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Artificial Intelligence and the Philosophy of Labour: Challenges and Prospects

The article offers a philosophical-ethical account of how labour is being transformed in the era of artificial intelligence. Drawing on classical conceptions of labour (Aristotle, Karl Marx, Hannah Arendt) and contemporary AI-ethics frameworks, it juxtaposes deontological constraints with utilitarian assessments of outcomes, thereby delineating the moral boundaries of permissible automation and the conditions of its legitimacy. A three tier model is proposed: conceptual foundations agency, dignity, and procedural justice; applied effects of technological unemployment and occupational redesign, algorithmic unfairness and the "responsibility gap", alongside opportunities to reduce routine, enhance safety, and promote inclusion; operational requirements across the AI lifecycle explainability and traceability, Algorithmic Impact Assessment, the human-in-the-loop regime, post-market monitoring, as well as reskilling programmes and recognition of micro-credentials. It is shown that "fair automation" is achievable only when deontological red lines (rights, dignity, non-discrimination) are institutionalised and outcomes are optimised within these bounds. For the Kazakhstani context, a baseline governance package is proposed: transparent goal-setting, model and dataset "passports", independent auditing, a right to human review of decisions, and infrastructure for just labour transitions.

Keywords: artificial intelligence, philosophy of labour, deontology, utilitarianism, algorithmic fairness, explainability, responsibility gap, human-in-the-loop, Algorithmic Impact Assessment (AIA), reskilling.

Introduction

The development of artificial intelligence (AI) systems is prompting a radical rethinking the nature of labour, the division of roles between humans and machines, and the very foundations of work ethics. Whereas industrialisation primarily automated physical operations, the current wave of automation reaches into cognitive and evaluative functions from candidate screening and shift scheduling to managerial decision making. This shift intensifies several tensions at once: a crisis of worker agency when the decision is taken by an algorithm, the problem of technological unemployment, and the need for new standards of fairness, transparency, and accountability in the digital economy.

Scholarly and public debates about AI's impact on work unfold in three registers. First, in the philosophy of labour (Aristotle, Marx, Arendt), the meaning of work is examined as an activity that creates the world of things and sustains human life and dignity. Second, AI ethics considers the normative frameworks deontological requirements (duty, rights, constraints) and utilitarian calculations of consequences (overall utility, efficiency). Third, applied labour market research addresses algorithmic fairness, responsibility for errors, and the contours of "human-in-the-loop" processes. Yet these strands often run in parallel: classical philosophical foundations are rarely integrated with the concrete mechanisms of algorithmic management of labour.

Based on this, the research question is formulated as follows: how do deontological and utilitarian models of ethics illuminate the transformation of labour under the influence of AI, and what normative-practical implications does this have for the design and use of algorithmic systems in the world of work? To operationalize the inquiry, we specify three sub-questions:

RQ1. How do classical conceptions of labour (teleology/goal-setting, alienation, and the triad "labour–work–action") relate to the logic of algorithmic management?

RQ2. What typical risks (the responsibility gap, algorithmic unfairness, technological unemployment) and opportunities (reduction of routine, emergence of new occupations, inclusion) arise when AI is implemented in HR and production workflows?

RQ3. What minimal normative guarantees (transparency, explainability, auditability, human participation) are necessary to preserve dignity and justice under conditions of the algorithmization of labour?

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Originality and contribution unfold along three axes. First, the paper proposes a coherent framework that stitches together the philosophy of labour and AI ethics, using classical intuitions about the shades of human activity as criteria for evaluating algorithmic practices. Second, it systematically compares deontological and utilitarian justifications at the level of ex ante design requirements for systems and ex post control procedures, which enables a shift from general values to verifiable rules. Third, it formulates a compact set of regulatory and organizational recommendations explainability, traceability, AIA, human-in-the-loop, and reskilling directly applicable to work processes.

