**LITERATURE SURVEY**

1)**Trends and priority shifts in artificial intelligence technology invention: A global patent analysis**

**AUTHORS:** Fujii H, Managi S

This study is the first to apply a decomposition framework to clarify the determinants of AI technology invention. Consisting of 13,567 AI technology patents for the 2000–2016 period, our worldwide dataset includes patent publication data from the U.S., Japan, China, Europe, and the Patent Cooperation Treaty (PCT). We find that priority has shifted from biological and knowledge-based models to specific mathematical models and other AI technologies, particularly in the U.S. and Japan. Our technology type and country comparison shows that the characteristics of AI technology patent publication differ among companies and countries.

2)**When Artificial Intelligence Systems Produce Inventions: The 3A Era and an Alternative Model for Patent Law**

**AUTHORS:**  Yanisky-Ravid S, Liu X J

Currently, robots, Artificial Intelligence and machine learning systems (hereinafter referred to collectively as “AI” or “AI systems”) can create inventions, which, had they been created by humans, would be eligible for patent protection. This study addresses the patentability of these inventions created by AI systems. We argue that traditional patent law has become outdated, inapplicable and irrelevant with respect to inventions created by AI systems. We call on policy makers to rethink current patent law governing AI systems and replace it with tools more applicable to the new (3A) era of advanced automated and autonomous AI systems. Our argument is based on three pillars: the features of AI systems, the Multiplayer Model and the irrelevance of theoretical justifications concerning intellectual property. In order to fully convey the ability of AI systems to create inventions, the article explains, for one the first times in the legal literature, what AI systems are, how they work and what makes them (so) intelligent. This understanding is crucial to any further discourse about AI systems.

3)**The Impact of Artificial Intelligence on Innovation. National Bureau of Economic Research**

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Artificial intelligence may greatly increase the efficiency of the existing economy. But it may have an even larger impact by serving as a new general-purpose “method of invention” that can reshape the nature of the innovation process and the organization of R&D. We distinguish between automation-oriented applications such as robotics and the potential for recent developments in “deep learning” to serve as a general-purpose method of invention, finding strong evidence of a “shift” in the importance of application-oriented learning research since 2009. We suggest that this is likely to lead to a significant substitution away from more routinized labor-intensive research towards research that takes advantage of the interplay between passively generated large datasets and enhanced prediction algorithms. At the same time, the potential commercial rewards from mastering this mode of research are likely to usher in a period of racing, driven by powerful incentives for individual companies to acquire and control critical large datasets and application-specific algorithms. We suggest that policies which encourage transparency and sharing of core datasets across both public and private actors may be critical tools for stimulating research productivity and innovation-oriented competition going forward.

4)**The ethics of artificial intelligence. The Cambridge handbook of artificial intelligence**

**AUTHORS:**Bostrom N, Yudkowsky E

the ethical challenges that may arise as one can create artificial intelligences (AI) of various kinds and degrees. Some challenges of machine ethics are much like many other challenges involved in designing machines. There is nearly universal agreement among modern AI professionals that artificial intelligence falls short of human capabilities in some critical sense, even though AI algorithms have beaten humans in many specific domains such as chess. In creating a superhuman chess player, the human programmers necessarily sacrificed their ability to predict Deep Blue's local, specific game behavior. A different set of ethical issues arises when one can contemplate the possibility that some future AI systems might be candidates for having moral status. One also has moral reasons to treat them in certain ways, and to refrain from treating them in certain other ways. Superintelligence may be achievable by increasing processing speed.

5)**The Governance of European Intellectual Property Rights: Toward a Differentiated Community Approach**

**AUTHORS:**Kica E, Groenendijk N.

In this article we argue that the regulation of Intellectual Property (IP) protection should go beyond the traditional regulatory models and follow a more flexible regulatory framework. Considering the range of industrial needs and developments, the article develops a differentiated Community IP protection model that could stimulate growth and innovation, alter the behavior of patent users, and improve the quality of patents through spontaneous harmonization and convergence. To explain the model better, we distinguish two key elements: differentiated framework directives and epistemic patent communities. Differentiated framework directives dictate the establishment of general patentability standards at the EU level but allow national patent systems to set up stricter patent standards for particular subject matters at the national level. In this way, differentiated framework directives should lead to an appropriate balance between the principles of the IP protection regime and the ideals of economic integration. However, given the current diversity in innovation developments and industrial operations, we recognize the risk that not all IP stakeholders would agree to a differentiated Community IP protection model. To overcome the risk of deadlock within model negotiations, and to encourage the integration of countries that want to move forward and advance certain innovation developments, we propose the creation of epistemic patent communities. In this article, epistemic patent communities are perceived as strong mechanisms for establishing an inclusive patent protection environment that encourages various stakeholders to agree on certain patentability principles and to acquire better IP protection at the EU level.