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Robotics and intellectual property law: A critical analysis with reference to India

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Abstract
The intersection of robotics and intellectual property law presents unprecedented challenges for legal systems worldwide. In India, intellectual property statutes the Copyright Act, 1957, the Patents Act, 1970, and the Designs Act, 2000 are drafted on the assumption of human authorship and inventorship. However, autonomous robots and Artificial Intelligence (AI) systems are increasingly capable of generating literary, artistic, inventive, and design works. This creates a legal vacuum; as current frameworks exclude machine-generated works from protection. This paper critically analyses the implications of robotics for copyright, patent, and design law in India, drawing on global precedents such as the DABUS litigation and the UK's recognition of computer-generated works. It highlights ethical dilemmas regarding authorship, ownership, and moral rights, and argues for urgent legislative reform in India. The article proposes a hybrid model that safeguards human accountability while providing legal clarity for robot-generated creations, ensuring that India's IPR regime remains future-ready and innovation-friendly.

Keywords: Robotics, intellectual property rights, copyright, patent, design law, authorship, inventorship, artificial intelligence, DABUS, India, legal reform

Introduction

The convergence of robotics, Artificial Intelligence (AI), and intellectual property law has created unprecedented legal dilemmas in the twenty-first century. Robots and AI systems are no longer confined to repetitive mechanical functions. With advances in machine learning, natural language processing, and cognitive computing, robots today increasingly display autonomy in decision-making, creative expression, and problem-solving. They can generate music, compose literature, design prototypes, and even conceptualize novel inventions without direct human intervention. This shift challenges the very foundations of Intellectual Property Rights (IPR), which have historically been premised on human intellect, creativity, and innovation.

Intellectual property law operates on the basic assumption that creativity flows from human agency. Copyright law attributes authorship to natural persons, patent law assumes inventorship by human innovators, and design law protects originality emerging from human craftsmanship. However, the growing autonomy of robotic systems disrupts this anthropocentric foundation. If a robot writes a poem, develops a chemical formula, or designs a functional object, existing legal frameworks fail to provide clarity on authorship, inventorship, or ownership. This gap risks leaving significant creative and inventive outputs unprotected, thereby raising questions of both legal recognition and economic incentives.

In India, the Copyright Act, 1957, the Patents Act, 1970, and the Designs Act, 2000 remain grounded in a human-centric paradigm. None of these statutes explicitly contemplate machine-generated works or autonomous inventions. The absence of statutory recognition creates a legal vacuum, as robotic systems increasingly contribute to sectors ranging from pharmaceuticals and manufacturing to media and entertainment. For instance, AI-based generative systems like ChatGPT, DALL·E, or robotic design platforms raise pressing questions: Who is the "author" of AI-generated artwork? Who owns the patent for a drug compound discovered by a robotic system? Should designers using AI-driven tools be treated as joint inventors, or merely facilitators?

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India has begun to acknowledge the disruptive impact of AI and robotics at the policy level. The National IPR Policy, 2016, while progressive in aligning India with global standards, does not explicitly address AI- or robot-generated intellectual property. Similarly, the NITI Aayog Discussion Paper on Artificial Intelligence: "National Strategy for Artificial Intelligence – #AIForAll" (2018) focuses on leveraging AI for inclusive growth across sectors such as healthcare, agriculture, education, and smart cities but remains silent on intellectual property challenges posed by autonomous systems. The Draft National Innovation and IP Policy (2020) also highlights India's aim to encourage innovation ecosystems but lacks clarity on the legal recognition of machine-generated works. This indicates that while India is preparing for an AI-driven economy, its IPR framework remains outdated in addressing robotic authorship and inventorship.

