The Infinite
An International Peer Reviewed / Refereed Journal of Multidisciplinary Research

An Online Peer Reviewed / Refereed Journal
Volume 3 | Issue 1 | January 2026
ISSN: 3048-9539 (Online)
Website: www.theinfinite.co.in

Artificial Intelligence as An Inventor: Challenges to Patent Law Regime

Prof. Ashok Kumar Rai

Head

Department of Law

K.S. Saket P.G. College, Ayodhya

ARTICLE DETAILS

Research Paper

Keywords :

Artificial Intelligence, Inventorship, Patent Law Regime, Intellectual Property Rights, Autonomous Innovation

ABSTRACT

The unprecedented growth of artificial intelligence has fundamentally altered the process of innovation in the contemporary technological era. Artificial intelligence systems are no longer confined to performing auxiliary or supportive roles in research and development. Instead, advanced machine learning and generative models are increasingly capable of producing technical solutions, product designs, chemical compositions, and engineering methods without direct human intellectual intervention. This transformation has exposed serious limitations within existing patent law regimes, which have historically been constructed on the assumption that inventions originate exclusively from human intellect.

Patent law across jurisdictions is premised on the concept of inventorship, which traditionally requires mental conception, creativity, and intentionality—qualities attributed only to natural persons. The emergence of autonomous AI-generated inventions has therefore raised complex legal questions concerning inventorship, ownership of patent rights, disclosure requirements, and accountability. Courts and patent offices worldwide have struggled to apply conventional legal doctrines

to technological realities that were unimaginable at the time these laws were enacted.

This research paper critically examines whether artificial intelligence can be recognized as an inventor under existing patent law frameworks and analyses the challenges such recognition presents. Through doctrinal analysis, comparative legal study, and examination of international developments including the DABUS litigation, the paper explores the growing tension between technological advancement and legal rigidity. It argues that while current patent regimes do not permit AI inventorship, urgent legal reform is required to ensure that patent law continues to promote innovation, transparency, and economic growth in the age of intelligent machines.

Introduction

Innovation has always been central to human progress, driving economic development, industrial transformation, and scientific advancement. The patent system emerged as a legal mechanism to reward inventors for their intellectual contributions by granting temporary monopolies in exchange for public disclosure of inventions. At its core, the patent regime assumes that innovation is the outcome of human creativity, reasoning, and problem-solving capacity.

However, the rise of artificial intelligence has significantly disrupted this foundational assumption. Unlike conventional tools that merely assist human inventors, modern artificial intelligence systems possess the ability to analyse massive datasets, identify complex patterns, and generate solutions independently. These systems operate through machine learning algorithms that evolve dynamically, producing outcomes that are neither explicitly programmed nor fully predictable by their creators.

As artificial intelligence becomes increasingly autonomous, it challenges the traditional relationship between human agency and invention. In situations where AI systems independently generate patentable subject matter, identifying a human inventor becomes difficult, if not impossible. This development poses fundamental questions for patent law: Can inventorship exist without human intellectual contribution? If not, should such inventions remain unprotected? And if protection is denied, does the patent system risk becoming obsolete in technologically advanced industries?

These questions are no longer speculative. Patent offices around the world have received applications involving AI-generated inventions, compelling legal systems to confront the inadequacy of existing statutory frameworks. The conflict between technological progress and legal tradition lies at the heart of the contemporary debate on artificial intelligence as an inventor.

Artificial Intelligence and The Nature of Autonomous Invention

Artificial intelligence refers to computational systems capable of simulating aspects of human intelligence, including learning, reasoning, adaptation, and decision-making. Through techniques such as deep learning, neural networks, and reinforcement learning, AI systems can independently process information and generate novel outputs.

In the innovation ecosystem, AI operates along a spectrum. At one end, AI functions merely as a tool that enhances human efficiency, such as computer-aided design software. At the other extreme, AI systems function autonomously, independently identifying problems and generating technical solutions without human conceptual input. It is this latter category that presents the most serious legal challenges.

Autonomous AI systems are capable of producing inventions that satisfy the traditional criteria of novelty, inventive step, and industrial applicability. Yet, no human may be able to claim genuine mental conception of the inventive idea. This absence of human creativity undermines the legal foundation upon which patent rights are granted.

The increasing autonomy of artificial intelligence thus necessitates reconsideration of whether patent law should continue to rely exclusively on human-centered notions of invention.

Inventorship Under Patent Law

Inventorship is the cornerstone of patent law. Traditionally, an inventor is defined as the individual who conceives the inventive concept and contributes intellectually to the creation of the invention. Patent statutes across jurisdictions consistently reflect this understanding.

Under the United States Patent Act, the term “inventor” refers to an individual. The European Patent Convention requires the designation of a natural person. The United Kingdom Patents Act similarly presumes human inventorship. The Indian Patents Act, 1970, though not explicitly defining inventor as human, consistently uses language implying human agency.

