

Course Name – Artificial Intelligence, Law and Justice
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Artificial Intelligence, Law and Justice

Session 18

AI and Patents / Patenting -Part-I

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Artificial intelligence, law and justice, session 18. This is the first class of the two classes on AI and patents.



Recap

- In the last session we completed the discussion on Copyrights and AI and highlighted emerging issues
- In the four sessions we touched upon and



In the last four sessions, we had a very good overview of the issues in copyright and AI, where we touched upon many emerging issues, including those that raise fundamental questions in copyright versus AI. And more importantly, we also noticed that the idea of authorship versus the idea of AI as an author has a lot of controversial implications, particularly as AIs are becoming increasingly creative and more challenging in terms of their capacity. So, in the last four sessions, we touched upon them, and we also dwelled upon some of the policy measures that are being proposed, even if not fully adopted, to address some of them. In these two sessions relating to patenting and AI, there will be, in one sense, a parallel discussion of the debates and issues in copyright, in the sense that there are some fundamental issues that are very common here: criteria, authorship if it is copyright, and inventorship in patenting. And there are also some fundamental assumptions in both copyright and patenting in that both are incentives to innovate and incentives for creators as well as innovators to enjoy the economic benefits from their innovations. But there are a lot of differences because patents and copyrights, by nature, are very different forms of protection for different types of outputs, so we will also see and discuss this in detail in both classes. Additionally, we need to keep in mind that AI is not only questioning the fundamental issues in IP law, but it is also moving in a direction that may require us to either create new rights vis-à-vis the "AI-created wars." Or we may have to substantially change the way we look at inventorship, authorship, human-machine collaboration, and the human as the inventor and writer or author. How we will address them is a tough task, but we can at least try to understand them in the two sessions.



Protection under Patent Law



- **Purpose of Patent Law**
 - Rewards investment in research and development
 - Provides temporary monopoly rights to patentees
- **Scope and Duration of Patent Rights**
 - Limited to 20 years from application date
 - Subject to annual fee payments
 - Includes direct and indirect infringement claims
 - Exceptions for experimental and noncommercial use
- **Eligibility Conditions for Patents**
 - Excludes abstract ideas like pure algorithms



So, the purpose of the patent law is to invest in R&D, limited to 20 years from the application date. We all know this. Abstract ideas like pure algorithms cannot be patented unless they are embedded in a practical application.



Patentability Conditions



- **Novelty Requirement**
 - Invention must not be available to the public at the date of filing
 - Known as the 'state of the art'
- **Inventive Step**
 - Invention must not be obvious to a person skilled in the art (PSA)
 - Based on the state of the art
- **Industrial Applicability**
 - Invention must be usable in an industrial context
- **Challenges in Inventiveness Analysis**
 - Only technical features contributing to solving a technical problem are considered
 - Nontechnical features, like abstract algorithms, are excluded



There are various ways countries define what is patentable, what is excludable, and what can be patented under what criteria. The patenting criteria are novelty, inventive step, and industrial application. These are common everywhere. Only technical features that contribute to solving the technical problem are considered as inventive. If AI does not result in it, it could be said that inventiveness is missing or it does not fulfil that criteria; similarly, abstract algorithms are also excluded from this idea in the sense that they cannot be patented, but in the future, these things may undergo change.



Disclosure Requirements



- **Patent Bargain and Disclosure Requirements**
 - Patentees must disclose inventions clearly and completely
 - Disclosure must enable a PSA to carry out the invention
- **Black Box Nature of AI Technology**
 - AI systems often lack transparency in their operations
 - Difficulty in explaining how AI systems reach results
- **Impact on AI-Related Inventions**
 - Some AI inventions may not meet disclosure requirements
 - Experts can disclose AI system structure and principles
 - Patent offices may accept this level of disclosure
- **Incentives for Explainable AI**
- **Alternative Protection Methods (Trade Secret)**



Then come disclosure requirements, patents are a bargain where you disclose and, in return, you are granted a monopoly, provided you fulfil other criteria. But, as we know, AI systems are more or less black boxes; they lack transparency. They won't be able to

explain, for example, what exactly the AI system did to come to this conclusion, and some of the AI-related inventions may not meet the full disclosure norms for the simple reason that people can explain how it works. However, that level of explanation cannot be taken as 100% disclosure and does not meet the criteria set in patent law and practice. So, ways to address them in the future may arise, or people may say that a disclosure of AI-related inventions may be a little relaxed, and since you are able to sufficiently prove that this disclosure is an acceptable disclosure, then this disclosure can be testified to, tested, and proven. The second thing is whether the correctness of the disclosure can be verified and tested, but if it is not sufficient to identify what else is needed; then the developer can be asked to provide that information or to give some supplementary information on the workings of the machine, the algorithms, or the reasons for how it was arrived at.