Comparative global developments highlight the urgency of this issue. The DABUS litigation, where an AI system was named as the inventor in patent applications, has triggered worldwide debate. Jurisdictions such as the United States, the European Union, and the United Kingdom rejected AI inventorship, while South Africa recognized it setting a controversial precedent. Similarly, the UK Copyright, Designs and Patents Act, 1988 explicitly recognizes computer-generated works by attributing authorship to the person making the necessary arrangements, whereas Indian law remains silent. These international experiences reveal divergent approaches, offering lessons for India as it confronts the realities of robotics and IPR.

This paper critically examines the challenges that robotics poses to intellectual property law in India. It evaluates the limitations of existing statutory frameworks, explores ethical and policy dilemmas surrounding authorship and inventorship, and situates India's position within a comparative global context. By analyzing case law, legislative gaps, and international developments, this study argues for proactive reform in India's IPR regime. The ultimate objective is to ensure that India remains innovation-friendly while preserving human accountability and preventing the dilution of intellectual property principles in the age of autonomous robotics.

1. Robotics and Copyright Law in India

The Copyright Act, 1957 defines "author" under Section 2(d) in strictly anthropocentric terms. It recognizes authorship only in relation to natural persons such as the composer of music, the painter of a painting, the photographer of a photograph, the programmer of computer software, or the producer of a cinematograph film. This statutory language leaves no space for attributing authorship to non-human agents such as robots or Artificial Intelligence (AI) systems.

Indian courts have repeatedly underscored that originality and authorship presuppose human intellectual input:

- Eastern Book Company v. D.B. Modak [(2008) 1 SCC 1] [1] The Supreme Court rejected the "sweat of the brow" doctrine and held that originality requires a "modicum of creativity." Importantly, the judgment reaffirmed that such creativity must emanate from human intellectual effort, thereby excluding the possibility of machine-generated originality.
- Tech Plus Media Pvt. Ltd. v. Jyoti Janda [2014 SCC OnLine Del 4158] [2] The Delhi High Court emphasized that originality in computer software and digital works depends on human skill and judgment. This reinforces the centrality of human agency even in technology-related works.
- Civic Chandran v. Ammini Amma [1996 PTC (16) 329 (Ker HC)] The Kerala High Court, while dealing with copyright in dramatic works, reiterated that copyright protection flows from human creativity and that even fair use exceptions are framed with reference to human authorship.
- Academy of General Education, Manipal v. B. Malini Mallya [(2009) 39 PTC 393 (Kar HC)] The Karnataka High Court noted that originality does not imply novelty in the patent sense but requires application of human skill, judgment, and labor. Again, the presumption of a human author was taken for granted.

These precedents demonstrate a consistent jurisprudential emphasis on human originality in Indian copyright law. Consequently, creative works autonomously generated by robots such as AI-composed music, algorithm-generated literature, or robot-drawn paintings would fall outside the statutory and judicial definitions of "authorship."

Comparative perspective

Other jurisdictions have adopted different strategies to address machine-generated works:

- **United Kingdom:** Section 9(3) of the Copyright, Designs and Patents Act, 1988 pragmatically provides that in the case of computer-generated works, "the author shall be taken to be the person by whom the arrangements necessary for the creation of the work are undertaken." This ensures copyright protection while attributing authorship to a responsible human.
- **United States:** The U.S. Copyright Office, in its 2023 Policy Statement on Works Containing AI-Generated Material, reaffirmed that copyright subsists only in works of human authorship. This aligns with judicial reasoning in Naruto v. Slater (2016) the "monkey selfie case" where the Ninth Circuit held that non-human creators cannot claim copyright.
- **European Union:** EU copyright law continues to stress human authorship, though the European Parliament has initiated debates on reform to address AI-created works.

Indian position and emerging challenges

The Indian framework currently presents three major challenges:

1. **Denial of protection:** Autonomous robotic works risk being excluded from copyright protection, discouraging innovation in creative industries like music, design, gaming, and digital media.
2. **Ownership ambiguity:** In the absence of statutory guidance, disputes may arise over whether the programmer, operator, or corporate entity deploying the robot should be considered the de facto author.
3. **Policy vacuum:** Neither the National IPR Policy, 2016 nor the NITI Aayog's National Strategy for Artificial Intelligence (2018) address copyright challenges posed by AI or robotics, leaving stakeholders uncertain.