The article's empirical basis is review-analytical: we aggregate recent applied cases and regulatory initiatives and juxtapose them with classical philosophical positions. Methodologically, the study relies on a historical-philosophical analysis of labour concepts; a normative analysis of deontological and utilitarian requirements for AI; a conceptual synthesis of risks and opportunities in the sphere of work; and the translation of these requirements into operational principles for the design and audit of algorithms.

The structure of the article follows the logic of answering RQ1–RQ3. First, it clarifies the classical foundations of labour and their heuristic power for analysing algorithmic management; next, it identifies the key risks and resources of AI in the domain of work; then, it juxtaposes deontological and utilitarian justifications as sources of concrete design requirements; finally, the study provides outcomes and practical recommendations for employers, developers, and regulators.

Materials and methods

The methodological basis of the study comprises the works of the classics of the philosophy of labour and contemporary AI ethics, as well as interdisciplinary developments at the intersection of social philosophy, law, and applied analytics. In line with the historical-anthropological tradition, the focus shifts from abstract schemata to the micro-level of everyday labour practices under algorithmization: we consider typical situations of recruitment, performance monitoring, and shift scheduling in which decisions are taken or supported by algorithms. This perspective makes it possible to trace how general norms—dignity, justice, responsibility—are reproduced and transformed by concrete actors (workers, managers, and system developers) who simultaneously appear as objects of digital transformation and as its active subjects.

A mixed set of general scientific and specialized methods is employed. The general methods include analysis and synthesis, induction and deduction, comparison and typologization, and the systematization of material; based on this we construct a conceptual map of key categories (agency, the responsibility gap, algorithmic fairness, explainability, and accountability).

This configuration of methods enables us to link a high theoretical register with operationalizable conclusions for the design, deployment, and oversight of algorithmic systems in work, maintaining a balance between deontological constraints and consequentialist assessment.

In addition, we use case studies and content analysis of professional documents, and where appropriate elementary statistical procedures.

Discussion

We clarify that the structure of AI-driven automation affects through concrete domains of application. In healthcare, AI typically assumes three classes of tasks: triage and prioritisation of intake, clinical decision support, and operational logistics (scheduling, supply). Each node carries a different ethical load: while managerial algorithms primarily affect efficiency, decision-support systems implicate patient dignity and the right to a comprehensible explanation. Accordingly, the threshold for human participation (human-in-the-loop) should rise in proportion to the risk of irreversible harm; a minimal safeguard package includes explainable rationales for recommendations, a recorded decision trail, and an appeal channel with mandatory physician involvement, developing a framework to enhance the explicability of AI systems that make socially significant decisions… the ability for individuals to obtain a factual, direct, and clear explanation of the decision-making process, especially in the event of unwanted consequences [1].

In logistics and industry, algorithms reallocate working time and efficiency metrics; the priority here is protection against "digital Taylorism" excessive task fragmentation and opaque micromanagement that foster alienation in the Marxian sense. A worker who performs the same simple operation for the whole of his life converts his body into the automatic, one-sided implement of that operation [2].

In education, AI-based assessment and resource-allocation systems shape trajectories of students and faculty; it is unacceptable to operate with hidden criteria that automatically label "non-compliance" without the possibility of human review [3].

Practice shows that algorithmic fairness cannot be reduced to a single metric. Competing definitions—demographic parity, equalized odds, predictive parity—are logically incompatible, so the choice of criteria is a normative, not merely technical, decision. In the labour context a bundled approach is appropriate: a prior assessment of datasets for historical biases; a transparent selection of fairness metrics with explicit justification of trade-offs; and periodic recalibration in real-world operation, since distributions shift over time. This implies a requirement for living documentation—model cards and datasheets for datasets as mandatory deployment artefacts: they record the model's purpose, permissible use domains, known risks, testing procedures, and lines of responsibility. Without such documentation, the responsibility gap widens: at the organisational level it becomes unclear who authorised the objective function, what costs are acceptable, and which criteria should trigger shutdown.

