assistance of artificial intelligence innovation. The construction of digital villages, in turn, serves as a guiding principle for artificial intelligence innovation, which can drive the progress of artificial intelligence innovation. For the Yellow River Basin, artificial intelligence innovation empowering digital rural construction has become a new driving force for the current digital transformation of the Yellow River Basin. At the same time, domestic and foreign experts have studied the relationship between artificial intelligence innovation and digital rural construction in the basin. For example, Zhang Jinliang et al.<sup>[14]</sup> believe that digital transformation is a new driving force for high-quality development in the Yellow River Basin. They propose to use artificial intelligence innovation to promote the overall goal of achieving digital scenes, intelligent simulation, and precise decision-making, in order to achieve the construction of digital rural areas in the Yellow River Basin.

## 4. Conclusion

Through the review of research on artificial intelligence innovation and digital rural construction in the Yellow River Basin, it can be found that there are still many research areas in the current research. Firstly, existing literature has focused less on the application of artificial intelligence innovation in rural digital transformation scenarios; The second is based on the urgent need for the construction of the Smart Yellow River. In the future, it is necessary to deeply explore the coupling and coordination laws and influencing factors between artificial intel-

ligence innovation and digital rural construction in the Yellow River Basin, in order to obtain a path suitable for the relative advantages of digital transformation in the Yellow River Basin.

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