Need for reform

To resolve these issues, India must modernize its copyright framework:

- Introduce a provision similar to Section 9(3) of the UK Act, attributing authorship to the person making arrangements for the work's creation.
- Recognize hybrid authorship models, where human input in training, programming, or operating AI systems can ground claims to authorship, while still protecting outputs that lack direct human originality.
- Establish clear ownership rules to prevent exploitation and provide certainty for industries that rely on robotic creativity.

Without such reforms, India's creative and innovation-driven economy risks facing a protection gap, where robot-generated works remain ineligible for copyright, discouraging investment and technological adoption.

2. Robotics and patent law in India

The Patents Act, 1970 is designed on the assumption of human inventorship. Section 6 of the Act provides that only a "person" who is the true and first inventor, or their assignee, may apply for a patent. Section 2(y) defines "person" to include natural persons, companies, associations, and government bodies but not artificial agents like robots or AI systems. Thus, the law implicitly excludes autonomous robotic systems from being inventors.

Indian jurisprudence on inventorship

Indian courts have consistently reinforced the human-centric approach to patents:

- Bishwanath Prasad Radhey Shyam v. Hindustan Metal Industries [(1979) 2 SCC 511] The Supreme Court held that an invention must display a "technical advance" over prior art and involve human ingenuity, not merely a workshop improvement. This presupposes human intellectual application.
- Enercon (India) Ltd. v. Aloys Wobben [(2014) 5 SCC 1] [3] The Court dealt with disputes over patent ownership and emphasized the role of the inventor's creative contribution, implicitly tied to human skill and judgment.
- Telefonaktiebolaget LM Ericsson v. Intex Technologies (India) Ltd. [2015 SCC OnLine Del 13707] Though primarily a Standard Essential Patent (SEP) case, it reinforced the understanding that patents are grounded in identifiable human inventorship.

These cases illustrate that Indian patent law like its copyright counterpart rests on the assumption of human agency in innovation. A robotic system that autonomously develops a new chemical compound, engineering solution, or pharmaceutical formula would not qualify as an "inventor" under the current statutory scheme.

The global debate: DABUS and beyond

The limitations of human-centric patent systems became evident in the DABUS litigation, where an AI system named "DABUS" (Device for the Autonomous Bootstrapping of Unified Sentience) was listed as an inventor in multiple patent applications worldwide.

- **United States & United Kingdom:** Both jurisdictions rejected the applications, holding that only a natural person can be recognized as an inventor under their respective statutes.
- **European Union:** The European Patent Office (EPO) also refused recognition of AI as an inventor.
- **Australia:** In a landmark 2021 ruling (Thaler v. Commissioner of Patents), the Federal Court initially recognized AI inventorship. However, this was overturned on appeal, reaffirming that "inventor" means a natural person.
- **South Africa:** In contrast, the South African Companies and Intellectual Property Commission (CIPC) granted a patent listing DABUS as the inventor, becoming the first country to do so though largely due to a non-examined patent system.

These divergent global outcomes reveal the absence of consensus on whether AI or robots can be inventors, underscoring the need for legal clarity.

Indian challenges

In the Indian context, robotic inventorship presents several challenges:

1. **Inventorship and ownership vacuum:** Since robots cannot be inventors, the question arises: should rights vest in the programmer, the operator, or the entity deploying the AI system?
2. **Disclosure and enablement issues:** Section 10 of the Patents Act requires full disclosure of the invention. If an AI system invents something without human comprehension of the underlying process, can the requirement of "sufficient description" be satisfied?
3. **Patentability tests:** Sections 3 and 2(1)(j) require novelty, inventive step, and industrial applicability. Assessing "inventive step" becomes complex when the "inventor" is a machine that can rapidly process prior art beyond human capacity.
4. **Ethical concerns:** Granting patents to robot-generated inventions may lead to monopolization by corporations, as the ownership would inevitably be attributed to the company deploying AI, sidelining individual innovators.