The key organisational dilemma is whether to design AI for workers or instead of workers. Co-design with the participation of employees and trade unions allows one, at the problem-formulation stage, to adjust objective functions, to clarify the boundaries of automation, and to set deontological "red lines" (what must not be delegated to a machine under any gains). In Arendt's terms, this is the defense of the space of action—where responsibility and initiative unfold—against its full absorption by the managerial automation of labour. Otherwise, even outcome-beneficial decisions can undermine legitimacy, as workers perceive a loss of agency and the rise of "cold control".

Data governance is of particular importance: sources, legal bases for processing, procedures for de-identification, and controls on secondary use. In the sphere of labour, personal data are closely tied to an individual's dignity and opportunities (predictive models of propensity to resign or "error risk"). The deontological imperative sets strict limits here: a ban on hidden purposes, requirements of data minimisation and purpose limitation, the right of access and rectification, and a prohibition on retroactive sanctions without human involvement. Utilitarian reasoning is useful when selecting technical safeguards (differential privacy, federated learning), balancing the benefits of analytics against the risk of harm. Yet it is deontological constraints that fix the boundaries of the permissible—outside them, outcome optimisation is inadmissible.

The distribution of responsibility requires a multi-level architecture. At the ex ante stage, Algorithmic Impact Assessment (AIA) includes: articulating the goal and compiling a risk register (which rights and interests are affected); describing the data and their provenance; selecting quality and fairness metrics; defining failure scenarios; setting a response plan; and assigning roles (developer, integrator, employer, supervisor/regulator). At the ex post stage, regular audits (internal and external), stress-tests for bias, monitoring for quality degradation, incident protocols, and mandatory reporting to employees and the regulator. This linkage reduces uncertainty about "who is responsible for what" and translates abstract principles into verifiable practices [4].

The employment dilemma is not reducible to counting displaced positions. What matters is the quality of transitions: the financial and organisational infrastructure for reskilling and upskilling, guarantees of transitional employment, and recognition of informally acquired skills. In the absence of such mechanisms, the utilitarian "overall benefit" is perceived as unevenly distributed, undermining procedural justice. Therefore, any governance package must pair algorithmic requirements with guarantees of training and career bridges otherwise even technically "fair" models will remain socially illegitimate.

To mitigate risks, it is advisable to introduce tiered risk levels:

- Low risk: managerial auxiliary applications of human-on-the-loop is acceptable; periodic audits required.
- Medium risk: algorithms that affect evaluation and resource allocation explainability, access to logs, and a right to review are mandatory.
- High risk: decisions with significant consequences for workers' rights and status (hiring/firing, disciplinary sanctions) human-in-the-loop only, with a documented rationale for the human decision; fully autonomous operation prohibited.

The procurement and deployment toolkit should encode ethical requirements as technical specifications: no model is accepted without a model card; no dataset without a datasheet; contracts must stipulate auditors rights to log access, the frequency of audits, KPIs for fairness and explainability, and scenarios for pausing/withdrawing a system in case of incidents. This shifts ethics from "moral aspirations" to a language of governable artefacts and enforceable commitments.

Cultural-contextual factors are crucial for how AI is perceived in workplaces across Kazakhstan and Central Asia: historical memory of collectivist practices, expectations of social justice, and the state's role as arbiter heighten the demand for transparent, explainable, and appealable procedures. Here the philosophical

foundations of labour serve not only as a source of critique but also as a resource for constructive institutionalization, support for initiative, recognition of merit, and fair evaluation must be built into algorithms objective functions so that automation does not erode but strengthens the human dimension of work [5].

In sum, the fair introduction of AI into the world of work requires a combination of deontological "red lines" and utilitarian optimisation within those boundaries; the institutionalization of explainability and traceability; staged impact assessment; human participation in critical decisions; and an infrastructure for just labour transitions. Otherwise, technological rationalization risks turning into moral irrationality growing alienation, and erosion of dignity and trust which runs counter to both the classic intuitions of the philosophy of labour and contemporary frameworks of AI ethics.