These statutory frameworks emphasize mental conception, intention, and creativity—attributes that legal systems associate exclusively with natural persons. Artificial intelligence, lacking consciousness and moral agency, does not fit within this framework.

As a result, when AI-generated inventions emerge without human intellectual contribution, patent law faces a conceptual vacuum. The existing legal structure simply does not contemplate invention without inventorship.

Theoretical Foundations of Patent Law

The difficulty in recognizing artificial intelligence as an inventor is deeply rooted in the philosophical foundations of patent law. The incentive theory views patents as rewards for human ingenuity, encouraging inventors to invest effort and resources. Since AI lacks motivation and personal interest, extending inventorship to machines undermines this rationale.

The natural rights theory associates intellectual property with moral entitlement derived from human labor. Artificial intelligence, lacking moral personality, cannot claim such rights. Similarly, personality-based theories connect creative works with human identity, further excluding machines from recognition.

However, economic theories present a contrasting perspective. From an economic standpoint, innovation policy must adapt to technological realities. If AI-generated inventions remain unpatentable, innovators may rely on trade secrecy, limiting knowledge dissemination and weakening the patent system's disclosure function.

This tension between philosophical purity and economic practicality forms the core dilemma of AI inventorship.

The Dabus Litigation and International Response

The global debate surrounding AI inventorship was catalyzed by the DABUS case. DABUS, an artificial intelligence system developed by Stephen Thaler, autonomously generated inventions for which patent applications were filed listing the AI as inventor.

Patent offices in the United Kingdom, European Union, and United States rejected these applications, holding that inventorship requires a natural person capable of holding rights and duties. The UK Supreme Court affirmed that patent law does not permit non-human inventors, regardless of technological advancement.

In contrast, South Africa granted a patent listing AI as inventor, though without judicial examination. This divergence exposed the lack of international harmonization and underscored the inadequacy of current legal frameworks.

The DABUS case demonstrated that existing patent systems are structurally unprepared to address autonomous machine innovation.

Legal and Practical Difficulties

Recognizing AI as an inventor presents serious practical challenges. Artificial intelligence lacks legal personality and cannot own property, transfer rights, or bear liability. Patent law presumes accountability, a requirement machines cannot fulfill.

Ownership disputes further complicate matters. If AI generates an invention independently, determining entitlement among programmers, owners, users, or data providers becomes legally uncertain. Existing laws provide no clear mechanism for resolving such disputes.

Additionally, patent disclosure requirements are strained by opaque AI systems. When even developers cannot fully explain how an invention was generated, satisfying sufficiency of disclosure becomes problematic.

Comparative International Approaches

Different jurisdictions across the world have adopted varying approaches in addressing the challenge posed by artificial intelligence–generated inventions. These approaches reflect differences in legal philosophy, economic priorities, and technological readiness. Most patent regimes continue to rely on traditional human-centric notions of inventorship, even while acknowledging the increasing role of artificial intelligence in innovation.

In the United States, patent law maintains a strict interpretation of inventorship. Courts have repeatedly held that the term “inventor” refers exclusively to natural persons. In Thaler v. Vidal, the Federal Circuit Court emphasized that statutory language leaves no scope for recognizing artificial intelligence as an inventor. The court reasoned that any change in inventorship requirements must be introduced through legislative reform rather than judicial interpretation. This position underscores the American legal system’s commitment to statutory certainty but also reveals its limited flexibility in responding to technological change.

The European Patent Office has adopted a similar stance. Under the European Patent Convention, the designation of an inventor requires identification of a natural person with legal capacity. The EPO rejected applications listing artificial intelligence as inventor on the ground that legal rights and duties cannot vest in machines. However, the European Union has simultaneously initiated regulatory frameworks such as the Artificial Intelligence Act, indicating an acknowledgment of AI's transformative impact while preserving human inventorship.

The United Kingdom's legal response mirrors the European position. In Thaler v. Comptroller-General of Patents, the UK Supreme Court held that the Patents Act recognizes inventorship only in relation to natural persons. The Court clarified that ownership of a machine does not confer inventorship over its outputs, thereby rejecting the argument that patent rights can automatically flow from AI ownership.

In contrast, South Africa granted a patent naming an AI system as inventor. Although this decision lacked judicial reasoning, it marked the first formal recognition of AI inventorship. Nonetheless, its persuasive authority remains limited, as it does not represent a substantive legal shift.

China and Japan have adopted pragmatic approaches focused on economic competitiveness. While neither jurisdiction recognizes artificial intelligence as an inventor, both allow patent protection where humans play supervisory or controlling roles. Their emphasis lies in maintaining innovation incentives rather than redefining inventorship.

AI as a Tool Versus AI as An Inventor

A crucial distinction in patent law debates is between artificial intelligence functioning as a tool and artificial intelligence acting as an autonomous inventor. When AI merely assists human inventors—such as optimizing designs or analysing data—the existing patent framework operates effectively. The human remains the creative decision-maker and can legitimately claim inventorship.