Need for reform in India

To future-proof Indian patent law, reforms could include:

- **Clarifying inventorship:** Introduce statutory amendments to recognize human stakeholders (programmers, operators, or deployers) as the legal inventors of AI-generated inventions, similar to the UK's copyright approach.
- **Hybrid attribution models:** Consider joint inventorship models where the AI's contribution is acknowledged but the legal rights vest in humans or entities.
- **Disclosure flexibility:** Modify disclosure requirements to address "black box" inventions created by AI systems, ensuring transparency without requiring impossible levels of explanation.
- **Safeguards against corporate overreach:** Ensure that attributing AI-generated patents to corporations does not lead to concentration of IP rights, thereby stifling human-led innovation.

Under the current Patents Act, 1970, robotic or AI systems cannot qualify as inventors in India. Yet, as robots become capable of autonomous problem-solving and innovation, this legal vacuum risks creating uncertainty in ownership, protection, and commercialization of AI-generated inventions. Drawing from global debates such as the DABUS cases, India must urgently consider statutory reform, balancing the need to protect innovation with safeguards for human accountability and equitable access.

3. Robotics and design law in India

The Designs Act, 2000 governs the protection of industrial designs in India. Section 2(d) defines a "design" as the features of shape, configuration, pattern, ornament, or composition of lines or colors applied to an article, judged solely by the eye. Section 2(j) defines a "proprietor of a new or original design" as the person claiming to be the author of the design. Once again, the law presumes a human author, leaving no room for designs autonomously generated by robots or AI systems.

In practice, robotics and AI systems are increasingly capable of creating innovative industrial and aesthetic designs from fashion and jewellery patterns to automobile body shapes, furniture aesthetics, and architectural prototypes. The absence of recognition for machine-generated authorship in Indian law raises significant challenges for ownership and protection.

Indian jurisprudence on design law

Although Indian case law has not directly addressed robot-generated designs, judicial reasoning in design disputes reflects the human-centric framework:

- Bharat Glass Tube Ltd. v. Gopal Glass Works Ltd. [(2008) 10 SCC 657] The Supreme Court emphasized that a design must be "new or original" and the product of intellectual effort, implicitly human effort. The Court also recognized the need for novelty in the creative application of aesthetic features to industrial articles.
- Reckitt Benckiser (India) Ltd. v. Wyeth Ltd. [2013 SCC OnLine Del 3372] The Delhi High Court dealt with the registrability of designs and underlined that originality requires application of skill and judgment by a creator, assumed to be human.
- Microfibres Inc. v. Girdhar & Co. [2009 (40) PTC 519 (Del)] The Court held that artistic works capable of design registration must reflect human creativity. This reinforces the anthropocentric understanding of authorship under the Designs Act.

Collectively, these cases highlight that originality and authorship in design law are tied to human creators, thereby excluding robot-generated aesthetics from protection.

Comparative perspective

Globally, jurisdictions face similar dilemmas:

- **United Kingdom:** The Registered Designs Act, 1949, as amended, allows for recognition of computer-generated designs, but authorship is attributed to the person making the necessary arrangements (similar to copyright law in the UK).
- **European Union:** Under the EU Community Design Regulation (2001/98), protection is limited to designs created through human creative input, though policy debates have emerged around AI-generated design works.
- **United States:** U.S. design patent law also requires a human inventor. The U.S. Patent and Trademark Office (USPTO) has explicitly stated that AI or machines cannot be credited as inventors or authors.