Continuing the line of argument, the robustness of labour algorithmization is determined not by a one-off "correct" model tuning, but by the entire governance life cycle from goal-setting and data selection to operation, review, and decommissioning. At the problem-formulation stage, it is critical to fix socially salient success parameters safety, dignity, and procedural justice on a par with productivity and costs. In deontological terms, this means entrenching clear "red lines" (a ban on hidden purposes, inadmissibility of discriminatory effects, and mandatory human involvement in high-risk decisions); in utilitarian terms, it requires explicit accounting for externalities and for the distribution of benefits and burdens across worker groups. Only under such a two-layer goal structure does algorithmic optimisation operate within rather than in place of moral constraints.

The practical implementation of this architecture requires the formalisation of responsibility artefacts. Model and dataset "passports" (statement of purpose, permissible contexts of use, limitations, known risks, testing methods, escalation channels) should be mandatory elements of procurement and deployment; without them the responsibility gap inevitably widens at the organisational level it becomes unclear who authorised the objective function, which fairness metric was chosen and why, and who is accountable for shutdown in the event of an incident. In parallel, regular checks must be institutionalised: prior to launch Algorithmic Impact Assessment (AIA); during operation periodic audits for bias and quality degradation, incident protocols, and public reporting to employees and the regulator. This governance loop translates value commitments into procedural obligations that are comparable in their stringency to occupational safety requirements [6].

Worker co-participation in the design and adjustment of systems is no less important. Experience shows that early involvement of employee representatives and trade unions reshapes the very objective function at the problem-formulation stage, indicators of well-being, schedule predictability, and avenues for appeal are incorporated metrics that do not emerge when the design is conducted solely by the managerial bloc. In this way, the space of "action" in the Arendtian sense is preserved: the worker remains a bearer of initiative and responsibility rather than an object of total micromanagement. Otherwise, even technically correct solutions generate the alienation effect warned of by Marx living experience being displaced by external quantitative indicators.

A further complication is that fairness is multidimensional. Popular criteria demographic parity, equalized odds, and predictive parity can be mutually incompatible; accordingly, the choice of metrics is not "purely technical" but normative, and must be transparently justified in light of consequences and legal constraints. In labour contexts, a bundled approach is appropriate: initial diagnosis of historical data distortions; explicit declaration of selected fairness metrics and the associated trade-offs; tailored settings for different stages of the process (screening, ranking, final decision); and subsequent revision in response to distributional shifts. Otherwise, the model will entrench and amplify latent discrimination by gender or other attributes.

The psychology of how "machine" decisions are perceived warrants separate attention. HR research shows that even with identical material outcomes, workers judge algorithmic decisions as less legitimate when explanations and a clear avenue for appeal are absent; this directly affects trust, cooperation, and willingness to learn. Accordingly, the right to an explanation and to review with human involvement is not an add-on but the core of procedural justice. It is supported by technical measures: traceability (a decision trail), logs indicating the key features that influenced the decision, and clearly defined limits of applicability beyond which the model must automatically halt [7].

Finally, the labour effects of AI remain ambivalent until the problem of high-quality employment transitions is solved. The utilitarian "overall good" of automation is diluted if specific workers face unpaid transition costs: loss of income during retraining, a lack of pathways for career mobility, and non-recognition of informally acquired skills. What is needed is a linked package of measures: employer-funded (or co-funded with the state) reskilling/upskilling, guarantees of transitional employment, recognition of micro-credentials,

and transparent rules for competitions for "new" roles. Without this infrastructure, even models with minimised bias will remain socially illegitimate the balance between consequences and rights is broken, contradicting both utilitarian and deontological logics.

The result is the following linkage of principles and procedures: moral constraints set the boundaries of the permissible (rights, dignity, the prohibition of discrimination), within which utilitarian optimisation of outcomes is carried out; this optimisation is institutionalised through explainability, traceability, AIA, auditing, and human-in-the-loop mechanisms, labour risks are offset by an infrastructure for just transitions and by worker participation in problem formulation; and the responsibility gap is closed by documented roles and artefacts that fix goals, data, metrics, and shutdown procedures. Configured in this way, automation becomes not a source of moral erosion but a mechanism capable of strengthening the human dimension of work—provided it is designed and governed in accordance with the classic intuitions of the philosophy of labour and contemporary frameworks of AI ethics.

