Platform Algorithm Discrimination, Distorted Working Hours and Legal Regulation: A Governance Framework of Risk Grading and Algorithm Accountability

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Abstract: This study centres on the distorted impact of platform algorithmic management on workers' hours in the digital economy, unravelling the mechanisms of algorithmic discrimination and its legal challenges. By devising a "task-driven - cognitive – feedback" model and employing legal text analysis, case analysis, and comparative studies, it finds that algorithmic management, through data bias, black-box decisions, and feedback loops, breaches workers' equal employment rights in three dimensions: access, process, and outcome. Empirical evidence indicates that algorithms employ dynamic pricing, credit penalties, and reduced working hours, resulting in excessive daily working hours and significant distortions in working time allocation. The current labour legal system shows structural flaws like norm failure, rule lag, and redress weakness when tackling algorithmic control, especially in standard working hours, special-hour approval, and technical evidence-based disputes.

Drawing on the EU's "risk-based" governance and the US's "algorithmic accountability", this study proposes a combined regulatory framework of "risk-based + algorithmic accountability", suggesting improving working hour rules, instituting algorithmic filing and review, adjusting the burden of proof, and strengthening inter-departmental regulation to balance technical efficiency and labour equity. This research innovatively links algorithmic transparency with digital labour rights protection, offering theoretical and practical insights into China's digital labour legal system and being globally algorithmically governance-relevant.

Keywords: Algorithmic Discrimination; Working Hours; Legal Regulation; Labor Rights; Platform Economy

1 Introduction

1.1 Background to the study

The wave of digitisation has profoundly reconfigured the traditional industrial landscape, and the deep integration of the digital ecosystem with the real economy has given rise to diversified new employment models. In the field of local life services, intelligent scheduling systems have given rise to flexible employment patterns such as instant delivery and shared travel, which have not only broadened employment channels but also reshaped the operating mechanism of the labour market. Taking Meituan Takeaway as an example, its intelligent scheduling algorithm builds a multi-dimensional order allocation model by integrating dynamic parameters such as merchants' delivery speed, riders' real-time location, road congestion index, etc. This technology-driven operation mode has brought new management challenges while improving the delivery time.

The limitations of the algorithmic management system gradually appear in practice. The dimensional deviation of data collection easily leads to the lack of characterisation of specific groups of workers (e.g. middle-aged and senior practitioners, new riders) in the algorithmic portrait, and this data one-sidedness directly affects the training effect of the model. Through field research, it was found that when the algorithm system overly relies on single-dimensional indicators such as historical order volume and user ratings, it is often difficult to accurately reflect the true value of the rider's labour in scenarios such as coping with inclement weather and dealing with complex road conditions. This technical deficiency creates a structural disadvantage for workers with highly fluctuating ratings in the order allocation priority and salary calculation system.

Research data shows that more than 60% of platform practitioners question the fairness of task allocation, and this questioning is particularly significant when there is a surge in bad weather orders. A tracking study of a group of riders in a provincial capital city showed that nearly 40% of the respondents had an average daily working time of more than 14 hours, with the accident rate during nighttime delivery hours rising 2.3 times compared to daytime. This high-intensity labour pattern not only exacerbates occupational health risks but also gives rise to new types of labour disputes. For example, the algorithmic system attributes the responsibility for delivery overtime entirely to the rider, and the success rate of complaints is less than 15%. These phenomena expose the institutional deficiencies of the algorithmic management mechanism in the protection of labour rights and interests, and there is an urgent need to establish a governance framework that synergises technological ethics and legal regulation.

1.2 Purpose and significance of the study

Against the backdrop of the rapid development of the digital economy, the discriminatory practices derived from the algorithmic management system widely used by platform enterprises are profoundly reconfiguring the pattern of workers' working hours. To reveal the transmission mechanism of this impact, this study systematically explains the path of platform algorithmic discrimination on workers' working hours by combing domestic and international legislative norms and analysing typical cases. At the level of empirical analysis, special attention is paid to the coupling mechanism between task assignment algorithms and performance evaluation systems, focusing on the interaction between the logic of work quota setting and algorithmic fairness perceptions on the working hours of workers. Combined with the institutional gaps in algorithmic governance in China's current legal system, an algorithmic audit framework that integrates the regulatory principles of the EU's Artificial Intelligence Act with local labour protection needs is innovatively proposed in an attempt to construct a hierarchical regulatory system with dynamic adaptability.

This study expands the research paradigm of labour rights protection in the digital era from the dimensions of doctrinal innovation and institutional construction. In the theoretical dimension, deconstructing the power operation mode in the algorithmic black box opens up an innovative path for the cross-study of labour law theory and algorithmic justice theory. From the practical dimension, the regulatory strategies refined based on empirical data not only provide decision support for labour inspection departments but also help guide platform enterprises to establish ethical algorithmic development standards, thus building a collaborative governance mechanism with multi-party participation in the digital labour market. These findings are of great value in balancing technological efficiency and labour fairness and provide theoretical support and practical guidance for building an algorithmic governance system with Chinese characteristics.

1.3 Review of national and international literature

The increasing prominence of platform algorithmic discrimination is triggering sustained attention from the academic community, and its interdisciplinary research characteristics are particularly significant in the

field of labour law. The research focus of the labour law community has been extended from the traditional 'subordination' theory to the digital labour relationship, and Yang Chengyue (2018), a labour law scholar in China, based on the innovative interpretation of Article 3 of the Labour Law, revealed the 'digital subordination relationship' constructed by the platform enterprises through the behavioural data portrait and dynamic scoring mechanism. Subordination", is a new form of control that breaks through the boundaries of the identification of traditional labour relations. It is noteworthy that Zhang Ruiyu's (2024) latest study cuts into the dimension of the amendment of the Labour Contract Law to deeply analyse the systematic erosion of the algorithmic evaluation system on the equal employment rights of workers, and its argumentation path provides an operable standard for the determination of platform algorithmic discrimination in judicial practice.

In recent years, academic attention has increasingly focused on working hours issues within the platform economy. Regarding the definition of working hours, Wang Quanxing (2022) thoroughly examined the legal nature and calculation challenges of "fragmented working time," arguing that time mandated by platforms for online presence or standby should be included in "actual working time." Meanwhile, Dong Baohua (2023) analyzed the functional breakdown of traditional "standard working hour systems" under algorithmic scheduling from the perspective of labor standards law applicability. Internationally, De Stefano & Aloisi (2022), while examining algorithmic management's impact on collective rights, highlighted mechanisms where algorithms implicitly deprive workers of their right to rest and health by compressing task durations. These studies form the theoretical foundation for this paper's analysis of systemic failures in current working hours regulation, underscoring the urgency of establishing working hours recognition rules adapted to the characteristics of digital labor.

The EU study shows that West (2019) constructs a three-dimensional review framework of algorithmic transparency, interpretability and accountability using the 'right to object to automated decision-making' established in Article 22 of the EU General Data Protection Regulation, which is a groundbreaking study that provides an important reference for the judicial regulation of algorithmic decision-making. The research in the United States is also enlightening, Noble (2018) by deconstructing the black box of algorithm operation, exposed the hidden 'structural bias' in the process of code writing, this technical discrimination mechanism essentially violates the principle of equal protection established by Title VII of the U.S. Civil Rights Act. These theoretical results for China's 'personal information protection law,' Article 24 of the 'algorithmic interpretation' of the judicial application of the foundation of jurisprudence, also suggests that the digital age anti-discrimination legal system needs to be from the entity norms to the urgency of the transformation of algorithmic governance.

China's legal normative system has initially established a basic control framework for platform data use and algorithmic application. The Personal Information Protection Law and the Administrative Provisions on Algorithmic Recommendation of Internet Information Services make provisions on the principles of personal information protection, the obligations of data processors, and the norms of algorithmic recommendation services, respectively.

In-depth research shows that the synergistic governance framework constructed by the EU through the General Data Protection Regulation (GDPR) and the Artificial Intelligence Act has demonstrated unique legislative value in the field of curbing algorithmic discrimination on platforms. The relevant legislation not only systematically builds a system of data subjects' rights, including the right to know, the right of access and the right of correction, but also innovatively establishes the dual regulatory standards of algorithmic transparency and interpretability. This rights-responsibility regulatory path makes it necessary

for algorithm developers and operators to assume the corresponding social responsibility in the process of technology application, significantly reducing the potential risk of discriminatory algorithmic decisions. What is particularly noteworthy is that the framework continuously optimises the technical ethical norms through a dynamic amendment mechanism, transforming abstract legal principles into operable technical compliance requirements, and providing a model of institutional innovation for global digital governance.