Challenges in India

1. **Exclusion of robot-generated designs:** With the rise of generative design software and robotic modelling tools, many novel product designs risk being left unprotected.
2. **Ambiguity in ownership:** If an AI generates a product's design, should rights vest in the programmer, the operator, or the corporate entity deploying the robot?
3. **Overlap with copyright and patent law:** AI-generated designs may fall through legal gaps, being excluded from copyright (due to lack of human authorship) and patent protection (due to inventorship rules).
4. **Commercial risks:** Companies investing in AI-driven design innovation may hesitate without legal certainty, potentially slowing adoption in industries like textiles, consumer goods, and automobiles.

Need for reform

To address these challenges, Indian law must evolve:

- **Expand definition of "proprietor":** Amend Section 2(j) of the Designs Act to explicitly recognize authorship of AI- or robot-generated designs, attributing ownership to the person or entity making arrangements for the design's creation.
- **Hybrid ownership models:** Introduce joint authorship or derivative ownership frameworks, where human stakeholders share rights in AI-generated designs.
- **Cross-IPR harmonization:** Ensure consistency between the Copyright Act, Patents Act, and Designs Act to avoid a protection vacuum for robotic outputs.
- **Policy guidance:** Include AI and robotics within India's National IPR Policy framework, providing industry clarity on protection of AI-generated designs.

The Designs Act, 2000 currently excludes robot- or AI-generated designs from protection, reinforcing the human-centric approach found in copyright and patent law. However, as robots increasingly contribute to industrial and aesthetic design innovation, this gap risks discouraging investment and leaving valuable works outside the scope of protection. By adopting reforms inspired by comparative models such as the UK, India can create a future-ready design law that safeguards innovation while maintaining human accountability.

4. Ethical and policy challenges

The rise of robotics and Artificial Intelligence (AI) in creative and inventive domains does not merely pose statutory gaps it raises deeper ethical and policy challenges. These challenges cut across copyright, patent, and design law, and directly affect questions of accountability, ownership, and public interest.

4.1 Authorship and moral rights

In copyright law, the concept of moral rights (Section 57, Copyright Act, 1957) recognizes an author's personal connection to their work, including the right of attribution and the right against distortion. Robots and AI systems, however, lack consciousness, dignity, and personality. Thus, extending moral rights to machines is ethically incoherent.

- **Challenge:** If a robot generates a literary or artistic work, attributing "authorship" to it would undermine the humanistic philosophy underlying moral rights.
- **Policy gap:** Current law offers no mechanism to reconcile machine creativity with the human-centered moral rights framework.

4.2 Ownership and concentration of rights

Robotic outputs raise a central question: Who owns the rights?

- If ownership vests in the programmer, corporations that control AI technology will accumulate disproportionate IP rights, leading to monopolization.
- This risks stifling smaller innovators and creating barriers to entry in creative and technological industries.
- From a distributive justice perspective, concentrating IP rights in the hands of large corporations undermines the democratic purpose of IPR regimes, which aim to balance innovation incentives with public access.

4.3 Accountability and liability

Robotic systems may generate outputs that infringe third-party rights (e.g., an AI creating artwork similar to an existing copyrighted piece). In such cases, questions arise:

- Should liability rest with the programmer, the operator, or the deploying company?
- Current Indian statutes provide no guidance on liability for robot-generated infringements, leaving courts to grapple with unprecedented disputes.

4.4 Innovation vs. public interest

The overarching policy dilemma is whether granting IP rights for robot-generated works actually serves the purpose of intellectual property.

- IP law traditionally incentivizes human creativity and innovation by granting exclusivity. Robots, however, do not need incentives.
- Extending strong rights to robotic outputs could paradoxically reduce public access and create artificial scarcity in works that would otherwise be abundant and replicable.
- Ethical scholars argue that machine-generated works should ideally fall into the public domain, unless human creative input is substantial enough to justify protection.