So, what level of disclosure, what documents, or what evidence we would need is something to be debated upon. The alternative protection mechanism is trade secrets, but trade secrets are problematic again because they may get disclosed by chance or someone may reverse engineer them. And then, when it comes to AI-related trade secrets, it is also possible that trade secret protection, extending that to AI, will work to some extent because AI is very complex. A trade secret for a chemical formula, a trade secret for one formula, or a trade secret for something special that only one person knows is valuable. But a trade secret for a larger AI system is also technically feasible, but later in the future, public policy may not allow that because transparency in AI systems might be needed or demanded due to various factors.

The slide features a yellow background with a decorative orange and white wave at the top. On the left is the NPTEL logo, and on the right is the NALSAR logo. The title 'Patent Application Trends' is centered in red. Below the title is a bulleted list of trends. To the right of the list is an icon of a book titled 'PATENT LAW' with a gavel and a ribbon. At the bottom right is a video inset of a man in a blue shirt speaking.

Patent Application Trends

- **Uncertainty in Patenting Process**
 - Difficulty in predicting outcomes
 - Does not deter prospective patentees
- **Rising Number of AI-Related Patent Applications**
 - Over 300,000 applications filed since the 1950s
 - Sharp increase in the past decade
 - More than half published since 2013
 - Trend expected to continue

Then, patent application trends show that AI patenting continues to zoom, and since 2013, half of them have been published.



Patent Trends



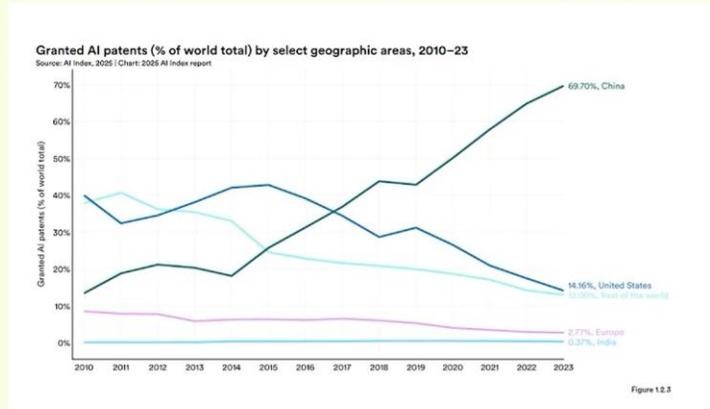
- Between 2010 and 2023, the number of AI patents has grown steadily and significantly, ballooning from 3,833 to 122,511. In just the last year, the number of AI patents has risen 29.6%.
- As of 2023, China leads in total AI patents, accounting for 69.7% of all grants
Source Stanford AI Index Report 2025



But as we will see in the next graph, the number has steadily increased significantly from 3,833 to 122,511 between 2010 and 2023. Which means that patenting in AI is massive, but how many of the patents that have been applied for, and how many of them have been granted, and what is their quality is something we will not go into detail about here. As AI patents have been increasing significantly, last year alone it was about 30%, and China leads in total AI patents, accounting for 69.7% of all the grants. So, this is what the Stanford AI Index, which is a very reliable source, reports. But the numbers game here will be very misleading because the way patents are granted, their conditions for being granted, the level of examination, and then the level of stringent norms being met varies from country to country. So just because China leads with the total number of AI patents, accounting for about 70% of all grants, does not mean that AI innovation, or patent-related AI, or AI innovation, if measured through patents, is happening in China. China is running neck and neck with the USA on many grounds. But if we use patents as the criteria to measure that, it will be totally misleading because the examination practice for the grant of patents varies from country to country.



Patent Granted Trends



So, this graph gives us an idea of where it started and where it has gone. So, the global trend is that it is supported upwards, but both China and the USA are the primary movers here.