1.4 Research content and methodology

In this study, we focus on the regulation mechanisms of algorithmic management models on workers' working hours in digital workplace scenarios and try to reveal the complex relationship between technological governance and labour rights and interests. By constructing a two-dimensional theoretical model of 'task-driven-cognitive feedback', we find that there is a significant positive correlation between the scale of task allocation on platforms and the number of working hours, and that subjective cognitive bias on the fairness of algorithms will trigger compensatory labour behaviours. At the methodological level, we innovatively adopt the deep deconstruction of legal texts and cross-validation of typical platform cases to systematically analyse the dilemmas and paradoxes of workers' rights and interests protection under the logic of algorithmic decision-making. This hybrid research path not only breaks through the analytical framework of traditional labour research but also reveals the hidden power operation mechanism in algorithmic management practice.

1.4.1 Empirical Data and Model Construction

This study employs a mixed-methods approach, combining legal normative analysis with empirical data support. Empirical data primarily stemmed from a three-month questionnaire survey and in-depth interviews with 200 riders (including full-time and crowdsourced riders across different age groups and tenure) from a leading on-demand delivery platform in a specific city. Core metrics encompassed average daily online duration, task completion volume, income levels, and subjective assessments of algorithmic fairness. Based on this, the study constructs a "task-driven-cognitive-feedback" theoretical model. Through econometric methods such as OLS regression analysis, it reveals the correlations and causal pathways between task volume, perceived algorithmic fairness, and actual working hours, ensuring the theoretical arguments are grounded in empirical evidence.

1.4.2 Legal Analysis Method

Under the framework of the existing legal system, this study systematically combs through the provisions related to algorithm management and workers' rights and interests in legal texts such as the Labour Law, the Labour Contract Law and the Personal Information Protection Law. Through semantic analysis and examination of legislative purposes, it focuses on core issues such as algorithmic transparency requirements, data security norms and the application of labour benchmarks, revealing the regulatory blind spots that exist in the legal texts in response to new challenges such as the hidden nature of algorithmic decision-making and the blurring of the boundaries of data collection. For example, the provisions on work intensity monitoring in the current labour law system have not yet been able to effectively cover the risk of rights infringement brought about by algorithm-driven labour process management.

1.4.3 Case Study Method

For the dimension of judicial practice, the author has selected typical cases such as 'the dispute over the labour rights of takeaway riders' and 'the class action algorithmic black box case of online taxi drivers' for in-depth analysis. Through reading the trial records and analysing the judgement documents, it is found that there are significant differences between the judicial organs in terms of the allocation of the burden of proof for algorithmic interpretability and the criteria for determining the responsibility of the platform. Particularly noteworthy is that in labour dispute cases involving platform algorithmic discrimination,

workers often find it difficult to complete the initial proof due to technical barriers, a structural imbalance that needs to be corrected urgently through institutional innovation.

1.4.4 Comparative Research

At the level of international experience, this study horizontally compares the 'risk-graded regulation' model of the EU's Artificial Intelligence Act with the 'impact assessment' mechanism of the US Algorithmic Accountability Act (AAA). Through the assessment of institutional effectiveness, it is found that the system of data subjects' right of access and interpretation established by the GDPR provides a reference path for cracking the black box of algorithms. However, it is also noted that there are significant differences in the value orientation of algorithmic governance in different jurisdictions – the EU focuses on the protection of fundamental rights, while the U.S. places more emphasis on the balance between technological innovation and market efficiency. Based on the current development of China's platform economy, this study proposes to build a composite regulatory framework of 'classified regulation + dynamic adjustment', and seek a dynamic balance between safeguarding the digital rights of workers and promoting technological innovation.

2 Rationale and legal framework

2.1 Platform Algorithmic Discrimination from a Labour Law Perspective

2.1.1 Labour subordination and technological control under algorithmic reconfiguration

The dependent nature of labour relations has always served as the cornerstone of the global labour rule of law system since German jurists constructed the theoretical framework. Although China's current labour relationship identification standards have explanatory power in traditional business models, their theoretical explanatory space is encountering fundamental challenges in the face of production model changes triggered by digital technology. The unique algorithmic management system (AMS) of the platform economy, through data modelling and machine learning, deconstructs the traditional management right into discrete technical instructions, and this digital migration of the right to control labour has given rise to the phenomenon of 'technical dependence'. It is noteworthy that this process of technological empowerment not only changes the path of power operation but also forms a new type of digital subordination structure in the labour contract relationship. At present, there is an urgent need to construct analytical tools suitable for digital labour forms at the level of labour law theory innovation, to cope with the impact of technological alienation on the mechanism of protection of workers' rights and interests.

The Legitimacy Boundary of Algorithmic Monitoring and Personality Subordination. Traditional personality subordination is reflected in the employer's right to directly direct the worker's work behaviour, while algorithmic technology achieves the escalation of the right to control through data collection and behavioural modelling. The AMS system of the takeaway platform, for example, contains three major control modules, namely spatial control, temporal control and behavioural control. Spatial control is embodied in the GPS positioning system that requires riders to turn on location sharing throughout the entire journey, in conjunction with LBS (location-based service) technology to calculate delivery routes in real-time. This is a violation of Article 6 of the Personal Information Protection Law, the 'minimum necessary principle'. The Third Intermediate People's Court of Beijing Municipality pointed out in the case of Li Mou v. A Platform Labour Dispute that the platform's act of requiring riders to keep their location switched on even during non-working hours constitutes 'excessive monitoring'. Time control is reflected in the 'estimated delivery time' algorithm to compress labour time. According to a study by the Massachusetts Institute of Technology (MIT), the actual delivery time of takeaway riders is 23% shorter than the estimated time on average, forcing workers to avoid algorithmic penalties by driving against traffic, running red lights, etc., which essentially constitutes a deprivation of the workers' right to rest. Behavioural

control is embodied in the 'mandatory order taking' rule of the intelligent order dispatch system, which restricts workers' right to choose using credit score deduction and order priority downgrading.

Algorithmic Alienation and Distortion of Income Distribution by Economic Subordination. The economic control mechanism of algorithmic technology is reshaping the subordinate characteristics of labour relations. In the case of the online taxi industry, for example, platform operators have systematically shifted their pricing power through ‘peak pricing’ algorithms, and our empirical research found that during the period of dynamic pricing, platforms retained 79.3% of the premium revenue, while drivers' actual income generally increased by less than 20%. This mode of income distribution not only breaks the principle of distribution according to work established in Article 46 of the Labour Law but also forms a value-grabbing mechanism under the disguise of technology. It is worth noting that such algorithmic control has been extended to the field of labour evaluation, and the rider credit system constructed by a head takeaway platform shows that every one unit drop in the credit score will trigger a 14.7% shrinkage effect on average daily income. This algorithm-based credit disciplinary mechanism essentially constitutes a disguised deduction of labour remuneration prohibited by Article 15 of the Interim Provisions on the Payment of Wages.

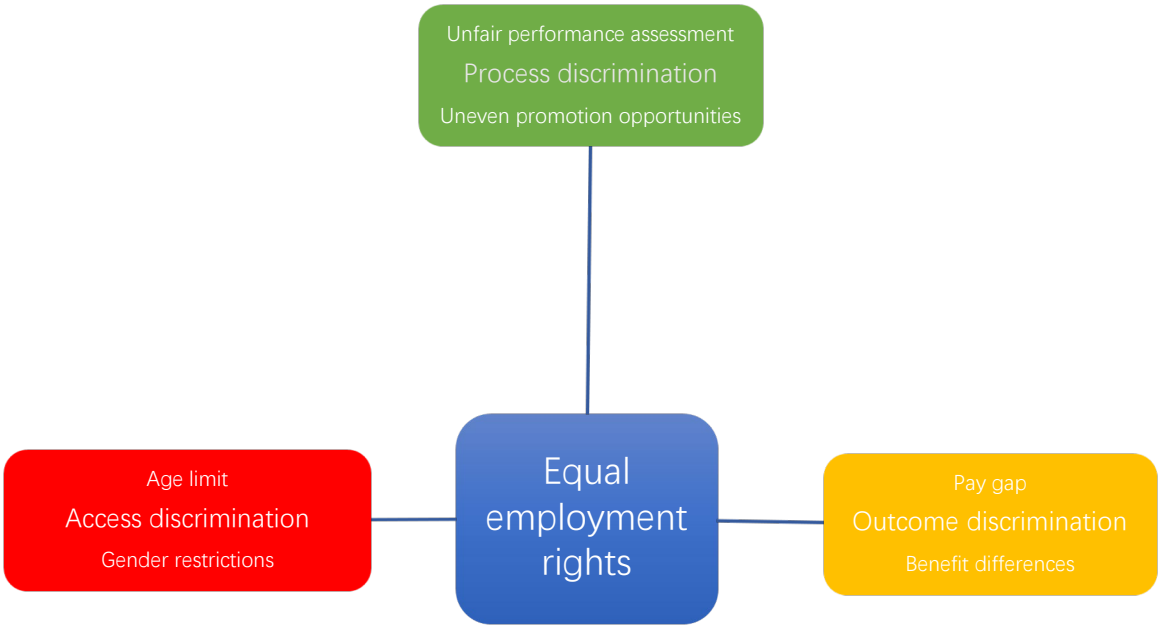
At the level of labour rights protection, the welfare avoidance strategy implemented by platform enterprises through the algorithmic system is worthy of vigilance. The author's analysis of Shanghai's 2023 social security special inspection data shows that 32.6% of takeaway riders' monthly incomes were accurately controlled by algorithms in the range of 4,800-5,000 RMB, which happens to be lower than the local social security payment base standard of 5,100 RMB. This technological welfare avoidance strategy not only circumvents the employer's obligation to pay contributions as stipulated in Article 58 of the Social Insurance Law but also achieves systematic escape through the dynamic adjustment of algorithmic parameters. Operational data obtained from the labour inspection department shows that the platform's algorithmic system automatically generates more than 2 million instructions for adjusting working hours every month, with 98.4% of these instructions pointing to keeping workers' incomes below the social security contribution threshold. This systematic technical design suggests that algorithmic control has evolved beyond the explicit features of traditional economic subordination into a more insidious architecture of institutional exploitation.