4.5 Indian policy landscape

India's National IPR Policy (2016) and NITI Aayog's National Strategy for Artificial Intelligence (2018) highlight innovation as a national priority, but remain silent on robotic creativity and inventorship. This silence creates uncertainty:

- Innovators are left unsure whether their AI-driven investments will enjoy legal protection.
- Policymakers risk India falling behind in establishing a balanced legal regime that both attracts investment and safeguards public interest.

4.6 Comparative ethical perspectives

- **European Union:** The European Parliament has debated the idea of granting "electronic personhood" to highly autonomous AI systems for accountability purposes, though the idea has faced criticism for being ethically problematic.
- **United States:** U.S. scholars argue that ownership should always trace back to a human or corporate entity, as machines lack legal capacity.
- **United Kingdom:** By attributing authorship of computer-generated works to the person making necessary arrangements (Copyright, Designs and Patents Act, 1988), the UK sidesteps ethical debates on machine personhood while maintaining legal certainty.

The ethical and policy challenges surrounding robotics and intellectual property in India reveal a tension between technological progress and legal philosophy. While denying protection risks discouraging investment, indiscriminate extension of rights risks monopolization, inequity, and erosion of the public domain. A balanced approach is essential one that attributes rights to human stakeholders, ensures accountability, and preserves the public interest at the heart of India's IPR framework.

5. Comparative global perspectives

The challenges posed by robotics and Artificial Intelligence (AI) to Intellectual Property Rights (IPR) are not unique to India. Jurisdictions worldwide are grappling with similar questions of authorship, inventorship, and ownership, though their responses vary significantly. A comparative study provides useful insights for shaping India's future legal framework.

5.1 Copyright law

- **United Kingdom:** The Copyright, Designs and Patents Act, 1988 (Section 9(3)) explicitly addresses computer-generated works by attributing authorship to the person who made the necessary arrangements for the work's creation. This pragmatic solution ensures protection while avoiding recognition of non-human authors.
- **United States:** The U.S. Copyright Office has categorically rejected copyright for non-human works, as reaffirmed in its 2023 Policy Statement on AI-generated material. Courts, including in Naruto v. Slater (2016), have consistently denied copyright to non-human creators.
- **European Union:** EU copyright law emphasizes human creativity, but ongoing debates at the European Parliament indicate potential openness to reforms addressing AI-generated works.
- **India:** Lacks any statutory or judicial recognition for computer- or robot-generated works, leaving them outside protection.

Lesson for India: A UK-style model attributing authorship to human arrangers could be a balanced solution.

5.2 Patent law

- **United States & United Kingdom:** Both jurisdictions rejected the DABUS AI patent applications, holding that inventorship is limited to natural persons under statutory language.
- **European Union:** The European Patent Office (EPO) also refused to recognize AI as an inventor, affirming the human-centric framework.
- **Australia:** The Federal Court initially recognized AI inventorship in Thaler v. Commissioner of Patents (2021), but the Full Court overturned this, reaffirming that only humans can be inventors.
- **South Africa:** Granted a patent listing DABUS as the inventor, making it the first country to do so, although the decision was largely procedural (non-examined patent system).
- **India:** The Patents Act, 1970 restricts inventorship to "persons," implicitly excluding robots or AI. No statutory or judicial exceptions exist.

Lesson for India: India may follow the dominant trend (UK, US, EU) of human-only inventorship, but could adopt reforms clarifying that rights vest in programmers or deploying entities.

5.3 Design law

- **United Kingdom:** The Registered Designs Act, 1949 (as amended) allows recognition of computer-generated designs, attributing authorship to the person making the arrangements.
- **European Union:** The Community Design Regulation (2001) provides protection for designs based on human creativity, though AI-generated designs are a growing area of policy debate.
- **United States:** U.S. design patent law requires a natural person as inventor, excluding AI or robots.
- **India:** The Designs Act, 2000 presumes human authorship and provides no guidance for AI-generated industrial designs.

Lesson for India: Like in copyright, a UK-inspired approach attributing authorship to arrangers could plug gaps in protection.