Conclusion

Thus, the impact of artificial intelligence on the sphere of work is neither local nor single-layered; it reshapes the very normative architecture of labour from conceptions of worker agency and human dignity to procedural justice and the distribution of responsibility. Drawing on classical accounts of labour (Aristotle, Marx, Arendt) and contemporary AI-ethics frameworks, we show that without built-in guarantees of explainability, traceability, and a right to review, automation tends to intensify alienation, erode the legitimacy of managerial decisions, and widen the responsibility gap. At the same time, when properly designed and governed, AI can remove routine, enhance safety, and create new employment trajectories thereby strengthening the human dimension of work provided that ethical requirements are institutionalised across all stages of the systems' life cycle.

Empirical and applied evidence confirms this duality of effects: gains in efficiency coexist with risks of technological unemployment and algorithmic unfairness, especially where decisions depend on historically skewed data and opaque objective functions. Workers rate "machine" decisions as less legitimate when accessible explanations and avenues for appeal are absent, which directly affects trust and willingness to cooperate. Consequently, a minimum governance package for the labour context should include: transparent goal-setting; documented artefacts of responsibility (model cards, datasheets); Algorithmic Impact Assessment (AIA) prior to deployment; regular audits and post-market monitoring; in-the-wild bias testing; and mandatory human involvement in high-risk decisions (human-in-the-loop)**.**

The key conclusion is that "fair automation" is feasible only as a coupling of deontological constraints with utilitarian optimisation within the boundaries they set. This requires entrenching clear red lines a ban on discrimination, respect for dignity, and a right to explanation and review while simultaneously investing in the infrastructure of just labour transitions: reskilling, upskilling, recognition of micro-credentials, and career "bridges" for workers whose functions are changing. Designing AI for workers rather than replacing workers, with early involvement of labour collectives and trade unions, enhances the legitimacy of automation, restoring to work the Arendtian space of action (initiative and responsibility), reducing the risks of alienation in the Marxian sense, and preserving the Aristotelian teleological meaningfulness of activity. Otherwise, technological rationalisation devolves into moral irrationality vulnerability, distrust, and the loss of justice undermining both the social resilience and the economic efficiency of labour institutions.

Recommendations

The study and responsible deployment of AI systems in the sphere of work should take a stable place on Kazakhstan's contemporary research and applied agenda. The results and methodological approaches presented here can serve as the basis for interdisciplinary educational modules on the philosophy of labour, AI ethics, law, and human-resource management, and be used in the practical training of HR specialists, data engineers, and officials responsible for digital transformation. The materials can underpin courses such as "AI Ethics and Work", "Algorithmic Fairness", "Philosophy and Anthropology of Labour", and "Algorithmic Impact Assessment" (AIA), as well as upskilling programmes and corporate trainings.

For applied implementation, the following steps are recommended:

- Institutionalise a "minimum ethical package" in procurement and development (explainability, traceability, right to human review, regular bias audits, post-market monitoring).
- Introduce mandatory AIA prior to launching AI solutions in high-risk labour processes.

- Mandate a human-in-the-loop model for decisions affecting workers' rights and status (hiring, reassignment, disciplinary actions).

- Establish model and dataset passports (model cards, datasheets) as integral artefacts of accountability.

- Deploy an infrastructure for just transitions—employer or co-funded reskilling/upskilling, recognition of micro-credentials, and transparent career "bridges".

- Adopt co-design practices: early involvement of employees and trade unions in problem formulation, selection of fairness metrics, and definition of non-delegable human functions.

- Embed these requirements in organisational normative documents (ethics codes, data-processing regulations, incident-management procedures) and in sectoral guidance.