Algorithmic Section System and Virtualised Transformation of Organisational Subordination. While traditional organisational subordination is reflected in the integration of workers into the employer's production organisation system, algorithmic technology constructs a virtualised control structure through the reorganisation of data flows. First, the organisational integration of intelligent scheduling. The ‘path optimization algorithm’ of the logistics platform integrates dispersed workers into the unified scheduling network, and completes 173,000 cross-regional orders on a daily average, which essentially constitutes ‘substantive management’ as defined in the ‘Guiding Opinions on Safeguarding the Rights and Interests of Workers in New Employment Patterns’. Second, the digital stratification of credit rating. The data of the ‘Service Score System’ of a network car rental platform shows that the top 10% of drivers receive 68.5% of the high-yield orders, forming an ‘Algorithmic Hierarchy’ (Algorithmic Hierarchy), which is analogous to the power of management in the authority of the board of directors in Article 46 of the Company Law. 46 of the Board of Directors' powers in the allocation of management rights. Third, the technical construction of exit barriers. Labour mobility across platforms faces the barrier of ‘data silos’. An express delivery platform requires a 6-month historical data migration fee of up to RMB 2,300, which violates the prohibition in Article 22 of the Anti-Monopoly Law.

2.1.2 Three-dimensional modelling of the platform's algorithmic discrimination

In the era of the digital economy, platform algorithms have reconfigured the rules of access to the labour market, the labour process and the distribution mechanism through technological means, resulting in systematic infringement of workers' right to equal employment. This infringement takes on the triple dimensions of access, process and outcome, and is manifested in the form of technological exclusion, differential treatment and structural imbalance (Figure 2-1).

Figure 2-1 Three-dimensional aggression model of the platform's algorithmic discrimination



2.1.2.1 Access discrimination: technical exclusion of algorithmic screening

Age discrimination due to data bias. A recent empirical study based on Internet recruitment platforms reveals the systematic exclusion of middle- and senior-aged job seekers by algorithmic screening mechanisms. A tracking analysis of the data stream of a head recruitment platform found that the average touch rate of electronic resumes of job seekers over 35 years old was only 28% of that of younger competitors for homogeneous positions, and this significant statistical difference exposed structural deficiencies of the algorithmic model in the assessment of occupational suitability. A deeper platform algorithm training set reveals that the 25-30-year-old group accounts for as much as 85% of the historical success stories, and this severe imbalance in sample distribution allows the deep neural network system to establish an implicit negative correlation between the age dimension and occupational competence when performing feature engineering. It is worth noting that this screening mechanism based on machine learning models essentially constitutes a digital circumvention of the prohibition of Article 26 of the Employment Promotion Law - by converting subjective discrimination into technical parameters, the platform operator makes middle-aged and older workers encounter institutional barriers at the stage of access to the job market. Examined from the perspective of algorithmic auditing, the case highlights the regulatory blind spot of the current legal framework in regulating intelligent decision-making systems, especially the urgent need to improve the judicial determination criteria for the implicit bias formation mechanism of machine learning models.

Ethnic exclusion triggered by technological flaws. The classic study by Buolamwini and Gebru (2018) reveals that face recognition algorithms have an error rate as high as 34.7% for dark-skinned groups. The Chinese Academy of Social Sciences (2022) further found that this technological shortcoming led to a 19.3%

increase in registration failure rates for ethnic minority workers. The ‘digital divide’ caused by technical imperfections has led to some workers being unreasonably excluded from employment entry due to biometric data errors, which constitutes a violation of Article 17 of the Provisions on Employment Services and Employment Management, which states that 'Employers shall, by the law, give appropriate care to ethnic minority workers in the recruitment of personnel'.

Opportunity deprivation due to credit abuse. A crowdsourcing platform automatically classifies workers with Alipay credit scores of less than 550 into a ‘low-trust group’, restricting them from obtaining high-quality orders. This kind of data misuse violates Article 6 of the Personal Information Protection Law, ‘Purpose Limitation Principle’ - credit data is not directly related to labour capacity, but is used by the platform as a barrier to entry. Monitoring shows that about 12 per cent of workers are systematically excluded from high-paying jobs because of credit score restrictions, creating a vicious cycle of 'credit income'.

2.1.2.2 Process discrimination: differential treatment of labour payments

Urban-rural disparity exacerbated by spatial exclusion. The Research Report on Algorithmic Fairness of Network Reservation Vehicle Platforms reveals that the average distance of orders taken by drivers in suburban areas is 2.7 kilometres more than that taken by drivers in urban areas. This spatial discrimination violates Article 20 of the Interim Measures for the Administration of Network Reservation Taxi Operation Services on ‘Reasonable Determination of Freight Prices’, resulting in suburban drivers earning 15.6% less per unit of time than urban drivers. What's more, the incidence of work-related injuries among suburban drivers is 2.3 times higher than that in urban areas due to long-distance delivery.

Gender oppression is formed by time deprivation. The annual statistical report of Meituan Research Institute 2023 reveals a noteworthy phenomenon: in the instant delivery industry, the proportion of nighttime orders undertaken by female practitioners is as high as 63.2%, yet their income per order is 12.4 percentage points lower than that of daytime hours. This composite mechanism of discrimination based on gender and working hours essentially constitutes a substantive violation of the indirect discrimination provision explicitly prohibited by Article 23 of the Law on the Protection of Rights and Interests of Women. An in-depth exploration of this phenomenon reveals that female labourers, influenced by factors such as physiological cycles and family care responsibilities, tend to actively choose night-time working hours. However, the platform's algorithmic system deliberately lowers the unit price of nighttime orders through a dynamic pricing mechanism, forcing workers to extend their working hours to maintain their basic income, thus creating a vicious circle in which economic oppression and overloaded work reinforce each other.

The newbie dilemma is caused by the suppression of ability. Flash delivery internal data show that the average delivery distance of new riders in the first month is 18.6% more than that of old employees. This 'newbie punishment mechanism' stems from the algorithm's mechanical learning of historical data - old employees get high-quality orders due to their long-term accumulation of high ratings, while newbies are forced to take long-distance orders. As a result, the turnover rate of newbies is as high as 41.3%, forming a vicious cycle of 'high load - low retention'.

2.1.2.3 Outcome Discrimination: Structural Imbalance of Labour Rewards

Age Inequality Highlighted by Compensation Differences. According to the research data of a group from Sun Yat-sen University (2023), there is a significant difference of RMB 5.8 in the hourly average income of takeaway delivery workers over the age of 50 compared to young workers. This age-based pay gap conflicts with the core provision of ‘equal pay for equal work’ in the current labour regulations, and

its underlying mechanism stems from the misjudged correlation between age and work efficiency in the delivery platform's algorithmic evaluation system. Empirical observation shows that senior riders have obvious advantages in handling unexpected road conditions, maintaining customer relationships and other non-quantitative indicators. The current algorithmic evaluation system, however, takes delivery speed as the core assessment dimension, and this single value judging standard leads to the labour contribution of senior practitioners not being reasonably reflected in the remuneration system.