The legal dilemma arises only when artificial intelligence independently determines the inventive step. In such situations, attributing inventorship to humans becomes increasingly artificial and legally strained. As AI autonomy expands, the traditional requirement of human mental conception becomes progressively detached from technological reality.

This growing disconnect highlights the inadequacy of existing patent doctrines and underscores the need for reform that acknowledges varying degrees of human involvement rather than imposing a rigid binary framework.

Policy Arguments Supporting Reform

Supporters of reform argue that excluding AI-generated inventions from patent protection risks undermining the fundamental objectives of patent law. Innovation in sectors such as pharmaceuticals, biotechnology, and advanced manufacturing increasingly relies on artificial intelligence. Denying patent protection to AI-generated outputs may discourage investment in research and development.

Moreover, absence of patent protection may encourage reliance on trade secrecy. This undermines the disclosure function of patents, reducing public access to technological knowledge and slowing cumulative innovation. From an economic perspective, patent law must evolve to ensure that incentives align with modern innovation practices.

Additionally, the principle of technological neutrality suggests that law should not discriminate between inventions based solely on the identity of the creator. If an invention satisfies patentability criteria, its origin should not automatically disqualify it from protection.

Arguments Against Recognizing AI as Inventor

Opponents of AI inventorship emphasize that patent law is fundamentally human-oriented. Artificial intelligence lacks consciousness, intention, and moral agency. Recognizing machines as inventors risks diluting the normative foundations of intellectual property law.

There are also concerns regarding accountability. Patent systems rely on identifiable inventors who can bear responsibility for misrepresentation, infringement, and compliance obligations. Machines cannot be subjected to legal sanctions or ethical judgment.

Furthermore, granting patent recognition to AI-generated inventions may result in excessive patent filings, overwhelming examination systems and creating monopolies over algorithmically produced outputs. Such outcomes could stifle, rather than promote, innovation.

Possible Legal Models for The Future

Several legal models have been proposed to address AI-generated inventions without conferring legal personhood upon machines. One approach is attributing inventorship to humans who exercise meaningful control over the AI system. Another model assigns patent ownership to the AI system's owner or operator, regardless of inventorship attribution.

A more radical proposal involves creating a sui generis regime specifically for AI-generated inventions, distinct from traditional patent law. Such a framework could provide limited protection while preserving human-centric patent doctrines.

Alternatively, reform may focus on strengthening disclosure requirements, ensuring transparency of AI-generated inventions without altering inventorship principles.

Each model involves trade-offs between innovation incentives, legal clarity, and ethical concerns.

Indian Legal Perspective and Future Implications

Under Indian patent law, inventorship remains implicitly restricted to human beings. The Indian Patents Act, 1970 emphasizes intellectual contribution and mental effort, concepts inconsistent with machine autonomy. While Indian courts have not yet addressed AI inventorship directly, existing statutory interpretation suggests that AI cannot qualify as an inventor.

India's rapidly expanding artificial intelligence ecosystem makes legislative clarity essential. Without reform, Indian innovators may face uncertainty in protecting AI-generated inventions, potentially affecting competitiveness in global markets.

A balanced Indian approach could involve recognizing human ownership of AI-generated inventions while refraining from granting inventorship to machines.

Future of Patent Law in The Age of Artificial Intelligence

Patent law stands at a critical juncture. Maintaining rigid adherence to traditional inventorship doctrines risks disconnecting legal frameworks from technological realities. Conversely, prematurely recognizing artificial intelligence as an inventor threatens to undermine core legal principles.

The future of patent law must involve carefully calibrated reform grounded in legislative action rather than judicial improvisation. International harmonization through organizations such as WIPO will be essential to prevent fragmentation of global patent systems.

Patent law must evolve not by anthropomorphizing machines but by acknowledging their role within human-directed innovation ecosystems.

Conclusion

Artificial intelligence has irreversibly transformed the nature of invention. As innovation becomes increasingly autonomous, the traditional human-centric assumptions underlying patent law face

unprecedented strain. Existing legal regimes, designed for human creativity, struggle to accommodate machine-generated inventions.

Judicial responses across jurisdictions demonstrate consistent reluctance to recognize artificial intelligence as an inventor, grounded in statutory interpretation and philosophical considerations. Nevertheless, continued exclusion of AI-generated inventions risks discouraging disclosure, weakening innovation incentives, and fragmenting international patent systems.The central challenge for modern patent law is not whether machines can think like humans, but whether legal frameworks can evolve to regulate innovation in a technologically advanced society. A balanced approach—preserving human inventorship while adapting ownership and protection mechanisms—offers the most viable path forward.

Through thoughtful legislative reform, international cooperation, and principled policy design, patent law can continue to fulfill its fundamental purpose: encouraging technological progress for the benefit of humanity in the age of artificial intelligence.

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