A Hybrid Inventorship Model for AI Innovations: Bridging the Gap Between Human Accountability and Machine Creativity, with a Focus on the Indian Patent System

Abstract

The advent of artificial intelligence (AI) is transforming innovation landscapes worldwide. However, traditional patent systems—such as those in India, the U.S., and the UK—are still designed to recognize only human inventors. This mismatch between technological advancements and legal frameworks has led to debates on whether AI can and should be acknowledged as an inventor. This paper proposes a **hybrid inventorship model** that balances AI's creative contributions with human accountability, tailored to the Indian context. By doing so, India can not only keep pace with global trends but also significantly improve its patent output, particularly in AI-driven sectors like healthcare, agriculture, and information technology.

1. Introduction

As AI increasingly contributes to the innovation process, traditional intellectual property (IP) systems—such as India's—are confronted with new challenges. AI's role in generating patentable inventions raises questions about how it should be recognized within patent law frameworks that were historically built to acknowledge only human inventors. India, currently undergoing a technological and economic transformation, has the opportunity to modernize its patent system to account for AI's contribution to innovation. This modernization can potentially increase India's patent filings, improve innovation in key sectors, and help the country become a global leader in AI-driven advancements.

The hybrid inventorship model proposed here is designed to strike a balance between acknowledging AI's contributions and maintaining human accountability. Such a system could improve India's patent statistics by fostering innovation in AI-related industries without undermining the core principles of patent law.

Research Questions

1. **Can AI systems be legally recognized as inventors under current patent laws in India, the U.S., and the UK?**
2. **What would a hybrid inventorship model look like in the context of India's legal framework, and how can it help improve the country's patent output?**
3. **How can human accountability be maintained while recognizing AI's role in the innovation process?**

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2. Literature Review

2.1 Current Legal Frameworks

India's patent laws are governed by the **Patents Act of 1970**, which mandates that inventors must be natural persons. Similarly, in the U.S. and UK, patent laws explicitly require human inventors, as outlined in **35 U.S.C. § 101** and the **UK Patents Act 1977**, respectively. Recent legal rulings, such as **Thaler v. USPTO** in the U.S., have reaffirmed that AI cannot be recognized as an inventor. India has so far followed suit, with the **Indian Patent Office (IPO)** rejecting applications that list AI as an inventor (Silva, 2023; Fraser, 2016).

However, as AI technologies become more integral to innovation, India's legal system must evolve to recognize AI's contributions without sacrificing the core principles of inventorship and accountability. A **hybrid inventorship model**, where AI is acknowledged as a co-inventor alongside a human inventor, could strike this balance.

2.2 The Role of AI in Indian Innovation

India is rapidly embracing AI across sectors such as healthcare, agriculture, telecommunications, and manufacturing. AI's ability to generate novel solutions to complex problems—whether it's designing new pharmaceutical compounds, optimizing agricultural outputs, or improving autonomous systems—positions it as a key driver of innovation in the country. AI's contribution could be critical to improving India's patent statistics, which have lagged behind global leaders like the U.S. and China in recent years (Nguyen & Quan, 2023).

For example, AI is revolutionizing the **pharmaceutical industry** by helping design new molecules for drug development. In agriculture, AI-driven systems are optimizing processes, improving crop yields, and creating new solutions for sustainable farming. Yet, under India's current legal framework, these AI-generated innovations face hurdles in patent recognition (Erivantseva & Blokhina, 2021).

2.3 Gaps in the Indian Patent System

India's patent system is not equipped to handle the complexities introduced by AI-generated inventions. The **Patents Act of 1970** does not account for non-human inventors, leaving AI-generated inventions in a legal gray area. Moreover, India's relatively low patent filing rate compared to global leaders indicates a need for reform. In 2020, for instance, India filed only **56,771 patent applications**, compared to China's **1.5 million** and the U.S.'s **597,141** (Geigel, 2022).

India has great potential to increase its patent output, particularly in AI-driven sectors, but this will require modernizing its IP framework to recognize AI's contributions while ensuring human accountability.

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3. Proposed Hybrid Inventorship Model

3.1 Model Overview

We propose a **hybrid inventorship model** tailored to India's patent system, where AI is recognized as a co-inventor alongside a human who retains full legal and ethical responsibility. The key features of this model include:

1. **AI Contribution Recognition**: AI systems would be named as co-inventors when they make substantive contributions to an invention, such as generating novel pharmaceutical compounds or designing advanced algorithms.
2. **Human Accountability**: A human or organizational entity would maintain full legal responsibility for the patent, ensuring compliance with India's legal and ethical standards.
3. **Inventorship Attribution**: While AI is acknowledged as a co-inventor, patent rights would be vested in the human inventor, who would also handle the application process and any associated legal or ethical concerns.