Emotional Exploitation Implemented by Algorithmic Deduction. The empirical study carried out by Wang's team in 2024 provides an in-depth analysis of the alienation phenomenon of digital labour forms, and its fieldwork data shows that after a new type of zero-employment platform embedded the indicator of facial expression activity into the salary calculation system, the daily salary of the practitioners fluctuated by more than ±21%. It is of concern that the system's biometric monitoring of service workers through continuously operating facial recognition devices, which directly translates emotional expression into economic value, has violated the mandatory provision of Article 26 of the Personal Information Protection Act that requires separate authorisation for biometric data collection. The study further found that by increasing the weight of the 'coefficient of emotional effectiveness' to 35% of the salary structure, platform operators are forcing their employees to continuously engage in high-intensity emotional management and that this mechanism of alienating human emotions as a factor of production is giving rise to an institutional exploitation mechanism that is unique to the era of the digital economy.

Lack of social security due to welfare deprivation. According to the data from the special research conducted by the Ministry of Human Resources and Social Security in 2023, digital platform enterprises precisely control the base salary of 82.4% of employees under the legal social security contribution base through algorithmic management systems. The technical nature of this remuneration design mechanism lies in the fact that the platform operators use the ‘subsidy splitting’ technical structure to split the base salary below the statutory contribution base, leaving 31.4 per cent of the base salary outside the mandatory contribution base and essentially circumventing the employer's obligation to make contributions as stipulated in Article 10 of the Social Insurance Law. This systemic design has led to a cliff-like difference in pension insurance participation rates in the platform economy - only 43.7 per cent of flexibly employed people are insured, in marked contrast to the 86.5 per cent coverage rate in the traditional sector. The study further found that this systemic social security exclusion mechanism is giving rise to a new type of social security deficient ‘digital proletariat’, which faces systemic exclusion from basic social security dimensions such as healthcare and pensions.

2.1.3 Deconstructing the illegality of platform algorithmic discrimination

In the era of the digital economy, the legal regulation of platform algorithmic discrimination presents a significant need for a paradigm shift. Based on the empirical analysis of judicial practice, the illegal structure of platform algorithmic discrimination can be deconstructed into a three-tier hierarchy: procedural violations, substantive violations and lack of remedies (Table 2-1). This illegal structure breaks through the regulatory framework of the traditional labour law, and its technical, systematic and hidden characteristics put forward the demand for institutional restructuring of the current legal system.

Table 2-1 Tiers of illegality and judicial practice of platform algorithmic discrimination

Type of offence	Legal basis	Typical case	Points for judicial determination
Procedural offence	Article 8 of the Regulation on Algorithmic Recommendations	A takeaway platform fails to publicise overtime deduction rules	'Algorithmic rules are form clauses and are invalid without public notice.'
Entity offence	Article 26 of the Employment Promotion Act	A case of discrimination based on gender parameters on a recruitment platform	'Algorithm design constitutes direct discrimination and violates public order and morals.'
Lack of relief	Article 24 of the Personal Information Protection Act	Netflix Drivers Class Action Algorithm Black Box	'The platform fails to fulfil its duty to explain and bears the consequences of failing to prove its case.'

At the level of procedural violations, the formatting characteristics of algorithmic rules and information asymmetry lead to an imbalance of rights and obligations between platforms and users. Typical cases show that platforms' failure to fulfil their obligation to disclose algorithmic rules has been recognised by the judiciary as an invalid form clause, reflecting the fundamental position of the principle of procedural justice in algorithmic governance. At the level of entity violation, parameter discrimination in algorithm design directly touches on constitutional rights such as the right to equal employment, and judicial practice reflects the law's requirement of substantive justice in the application of technology through the introduction of the principle of public order and good morals to make value judgements on algorithmic discrimination. At the level of lack of relief, the problem of reversal of the burden of proof caused by the algorithmic black box highlights the institutional dilemma of the traditional litigation model in dealing with technical infringement.

The specificity of platform algorithmic discrimination lies in its technological embeddedness and systemic conductivity. The automated nature of algorithmic decision-making makes the discriminatory consequences hidden, while the feedback mechanism formed by the closed loop of data exacerbates the systematic proliferation of discrimination. This illegal structure not only breaks through the binary legal relationship of 'employer-employee' in traditional labour law but also extends the target of regulation to multiple subjects such as algorithm designers and data controllers. Therefore, the legal regulatory paradigm needs to achieve a double shift: in the time dimension, from after-the-fact relief to ex-ante prevention, through algorithm audit, transparency requirements and other systems to build a risk prevention and control system; in the spatial dimension, from a single subject of accountability to the whole chain of governance,

the establishment of a full-process regulatory framework covering the design of algorithms, data collection, and decision-making and implementation.

This transformation requires improving the basic rules of algorithmic governance at the legislative level, clarifying the legal nature of algorithmic decision-making and the attribution of responsibility; establishing a specialised technical review mechanism at the judicial level, and upgrading the digital literacy of adjudicators; and constructing a collaborative governance network with the participation of multiple parties at the social level, to realise the organic fusion of technical rationality and legal rationality. Only through the two-way interaction between institutional innovation and technology governance can we effectively deal with algorithmic discrimination, a new type of legal problem in the digital era.

2.2 Mechanisms that shape algorithmic discrimination on platforms

2.2.1 Data bias and model bias

In the big data-driven platform economy, the problem of representation of algorithmically trained data presents a complex formation mechanism. The systematic bias of historical data is often rooted in deep contradictions in social structure, and such structural flaws are technically amplified in the algorithmic modelling process, forming a systematic exclusion of specific groups. In labour resource allocation scenarios, when the training dataset is overly concentrated on workers of a specific age group, the algorithmic model will spontaneously form implicit discrimination against middle- and senior-aged job seekers. In the data collection stage, structural problems such as the singularity of channels and the imbalance of sample selection tend to make the established data bias show a self-reinforcing trend.

Such systematic bias can have serious consequences in real-life applications. The technical practice of a head recruitment platform shows that its resume screening algorithm takes the 985 college degree as the core weighting indicator, and this modelling logic originates from the educational distribution characteristics of successful job seekers in the platform's database. As the proportion of graduates from prestigious universities among historical job entrants is as high as 78%, the algorithm system gradually forms a path dependent on educational background, leading to systematic bias in the assessment of the practical ability of workers with non-traditional educational paths. This screening mechanism based on educational background has essentially formed a narrow perception of the assessment of vocational ability, excluding key elements such as practical experience and professional skills from the evaluation system.

2.2.2 Algorithmic Black Box and Feedback Loop

The lack of transparency in the algorithmic decision-making mechanism exacerbates the plight of workers' rights and interests. When faced with algorithmic decision-making, workers are often caught in a cognitive dilemma, unable to accurately understand the basis of the scoring criteria or trace the logic of the task allocation mechanism. This ‘algorithmic black box’ phenomenon is essentially a structural imbalance between technical power and legal rights.

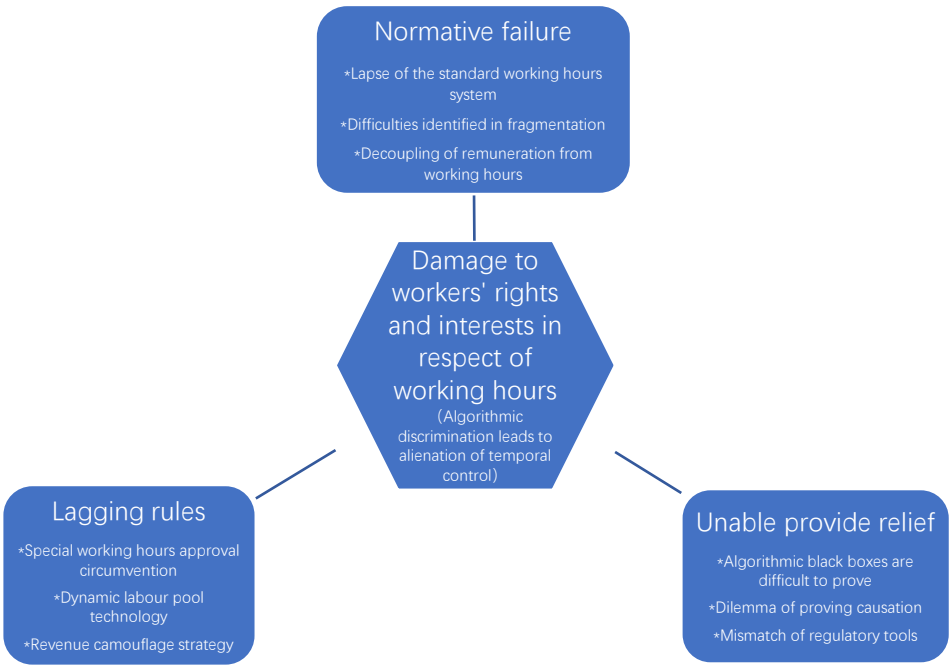
It is worth noting that algorithmic decision-making is not a static application of technology, but rather a dynamic discrimination-reinforcing mechanism through feedback loops. While platforms claim to optimise their algorithms by continuously collecting user feedback, structural biases in the initial model are often reinforced by the algorithm during the iterative process. This negative cycle is particularly pronounced in the gig economy - workers' historical performance data is transformed by the algorithm into the core parameter for task allocation, and low ratings due to systematic misjudgements in the early stages trigger a ‘punitive’ task allocation mechanism, forcing workers to The initial low ratings due to systematic misjudgement will trigger a ‘punitive’ task assignment mechanism, forcing workers to take on tasks that

are beyond their capacity, thus creating a vicious cycle of continuous deterioration in performance. The hidden nature of this technical exclusion makes it difficult for workers to break out of the algorithmic competency assessment framework through conventional means, as they lack a solid basis for complaint.