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Х.А. Шимшек, Г.Б. Көлеген

Жасанды интеллект және еңбек философиясы: сын-қатерлер мен перспективалар

Мақалада жасанды интеллект дәуірінде еңбектің өзгерісі философиялық-этикалық тұрғыдан талданған. Классикалық еңбектік тұжырымдамаларға (Аристотель, Карл Маркс, Ханна Арендт) және заманауи жасанды интеллект этикасы қағидаттарына сүйене отырып, авторлар деонтологиялық шектеулерді утилитаристік салдар бағалауларымен салыстырады, осылайша рұқсат етілетін автоматтандырудың моральдық шекаралары мен оның легитимділік шарттарын айқындайды. Үшдеңгейлі талдау ұсынылады: тұжырымдамалық негіздер — агенттік, қадір-қасиет және процедуралық әділеттілік; қолданбалы әсерлер — технологиялық жұмыссыздық және кәсіптердің қайта құру, алгоритмдік әділетсіздік және «жауапкершіліктің бұзылуы», сондай-ақ күнделікті қысқарту, қауіпсіздік пен инклюзивтілікті арттыру мүмкіндіктері; АИ өмірлік циклiндегі операциялық талаптар — түсініктілік және қадағалау, алгоритмдердің әсерін бағалау (AIA), адамның шешім қабылдау контурына қатысуы (human-in-the-loop), нарықтан кейінгі мониторинг, қайта даярлау бағдарламалары және микробіліктіліктерді мойындау. «Әділ автоматтандыру» деонтологиялық «қызыл сызықтар» (құқықтар, қадір-қасиет, кемсітпеу) институционалдандырылып, нәтижелер сол шектерде оңтайландырылған жағдайда ғана мүмкін екені дәлелденеді. Қазақстандық контекст үшін этикалық-құқықтық басқарудың базалық пакеті ұсынылады: ашық мақсат қою, модельдер мен деректер жиынтығының «паспорттары», тәуелсіз аудит, шешімдерді адамдар тарапынан қайта қарау құқығы және әділ еңбек өткелдерінің инфрақұрылымы.

Кілт сөздер: жасанды интеллект, еңбек философиясы, деонтология, утилитаризм, алгоритмдік әділеттілік, түсіндірмелілік, жауапкершілік алшақтығы, адамның араласуымен қабылданатын шешімдер жүйесі (human-in-the-loop), алгоритмдік әсерді бағалау (AIA), қайта даярлау.

Х.А. Шимшек, Г.Б. Колеген

Искусственный интеллект и философия труда: вызовы и перспективы

В статье представлен философско-этический анализ трансформации труда в эпоху искусственного интеллекта. Опираясь на классические концепции труда (Аристотель, Карл Маркс, Ханна Арендт) и современные принципы этики искусственного интеллекта, авторы сопоставляют деонтологические ограничения с утилитаристской оценкой последствий, тем самым определяя моральные границы допустимой автоматизации и условия её легитимности. Предлагается трёхуровневый анализ: концептуальные основы — агентность, достоинство и процедурная справедливость; прикладные эффекты — технологическая безработица и переразработка профессий, алгоритмическая несправедливость и «разрыв ответственности», а также возможности сокращения рутины, повышения безопасности и инклюзивности; операционные требования в жизненном цикле ИИ — объяснимость и отслеживаемость, оценка воздействия алгоритмов (AIA), участие человека в контуре принятия решений (human-in-the-loop), пострыночный мониторинг, программы переподготовки и признание микроквалификаций. Показано, что «справедливая автоматизация» возможна лишь при институционализации деонтологических «красных линий» (права, достоинство, недискриминация) и оптимизации результатов в этих пределах. Для казахстанского контекста предлагается базовый пакет этико-правового управления: прозрачное целеполагание, «паспорта» моделей и наборов данных, независимый аудит, право на человеческое пересмотрение решений и инфраструктура справедливых трудовых переходов.

Ключевые слова: искусственный интеллект, философия труда, деонтология, утилитаризм, алгоритмическая справедливость, объяснимость, разрыв ответственности, участие человека в контуре, оценка воздействия алгоритмов (AIA), переподготовка.

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