This model ensures that AI's creative contributions are recognized while humans remain accountable for the consequences of AI-generated inventions.

3.2 Legal Feasibility in India

In India, implementing this model would require adjustments to the **Patents Act**. For instance, the definition of "inventor" in **Section 6(1)** could be expanded to recognize AI as a co-inventor under certain conditions, while retaining the requirement for human oversight and accountability. A hybrid model could be integrated into India's existing patent framework by amending sections that deal with inventorship and inventive step (Liu & Liu, 2021).

The criteria for non-obviousness under **Section 2(1)(ja)** could also be expanded to recognize AI-generated innovations, ensuring that patent examiners are able to properly assess AI's contributions (Adaka & Olubiyi, 2022).

3.3 Potential Impact on India's Patent Statistics

By formalizing AI's role in inventorship, the hybrid model could lead to a significant increase in India's patent filings, particularly in AI-driven sectors like pharmaceuticals, agriculture, and information technology. This could help India close the gap with other leading innovation nations. **Fujii and Managi (2018)** found that AI-driven innovation has the potential to dramatically increase patent filings, especially in rapidly evolving fields like machine learning, biotechnology, and data analytics.

Encouraging businesses to file patents on AI-generated innovations would also foster investment in India's tech ecosystem, thereby improving the country's standing as a global innovation hub (Grashof & Kopka, 2022).

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4. Ethical and Legal Considerations

4.1 Accountability and Ownership

One of the most significant ethical considerations in AI inventorship is accountability. If AI is responsible for generating an invention, who should be held accountable for any associated risks or legal violations? Under the proposed hybrid model, the human co-inventor would be fully responsible for the AI's contributions, ensuring that ethical and legal standards are met.

This approach is consistent with current legal norms, which require human accountability for any actions taken by AI systems. It also addresses concerns about AI bias, which is particularly important in sectors like healthcare, where biased algorithms could have life-or-death consequences (Nguyen & Quan, 2023).

4.2 Transparency and Bias

The hybrid inventorship model would require human overseers to ensure that AI systems are transparent and free from bias. In India, where socio-economic disparities are significant, it is essential that AI systems do not perpetuate existing inequalities. This is particularly important in the **healthcare** and **agriculture** sectors, where AI has the potential to significantly impact vulnerable populations (Liu & Liu, 2021).

Transparency measures, such as requiring detailed reports on how AI systems were trained and how they arrived at their inventive outputs, would help ensure that AI-driven innovations are ethical and fair.

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5. Practical Implementation in India

5.1 Patent Office Guidelines

The **Indian Patent Office (IPO)** would need to update its guidelines to accommodate the hybrid inventorship model. Specific criteria for determining when AI should be recognized as a co-inventor would need to be established. For instance, an AI system that autonomously generates a novel pharmaceutical compound or designs an innovative agricultural process could be listed as a co-inventor (Fraser, 2016).

Additionally, oversight mechanisms would need to be created to ensure that human inventors are held accountable for the AI's actions. This could include requiring inventors to submit detailed documentation on how the AI was used in the inventive process (Almarzoqi & Albakjaji, 2022).

5.2 Industry Impact

Implementing the hybrid inventorship model could have a profound impact on India's key industries, including:

- **Pharmaceuticals**: AI systems are already playing a significant role in drug development by designing new molecules and optimizing clinical trials. Recognizing AI's contributions in this sector could spur further innovation and attract international investment (Erivantseva & Blokhina, 2021).
- **Agriculture**: AI-driven solutions are transforming agriculture by improving crop yields, reducing resource use, and developing new methods for sustainable farming. Formalizing AI's role in inventorship could lead to more patents in this sector, helping India tackle food security issues (Geigel, 2022).

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6. Conclusion

The hybrid inventorship model offers a pragmatic and legally sound solution to the challenges posed by AI-generated inventions. By recognizing AI as a co-inventor while ensuring human accountability, India can modernize its patent system and improve its patent output, particularly in AI-driven sectors like pharmaceuticals and agriculture. This model could help India become a global leader in AI innovation, fostering technological advancements while maintaining robust legal and ethical safeguards.

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