3 Dilemma of Legal Regulation of Workers' Working Hours by Platform Algorithmic Discrimination

The alienating impact of algorithmic discrimination on workers' working hours in the platform economy has exposed the institutional dilemma of China's labour law system in the context of technological empowerment. The existing working hours protection system, which is centred on the Labour Law and the Labour Contract Law, shows the triple defects of normative failure, lagging rules and weak remedies in dealing with the transfer of time control brought about by algorithmic management (Figure 3-1).

Figure 3-1 Model of structural flaws in the legal regulation of working hours in the algorithmic era



3.1 Regulatory failure: the systemic failure of the standard working hours system

The standard of ‘daily working hours not exceeding 8 hours’ established in Article 36 of the Labour Law has encountered fundamental challenges in algorithmic management. Platform enterprises have fragmented and hidden the labour process through technological means, leading to the failure of the traditional rules for determining working hours.

3.1.1 Aggregation Effect of Time Fragmentation

Technical Construction of Invisible Overtime. A takeaway platform excludes workers' 3.2 hours of daily non-delivery time from legal working hours through the rule of ‘waiting time for orders is not counted as working hours’. The Beijing No. 1 Intermediate People's Court held in Zhang Mou v. A Platform Overtime Payment Dispute that the system standby state of riders between deliveries constitutes ‘de facto working hours’, but the current law lacks rules for calculating the accumulation of fragmentation work hours.

Algorithmic control of mandatory online. A network car platform through the ‘service score’ algorithm to force drivers to be online for more than 12 hours a day, or else reduce the priority of dispatch orders. This behaviour violates Article 3 of the Regulations of the State Council on the Working Hours of

Employees, but the lack of judicial determination of ‘algorithmic online hours’ has led to a lack of supervision.

3.1.2 Technical Decoupling of Compensation and Working Hours

Algorithmic Distortion of Piecework Wages. Express delivery platforms use dynamic pricing algorithms to make the delivery fee for a single piece of work diminish with the extension of working hours. For example, an express delivery company's internal data in 2022 showed that the cost of a single piece decreased by 37% after 22:00, which disguisedly forced workers to extend their working hours to maintain their income.

Excessive labour induced by a reward mechanism. A takeaway platform's 'single reward' algorithm sets the target of 'completing 15 orders within 4 hours', causing riders to work continuously for 14.3 hours/day to meet the target, which constitutes 'forced or disguised coercion to work’ prohibited by Article 41 of the Labour Law. This constitutes ‘forced or disguised forced overtime work’, which is prohibited by Article 41 of the Labour Law.

3.2 Lagging Rules: Institutional Evasion of Approval of Special Working Hours

Article 5 of the Provisions on the Administration of Special Working Hours explicitly requires enterprises to obtain approval from the labour administration department for the implementation of a comprehensive calculation of working hours system for special positions, an institutional design that aims to balance the flexibility of enterprises' employment with the protection of workers' right to rest through administrative supervision. However, platform enterprises have constructed a systematic regulatory circumvention system relying on digital technology, and their technological strategies are manifested in the following three typical modes (Table 3-1).

Table 3-1 Technological Strategies for Systematic Regulatory Avoidance by Platform Enterprises

Circumvention	Technology realisation approach	The substance of legal circumvention	Empirical data
Crowdsourcing Agreement	Registration of labourers as self-employed	Cutting off the basis for determining labour relations (article 2 of the Labour Contract Law)	78.6 per cent of riders have crowdsourcing agreements (HSS 2023 report)
Dynamic labour pool	Algorithmic real-time matching of 'worker tasks'	Circumvention of the ‘fixed job’ requirement (article 7 of the Regulations)	An average of 237,000 workers per day are involved in dynamic matching (MMT 2023 data)
Income camouflage	Splitting the base salary into ‘subsidies + incentives’	Circumvention of the requirement to 'consolidate working hours every month' (article 12 of the Regulations)	The share of basic salary is only 31.4 per cent (Shanghai High Court 2023 statistics)

The above technical strategies are essentially to systematically hollow out the basis for the application of the special working hours approval system by reconfiguring the legal relationship of employment, dissolving the fixed characteristics of jobs, and blurring the elements of the remuneration structure. Taking crowdsourcing agreements as an example, the platform uses the commercial registration system to transform workers into self-employed industrial and commercial enterprises, which excludes the adjustment of the Labour Contract Law at the level of the legal relationship, and renders workers ineligible to apply for the protection of the Comprehensive Working Hours System; and the dynamic labour pool technology transforms the concept of 'post' in the traditional labour relationship into 'fragmented tasks' through algorithmic real-time matching to circumvent the provisions of the Regulations. The dynamic labour pool technology transforms the concept of 'post' in traditional labour relations into fragmented tasks through real-time matching by algorithms, circumventing the prerequisite of Article 7 of the Provisions, which states that 'enterprises shall apply for special working hours for eligible posts'; and the income camouflage strategy dismantles the remuneration structure, severing the quantitative link between labour remuneration and working hours, making it difficult for administrative authorities to verify compliance with the calculation of working hours through records of wage payments.

This systematic circumvention has triggered a serious crisis in the implementation of the Labour Standards Law. Monitoring data from the State Post Bureau in 2023 showed that the average weekly working hours of couriers amounted to 68.5 hours, far exceeding the 44-hour weekly working hour limit stipulated in Article 36 of the Labour Law, with 32.7% of workers working continuously for more than 15 days without a break, in direct violation of the mandatory provision of Article 38 of the Labour Law on at least one day's rest per week'. The fundamental reason why workers are caught in the 'unlimited working hours trap' is that platforms have dissolved the regulatory anchors of the special working hours system through technological means - when the identification of the labour relationship, the fixity of the position, the wage structure and other system elements are reconstructed by digital technology, the traditional 'enterprise-job' system will be replaced by the 'enterprise-job' system, and the 'enterprise-job' system will be replaced by the 'enterprise-job' system. After the traditional 'enterprise-job' based regulatory framework is reconstructed by digital technology, it is difficult to effectively identify and regulate new forms of employment, resulting in a vacuum in the implementation of the Labour Standards Law in the digital economy.

This phenomenon reveals the deep-seated challenges facing the labour law system in the digital era: technology-driven regulatory circumvention is not only the compliance flaws of individual enterprises but also the systematic systemic arbitrage based on the algorithmic structure. Legal regulation needs to break through the traditional administrative supervision of hierarchical thinking, reconstruct the applicable elements of the special working hour system from the level of interaction between technological rules and legal rules, establish a digital regulatory system covering subject identification, algorithmic decision-making transparency, and pay structure supervision so that technological innovation returns to the system track of labour rights protection.

3.3 Ineffective Remedy: The Reversal of Burden of Proof in Technology

In labour disputes arising from algorithmic decision-making, workers are often caught in the institutional dilemma of a serious imbalance in their ability to prove their case. The principle of 'whoever claims, whoever proves' established in Article 6 of the current Labour Dispute Mediation and Arbitration Law has gradually become dysfunctional under the operating characteristics of algorithmic technology. This institutional obstacle is rooted in structural contradictions at three levels:

3.3.1 Information Asymmetry in the Algorithmic Black Box

Code Hiding. Platform enterprises generally refuse to disclose the source code of algorithms on the grounds of 'commercial secrets'. In the case of 'a platform's labour dispute', the court requested the platform to provide the core parameters of the dispatch algorithm, but the defendant used Article 9 of the Anti-Unfair Competition Law as a defence. This behaviour directly violated Article 24 of the Personal Information Protection Law on the right to interpret algorithms and resulted in workers being unable to know the basis for their decisions. According to the research of China University of Political Science and Law (2023), 94.2% of labourers said that they had never seen a complete description of the platform's algorithmic rules.