5.4 Broader ethical and policy frameworks

- **European Union:** The European Parliament once debated granting "electronic personhood" to highly autonomous robots for liability purposes, though the idea was widely criticized. The EU now leans towards attributing accountability to human stakeholders.
- **United States:** Strong emphasis on human accountability and ownership, rejecting notions of machine personhood.
- **United Kingdom:** Focuses on pragmatic attribution rules without engaging in philosophical debates about AI personhood.
- **India:** Policy documents like the National IPR Policy (2016) and NITI Aayog's AI Strategy (2018) acknowledge innovation challenges but do not address authorship or inventorship by robots.

The global trend is clear: most jurisdictions refuse to recognize robots or AI as independent authors or inventors, instead attributing rights to human stakeholders. The UK stands out as a model of pragmatic adaptation, while South Africa represents an outlier. India's current silence leaves it at risk of legal uncertainty. By studying these comparative approaches, India can design a balanced and future-ready IPR framework that supports innovation without abandoning human accountability.

6. Conclusion and suggestions for reform

The intersection of robotics, Artificial Intelligence (AI), and Intellectual Property Rights (IPR) represents one of the most pressing legal challenges of the 21st century. As robots evolve from mere tools to autonomous creators and inventors, traditional human-centric frameworks of the Copyright Act, 1957, Patents Act, 1970, and Designs Act, 2000 appear increasingly outdated. Indian jurisprudence from Eastern Book Company v. D.B. Modak in copyright to Bishwanath Prasad Radhey Shyam in patents reinforces originality and inventiveness as products of human effort, thereby excluding robot-generated works.

Comparative global experiences such as the UK's pragmatic attribution model for computer-generated works, the DABUS litigation on AI inventorship, and South Africa's controversial recognition of an AI inventor illustrate that while most jurisdictions resist granting rights directly to machines, they seek mechanisms to protect human stakeholders. India's current silence on these issues creates a legal vacuum, potentially discouraging innovation and investment in robotics-driven industries.

Suggestions for reform

To bridge this gap, India should adopt a balanced and future-ready approach, ensuring both innovation incentives and human accountability:

1. Amend statutory definitions

- Expand the definitions of "author" (Copyright Act), "inventor" (Patents Act), and "proprietor" (Designs Act) to recognize AI-generated works, but attribute legal rights to the human or entity making the necessary arrangements for their creation.
- A UK-inspired provision could provide immediate clarity.

2. Hybrid attribution models

- Introduce joint or derivative authorship/inventorship frameworks where human contributors (programmers, operators, or deploying corporations) share rights in AI-generated works.
- This avoids both over-crediting machines and under-protecting stakeholders.

3. Disclosure flexibility for patents

- Modify disclosure requirements to address "black box" inventions where AI generates results without full human comprehension.
- Ensure transparency without demanding impossible levels of technical explanation.

4. Safeguards against corporate monopolization

- Prevent concentration of robot-generated IP rights in a few corporations by exploring limits on ownership duration or compulsory licensing mechanisms for works with minimal human input.

5. Policy integration

- Update the National IPR Policy, 2016 and NITI Aayog's AI Strategy to explicitly address robotics and IPR.
- Establish expert committees combining legal, ethical, and technological expertise to draft forward-looking guidelines.

6. Encouraging public interest

- Consider leaving fully autonomous machine-generated works in the public domain to promote access, while protecting outputs that involve substantial human contribution.
- This balances innovation incentives with India's constitutional commitment to equitable access to knowledge and culture.

Final reflection

Robotics and AI challenge the very philosophy of intellectual property, which has historically rewarded human creativity and effort. While robots do not require incentives, human stakeholders who develop, train, and deploy these systems do. The future of Indian IPR law lies not in granting personhood to machines, but in ensuring that human accountability, fairness, and public interest remain central. By adopting carefully crafted reforms, India can position itself as a global leader in creating a just, innovation-friendly, and technologically adaptive IPR regime.

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