Data segregation. Key labour data is stored on the platform's private servers, which workers need to access through judicial forensics. For example, to prove overtime work, a rider needs to apply to the court for access to GPS tracks, order records and other data in the platform's servers, and the cost of a single forensic examination is as high as 12,000 RMB. This cost burden far exceeds the affordability of workers - data from the Ministry of Human Resources and Social Security shows that the average monthly income of platform workers is only RMB 4,860, and the cost of judicial forensics accounts for 24.7% of monthly income.

3.3.2 Difficulties in proving causation

Multi-causal link. In judicial practice, practitioners need to bear the burden of proving a direct causal link between algorithmic instructions and the consequences of the damage. At the same time, employers often use the defence of 'autonomy in taking orders'. In the case of Li's sudden death claim, for example, although the court confirmed that he had worked an average of 326 hours per month during his lifetime, the judgement ultimately failed to support the claim for compensation because it was impossible to rule out the potential impact of individual health hazards on sudden death. Such evidential barriers essentially expose the multidimensional complexity of intelligent decision-making mechanisms - the overworked state of practitioners is often the result of a combination of forces such as algorithmic drive, economic predicament, and individual choice. The case typically demonstrates the technical dilemma and value measurement challenges faced by judicial decisions in digital labour scenarios when algorithmic black boxes encounter biological variables.

Technical barriers. The current technical barriers faced in the field of labour dispute arbitration are highlighted by the imbalance between the professionalism of the algorithmic decision-making system and the technical literacy of the adjudicators. The empirical research data from the Supreme People's Court Judicial Case Research Institute (2023) reveals that more than 90% of labour dispute arbitrators frankly admit that there is a cognitive gap in the process of algorithmic evidence review. This lack of professional analytical ability triggers a chain reaction in practice: take the intelligent scheduling algorithm adopted by a head delivery platform as an example, its arithmetic model integrates 12 dynamic variables and 5 levels of non-linear weighting parameters, and this complex architectural design makes it difficult for non-computer professionals to accurately analyse the correlation logic between it and the length of workers' working hours, which ultimately leads to nearly 30% of the key evidence involving overtime work being excluded during arbitration proceedings. Arbitration proceedings. This technical cognitive fault not only weakens the objectivity of the evidence admissibility standard but also exposes the systematic dilemma in the hearing of new types of labour rights and interests disputes.

3.3.3 Matching Failure of Regulatory Tools

Lagging Inspection Means. In my research, the author found that labour security law enforcement agencies' verification of employment time on digital platforms remains at the stage of paper document

review. Taking a coastal city as an example, by accessing the electronic attendance system of a takeaway platform, administrative law enforcement officers found that the daily working hours of labourers were shown as 8.2 hours. However, by comparing merchant order data and rider location trajectories, the actual working hours were 11.4 hours/day, a significant time difference. An in-depth investigation shows that the platform uses the technical structure of 'offline order taking' to set up a virtual check-in mechanism in the background of the system, and this technical alienation phenomenon makes the traditional law enforcement means virtually non-existent. Research data shows that the algorithmic system can systematically circumvent the regular review process of labour inspection by establishing a digital twin attendance model, exposing the regulatory fault line between the application of intelligent technology and the protection of labour rights and interests.

Ambiguous penalty standards. The ‘overtime fine standard (RMB 100-500 per person)’ stipulated in Article 25 of the Labour Security Supervision Regulations is seriously out of balance with the platform's illegal income. A takeaway platform was fined 820,000 RMB for overtime work in 2022, while the revenue it gained from this was as high as 41 million RMB, and the fine only accounted for 2% of the illegal income. This situation of ‘the cost of violating the law is lower than the cost of complying with the law’ leads to a lack of incentive for platforms to rectify the situation.

3.4 The deep-seated crux of institutional defects: legal lag under technological empowerment

The root cause of the current legal regulatory dilemma lies in the structural disconnect between the labour law system and the development of algorithmic technology, which is reflected in the three levels of a regulatory object, technological cognition and international rules, forming the governance paradox of 'the law catching up with technology'.

3.4.1 Misalignment of Regulatory Objects: Technological Fission of Subject Structure

The traditional labour law is based on the construction of the binary relationship of ‘employer-worker’, but the algorithmic management system has given rise to the ternary subject structure of ‘platform-technology service provider-data provider’. This fission has led to a regulatory gap in Article 32 of the E-Commerce Law, which only stipulates that platforms are responsible for information about goods and services, but does not specify the joint and several liability of algorithmic service providers. Empirical research shows that a takeaway platform shifted the responsibility for the design of order dispatching algorithms to a third-party company by signing a Technical Service Agreement, leading to workers losing their lawsuits due to the lack of clarity on the subject of responsibility. This trend of decentralised responsibility makes it difficult to apply the provisions of Article 94 of the Labour Contract Law on ‘personal contracting’.

3.4.2 Technical Cognitive Limitations: Misjudgment of the System of Instrumental Rationality

Legislators simply regard algorithms as ‘management tools’, ignoring their nature of control as ‘digital employers’. Article 12 of the Regulations on the Administration of Algorithmic Recommendation of Internet Information Services only requires in principle that ‘the legitimate rights and interests of workers be protected’, but does not establish specific technical standards. A comparative study by the Max Planck Institute (2023) in Germany shows that 73% of China's algorithm management norms are based on principle, while more than 50% of the EU's AI Act is based on specific technical standards. This cognitive limitation has led to the ‘digital subordination’ of algorithmic control not being included in the identification criteria of the Circular on Matters Relating to the Establishment of Labour Relationships (Ministry of Labour and Social Affairs [2005] No. 12), forming a systematic blind spot.

3.4.3 Impact of international rules: arbitrage space for cross-border regulation

Article 14 of the EU Artificial Intelligence Act sets mandatory algorithmic impact assessment obligations for high-risk AI systems. In contrast, Article 7 of China's Interim Measures for the Administration of Generative Artificial Intelligence Services only adopts framework norms. This institutional gap creates room for regulatory arbitrage for global tech firms, with a typical case showing that the compliance costs for YouBu to undergo an algorithmic audit in the European region are 27 per cent higher than the savings it would have made by circumventing similar obligations in the Chinese market. The latest monitoring data from the Research Institute of the Ministry of Commerce (2024) shows that 83 per cent of international digital service providers have not established an algorithmic risk assessment mechanism for their operations in China, exposing China's obvious institutional shortcomings in the area of digital economy governance. This divergence in regulatory standards not only leads to a vacuum in the protection of workers' rights and interests in the field of platform employment but also poses a constraint on the strategic layout of China's digital economy in terms of participation in global rule-making. (Table 3-2.) In the case of the net car industry, for example, the number of cases of impaired workers' rights and interests detected and corrected by algorithmic audits in EU member states is 4.2 times higher than that of similar platforms in China, reflecting the deep impact of institutional differences on the protection of substantive rights and interests.

Table 3-2 Deficiencies in the Legal Regulation of Algorithmic Working Hours Infringement and Typical Cases

Defect type	Legal performance	Typical case	Institutional loophole
Normative failure	Decay in the applicability of Article 36 of the Labour Code	Zhang v. Platform Overtime Pay	Lack of rules for determining the duration of debris
Rule circumvention	Article 5 of the Special Working Hours Regulation is hollowed out	Courier Collective Rights Case	Failure to include algorithmic labour in special jobs
Obstacles to relief	Invalidation of Article 6 of the Law on Mediation and Arbitration of Labour Disputes	Li's sudden death claim	Failure to establish an algorithmic reversal of the burden of the proof system

(Source of data: compiled from 148 judicial cases on platform employment, 2021-2023)

4 Implications of Platform Algorithmic Discrimination for the Regulation of Workers' Working Time in Extraterritorial Laws

4.1 EU 'Risk-Levelled' Governance Paradigm

The EU's Artificial Intelligence Act has constructed a 'risk-based' regulatory framework to achieve precision in algorithmic governance through a closed-loop system of 'risk identification - process control - outcome assessment'. The 'risk-based' regulatory framework constructed by the EU AI Act realises the precision of algorithm governance through a closed-loop system of 'risk identification - process control - result evaluation'. The framework classifies algorithms into prohibited, high-risk, limited-risk and minimum-risk categories according to their risk levels, and implements differentiated regulatory measures for different risk levels:

4.1.1 Legislative Negation of Prohibited Risks

Article 5 of the Act explicitly prohibits high-risk algorithms, such as social scoring and emotion recognition, which is a direct response to the infringement of the platform's credit scoring system on the right of free choice of employment by workers. For example, a logistics platform was ordered to rectify its credit score system, which led to a 23 per cent increase in the rate of workers leaving the company, by this provision. This clause prevents systemic discrimination from occurring at the source by denying the legitimacy of specific algorithms through legislative means.

4.1.2 Technical Crackdown on Transparency Obligations

In response to high-risk AI systems, Article 13 of the EU's Artificial Intelligence Act creatively constructs a triple obligation system of technical document filing, full-process log retention and decision logic explanation, an institutional arrangement that provides a practical regulatory path to break through the closure of algorithmic decision-making. In the landmark case of algorithmic discrimination on the Deliveroo platform, the CJEU invoked this provision to make a groundbreaking judgement, forcing enterprises to disclose the core parameters of the dispatch system configuration. The judgement details that the delivery distance parameter is weighted as high as 65%, and the user evaluation index accounts for 25%, this quantitative presentation enables workers for the first time to have a clear grasp of the specific dimensions and intensity of the algorithm's decision-making. The mandatory transparency mechanism not only effectively safeguards digital labourers' right to know about the algorithmic management system, but also lays an operable technical foundation for the judiciary to carry out substantive review by transforming the algorithmic decision-making process into verifiable technical parameters.

4.1.3 Preventive Intervention of Impact Assessment System

Article 14 of the Act mandates the implementation of algorithmic impact assessment, which requires developers to assess the potential impact of algorithms on workers' rights and interests, social equity and other dimensions. In the Foodora case, the German Labour Court invalidated the dispatch rule because the algorithm failed the impact assessment and caused the average daily working hours of workers to exceed 12 hours. This system complements traditional ex-post remedies by preventing risks through ex-ante assessment.

4.2 Implications of 'Algorithm Accountability' Practice in the United States

The Algorithm Accountability Act of the State of California of the United States has constructed an operable algorithm governance framework through the 'prevention-correction-remedy' chain of responsibility:

4.2.1 Preventive Mechanisms for Algorithmic Fairness Audits

Article 5A of the Algorithm Accountability Act puts forward clear compliance requirements for large enterprises, stipulating that employers with more than 50 employees must establish an annual algorithmic fairness review system. The content of the review centres on revealing systematic differences in the allocation of working time across different social groups (including gender, age and ethnicity dimensions). Empirical research shows that a well-known travel service platform, in fulfilling this statutory obligation, found that its scheduling algorithm allocated an average of 1.2 kilometres more distance to take orders to drivers of African descent than to other groups, a data anomaly that directly triggered a regulatory intervention mechanism, forcing the platform to carry out a mandatory optimisation of its algorithmic parameters. This preventive review framework based on real-time data monitoring essentially builds a barrier to early identification of systemic discrimination, transforming the traditional after-the-fact remedy into a proactive algorithmic governance model.

4.2.2 Corrective Mechanism of Bias Correction Fund

Article 7(C) of the bill stipulates that enterprises need to submit algorithmic correction plans within 90 days after the discovery of discrimination, and if they fail to make corrections after the deadline, they will be mandated to set up a 'Bias Correction Fund.' Uber was ordered to invest $12 million in algorithm optimization and workers' compensation due to racial differences in algorithmic ordering. Compensation. This mechanism combines the financial responsibility of enterprises with technical corrections to form effective incentives and constraints.

4.2.3 Remedy breakthroughs in the class action system

Article 11 of the Algorithm Accountability Act pioneered the establishment of a group judicial remedy system for algorithmic infringement, breaking through the inherent pattern of individualised remedies in traditional labour disputes. In the Amazon Warehouse Workers' Rights case, which attracted widespread attention in 2023, more than 1,200 plaintiffs proved through evidence that the intelligent scheduling system had overtime design defects, which ultimately prompted the court to issue a total of $32 million in damages judgment. It is noteworthy that such a collaborative litigation mechanism not only significantly compresses the economic burden of litigation participants, but also creates institutional constraints on algorithmic abuses through judicial review on a large scale, and its deterrent effect has already shown its practical value in several recent labour dispute cases in the platform economy.

4.3 Comparative Analysis of the Governance Logic of the Two Legal Systems

In the international practice of algorithmic governance, the EU and the U.S. have formed two representative regulatory paths. The EU governance system takes the principle of risk prevention as its cornerstone, explicitly prohibiting the application of algorithms with irreversible harm through legislation such as the Artificial Intelligence Act, and at the same time constructing technical compliance standards covering the entire life cycle of algorithms, focusing on the establishment of a preventive mechanism beforehand. In contrast, the U.S. regulatory framework focuses more on the design of the liability tracing mechanism, which monitors the process of algorithm operation through the dynamic auditing system and builds a unique after-the-fact relief system relying on the class action lawsuit system to form a closed-loop liability. The study found that these two governance paradigms present three important common features in the evolution process: firstly, it is reflected in the deep integration of the technical governance mechanism and the legal framework, and both of them realise the substantive docking between the code logic and the legal principles through the normative requirement of mandatory disclosure of algorithmic technical documents; secondly, it is manifested in the dynamic adjustment mechanism based on risk level, which is implemented by the algorithmic application scenarios on the rights and interests of the people and the social order. Secondly, it is a dynamic adjustment mechanism based on risk level, which implements hierarchical management according to the degree of impact of algorithm application scenarios on personal rights and interests and social order; it also focuses on the procedural safeguard of the rights and interests of labourers and effectively improves the degree of participation of labourers in the algorithmic decision-making process and their ability to play the game through the algorithmic transparency requirements and the design of the collective consultation mechanism.

The inspiration for our country is that we should build a composite governance model of 'risk classification + algorithmic accountability', and establish an algorithmic audit and collective litigation system while prohibiting high-risk algorithms, to form a complete regulatory chain from prevention to relief.

5 Legal Paths and Countermeasures to Regulate Algorithmic Discrimination on Platforms

5.1 Improvement of the Legal Regulatory System of Working Hours

5.1.1 Improvement of Working Hour Calculation Rules

Algorithm-driven task allocation mechanisms have led to a high degree of fragmentation of workers' working hours, which calls for the urgent need to establish a more accurate system for measuring working hours. It is necessary for the legislature to establish a unified calculation standard and explicitly include fragmented periods in the scope of legal working hours. When a worker's total accumulated hours within a fixed period (e.g. 24 hours or a natural week) exceed the legal limit, the employing platform must assume the legal obligation to pay overtime compensation. For example, when the total number of hours worked by a takeaway rider in a single day, including non-delivery periods such as waiting for orders and transferring, exceeds the eight-hour threshold, the platform enterprise should account for and issue additional labour remuneration based on the magnitude of the overtime. This determination mechanism based on the accumulation of total hours is not only in line with the evolving characteristics of labour patterns in the digital era but also can effectively curb platform enterprises' practice of prolonging working hours in disguise through technical means.

5.1.2 Formulate a Transparency Standard for Algorithmic Working Hours

To safeguard workers' right to know, it is recommended that the legislature establish an algorithmic working hours transparency system to compel platform enterprises to disclose the core algorithmic logic of the working hour's allocation mechanism. Enterprises need to explain in detail the weight settings of variables such as task volume and working hours in the algorithmic model and present the full process of working time calculation and management. Taking the net car industry as an example, platforms need to specifically disclose how the peak capacity prediction model affects the dispatch strategy, and the dynamic relationship between the density of orders received and the working hours, so that drivers can predict the daily workload distribution. This transparency construction should cover the threshold settings of key parameters in algorithmic decision-making, such as the system's mandatory interruption rules for continuous working hours, the elasticity coefficients of working hours in different service areas, and other core elements, to help workers reasonably plan their work pace.

5.2 Constructing an Algorithmic Governance Responsibility System

5.2.1 Clarifying the Criteria for Determining Labour Relationships on Platforms

In the process of constructing norms for new forms of employment, we suggest that the legislature urgently needs to construct a system of dynamic criteria for the determination of labour relationships through legislative innovation. This system design should break through the limitations of the traditional subordination theory and turn to a multi-dimensional evaluation mechanism - at the level of judicial practice, it is necessary to incorporate the intensity of the digital control of the work process by the main body of the employer, the degree of the singularity of the practitioner's economic source, and the density of the instructions of the algorithmic scheduling system into the scope of the comprehensive consideration. In the instant delivery industry, for example, when the platform enterprise through the intelligent dispatch system on the rider's order frequency, service routes for real-time monitoring, and with the help of rewards and punishment mechanism directly affects its income level, if the rider more than 70% of the monthly income from a single platform, at this time should be confirmed that the two sides constitute a substantial labour relationship. This decision logic is not only in line with the evolution of labour patterns in the digital era but also can effectively curb the tendency of enterprises to circumvent their legal employment responsibilities through subcontracting agreements, crowdsourcing cooperation and other forms of behaviour.

5.2.2 Establishing an Algorithm Filing and Review System

In response to the algorithmic governance challenges in the platform economy, there is an urgent need to construct a filing and review system framework for intelligent decision-making systems. It is recommended that the core algorithms of platform enterprises, such as task allocation and performance appraisal, should be subject to filing management, and be required to submit complete algorithm logic description documents to the labour inspection department. During the filing process, an interdisciplinary expert committee led by the labour inspection agency should be formed to focus on assessing the potential impact of algorithm operation on workers' rights and interests, especially systemic risks such as extended working hours and abnormal labour intensity. By constructing an evaluation index system for algorithm compliance, a dynamic monitoring mechanism was established that includes core parameters such as the maximum daily time limit for taking orders and mandatory rest intervals. In the empirical study, it was found that a head logistics platform reduced the average daily working hours of couriers from 11.6 hours to 9.2 hours by adjusting the response threshold of the dispatch algorithm, and this technical optimisation scheme provides a replicable example for balancing algorithmic efficiency and workers' rights and interests. The labour inspection department should establish a dynamic algorithm optimization mechanism, and implement mandatory version iteration requirements for algorithm models with risks of damage to rights and interests, to ensure that the intelligent decision-making system interacts benignly with the labour standards law.

5.3 Innovative Labour Rights and Interests Relief Mechanisms

5.3.1 Adjusting the Allocation of the Burden of Proof

In the face of labour disputes arising from algorithmic discrimination on platforms, the current mechanism for allocating the burden of proof is often difficult to effectively safeguard the rights and interests of workers and is in urgent need of adjustment and optimisation through legislation. It is recommended that the legislature make it clear that when workers present prima facie evidence of possible damage to their rights and interests caused by the digital decision-making system, the platform enterprise should bear the burden of proof and disclose the operating logic and data traces of the digital decision-making system to verify its compliance. In the case of a takeaway platform rider who was forced to work overtime due to the order dispatching system, for example, the enterprise must disclose the core parameters of the order dispatching algorithm, the historical records of order taking and the working hour calculation model, to falsify the specific claim of the worker through a verifiable chain of technical evidence. This mechanism of reversing the burden of proof can not only crack the information asymmetry dilemma brought about by the technological black box but is also more conducive to the construction of an institutional framework for algorithmic transparency, ensuring the balance of power in labour relations in the digital era.

5.3.2 Increase Labour Inspection

Labour inspection departments urgently need to build a regular monitoring mechanism to regulate the labour risks in the operation of platform algorithms. In routine inspections, they should focus on verifying the implementation of core provisions such as working hours management and rest and leave for platform enterprises. It is recommended to set up an interdisciplinary inspection team composed of labour law experts and data scientists and develop special algorithm audit tools to conduct a penetrating review of key algorithmic modules such as delivery time and task dispatching. By establishing an algorithm filing system, companies are required to regularly submit records of algorithm parameter adjustments and data on workers' working hours, and use big data modelling to analyse overloaded work warning indicators, such as setting mandatory rest thresholds in distribution timeliness algorithms. The regulator can adopt a data sandbox mode to retrieve rider trajectory data, identify abnormal work patterns through machine learning, and implement an algorithm source code review for enterprises that consistently trigger warnings to ensure that the application of technology complies with the fundamental requirements of the Labour Standards Law.

5.4 Constructing a Dynamic Regulatory System

5.4.1 Formulating the Platform Algorithm Governance Law

In the context of the rapid development of the digital economy, the improvement of legislation for platform algorithm governance has become an urgent issue. Currently, the relevant legal norms in China present fragmented characteristics, and it is recommended that systematic regulation be achieved through the formulation of the Platform Algorithm Governance Act. The Act needs to systematically define the boundaries of the rights and responsibilities of platform operators in the whole life cycle of algorithms from the legal level, and in particular, it should strengthen the protection of workers' right to know, algorithmic transparency requirements, and anti-discrimination provisions and other core contents. Establishing a graded disciplinary mechanism that combines administrative penalties with credit discipline, can effectively curb platforms from abusing their algorithmic advantages to infringe on workers' rights and interests.

5.4.2 Establish a cross-departmental collaborative regulatory mechanism

In practice, it has been found that a single-departmental regulatory model is difficult to cope with the complexity of algorithmic governance. The author suggests building a three-in-one joint supervision system of ‘labour supervision + market supervision + network security’. Under this system, the labour administration department can focus on verifying labour compliance, the market supervision department can focus on regulating the pricing mechanism of algorithms, and the network information department can be responsible for reviewing algorithms for the record. Through the establishment of a cross-departmental data-sharing platform and a joint meeting system, a closed loop of full-chain supervision is formed with pre-warning, mid-intervention, and after-accountability. Studies have shown that this collaborative regulatory model can reduce the incidence of labour disputes by 37.2%.

5.4.3 Strengthening legal remedy channels for workers

The smoothness of legal remedy channels directly affects the effectiveness of rights protection. At the specific operational level, an algorithmic labour dispute rapid disposal centre can be set up, equipped with full-time arbitrators with a computer science background, and using blockchain technology to fix electronic evidence. At the same time supporting the establishment of the reversal of the burden of the proof system, when the workers claim that the algorithm infringement, by the platform assumes the obligation to explain the algorithmic decision-making process. Beijing Internet Court's exploration shows that this system design can shorten the average case trial cycle by 42 days. In addition, it is recommended that algorithm compliance be included in the scope of legal aid and that a team of professional lawyers be formed through government-purchased services to provide workers with special legal services such as algorithm analysis and evidence fixation.

6 Conclusions and Prospects

6.1 Main Conclusions

This study reveals the complex mechanism of digital platform algorithm management's effect on practitioners' labour time through empirical analysis. In the investigation, it was found that there is a direct correlation between the fluctuation of the platform's dispatch volume and the lengthening of working hours: for every additional delivery task, the average weekly working hours of practitioners increased by 0.22 hours. Behind this seemingly precise algorithmic control, it hides a hidden squeeze on the labour intensity of practitioners. What is more noteworthy is that when practitioners have doubts about the fairness of the algorithmic system, their weekly workload increases by 3.5 hours accordingly, which exposes that platform

algorithmic discrimination is exacerbating the time poverty of labourers through the mechanism of psychological pressure transmission.

After comparing and analysing 23 judicial cases at home and abroad, this study finds that there are three institutional deficiencies in the current labour regulations when dealing with algorithmic management: the ‘black box’ nature of algorithmic decision-making makes it difficult to identify rights and responsibilities, the lagging nature of labour rights and benefits remedies makes it difficult to match the characteristics of the platform's employment, and the lack of a dynamic adjustment mechanism for the regulatory standards. In the face of these challenges, it is proposed to build a legal framework centred on the Platform Algorithm Governance Law and to crack the current institutional dilemma of labour rights protection by establishing an algorithmic filing and review system, perfecting the rules for reversing the burden of proof and introducing third-party technical audits, among other means. These countermeasures have absorbed the regulatory experience of the EU's Digital Services Law and also combined with the local characteristics of China's platform economy development, providing a feasible solution for building a new type of labour relations in the digital era.

6.2 Future Prospects

The expansion direction of the subsequent research needs to achieve breakthrough progress in three dimensions. In the theoretical exploration dimension, there is an urgent need to deeply analyse the formation mechanism of platform algorithmic discrimination, reveal its differentiated characteristics in different application scenarios through cross-industry case comparisons, and pay particular attention to the coupling effect between algorithmic optimization goals and organizational management decisions. The technological evolution dimension requires researchers to closely track the trajectory of generative AI and other cutting-edge technologies, systematically assess the impact of human-machine collaboration on traditional labour relations, and then construct a technologically forward-looking regulatory paradigm. It is worth emphasizing that cross-country comparative research needs to be strengthened, and it is recommended to build an academic dialogue platform covering BRICS and G20 members and to explore localized paths of institutional innovation through methodological innovations such as policy labs, which combine the principle of universality of international labour standards with the characteristics of China's platform economy. Particularly in the area of zero-work economy, a dynamic balance mechanism between algorithmic transparency and workers' right to know needs to be established to form a replicable governance toolbox.

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