AI Inventorship



- **Existence of Inventive Machines**
 - Inventive machines are rarer than AI systems in creative endeavors
 - Progress in this area is undeniable
- **DABUS: The Creativity Machine**
 - Developed by physicist **Dr. Stephen Thaler**
 - Neural network-based system simulating human creativity
- **Patent Applications for DABUS' Inventions**
 - Filed in 2018 for two inventions
 - DABUS listed as the inventor
 - **Dr. Thaler** obtained rights as successor in title
- **Test Case for AI Inventorship**
 - Patent applications offer a test case for AI inventorship



What exactly is an inventive machine? An inventive machine is one thing that has come up with a specified product or that can come up with a specified formula or a typical innovation in patent lingo. But then many machines, AI machines, are not inventive machines in the sense that AI systems are creative; generative AI systems are creative to write a book, write a novel, and create a thousand-page encyclopaedic novel. But then they are not the ones who can create a chemical formula or come up with a new formula for a drug. I am not saying that it is impossible. All I am saying is that, relatively

speaking, the number of AI systems that are capable of this is relatively small. Dr. Stephen Thaler's name is now synonymous with DABUS, and it is a very important case in patenting and AI, with a lot of discussion on his work regarding what he did and whether the creative machine he used should be linked to AI in patenting, which is something very important to understand. Based on a neural network simulating human creativity, he developed this creativity machine called DABUS. Using DABUS, he created "inventions for patentability." He first created two patents in 2018, for which he applied and listed DABUS as the inventor, and then he obtained rights as a successor in title but not as the patentee. But patent applications offer a test for AI inventorship. So, he went and applied for a test. But then it didn't work out.



Legal Perspective on AI Inventorship

- **AI Systems and Legal Personality**
 - AI systems cannot have ownership rights
 - AI systems cannot be considered employees
- **AI Systems as Inventors**
 - AI systems cannot be considered inventors under current law
 - Confirmed by European Patent Office, UK Supreme Court, and German Federal Supreme Court
- **Inventor's Right of Attribution**
 - Inventors have the right to be mentioned as such
 - Extending inventorship to AI systems may render this Right meaningless
- **Human Requirement in Patent Law**
 - Inventors must be human
 - Legislative provisions imply the need for physical personhood



Because the AI legal perspectives and principles are very different, AI systems cannot have ownership rights. They are not human. They do not have legal personality. They are not even legal entities like companies, joint ventures, or limited liability partnerships. And then they cannot be considered employees. Employees can be co-patent owners. Employees can apply for a patent and then assign the patent. An employee can, under a contract, do work for a company and then make a claim for co-inventorship if the company's norms accept it. But AI systems are the inventors under current law, as confirmed by at least half a dozen cases in different countries. No, they cannot be classified as inventors, or at least when it comes to patenting, they cannot be listed as an inventor and then granted patent rights. Further, inventors have the right to be mentioned as such. If I am an inventor, I can go to court and prove it, or if I have recorded evidence that I am the inventor, along with all the background documents and a lot of work to prove that, I can claim that I should be mentioned as the inventor. Extending inventorship makes this right meaningless because, first and foremost, we are not even considering them as inventors. So, when they are not inventors, we cannot extend that right to them. So, the outright problem is that patent law is human-centric.

Only humans can claim it; they must be the ones who can be listed as such and then granted patent rights. And here, the human patent is very narrowly defined, or it is taken as physical personhood. Why do we say physical personhood? Because cyborgs—half human, not exactly half human, but a human in whose body a lot of computer chips and digital devices are embedded—or a person, you know, in whose brain and nervous system there are controllable digitized devices, are also labelled in the popular term called cyborgs. But the patent law does not recognize that as personhood, not even the normal law. So technically, although we do not have the concept of a cyborg accepted in legal terms when it comes to patenting. But then, cyborg is a concept that is very much present in popular culture, in science fiction, in films, and even in theoretical literature on many topics, including AI. So, the human requirements in patent law are so drastic that only humans in physical form can fully become inventors.



Ownership of AI-Generated Output

- **Allocation of Ownership Rights**
 - IP law does not recognize AI systems as authors or inventors
 - Human authorship or inventorship is questioned with AI intervention
- **Human Control and IP Rights**
 - IP rights can protect creators if a human commands and controls the AI
 - Lack of sufficient causal relationship weakens the argument for human authorship
- **Complexity of AI Systems**
 - Black box nature of AI complicates establishing sufficient control
 - Determining causal links between human actions and AI output is challenging



So, the ownership, again, is a problematic one. AI systems cannot be authors or inventors. So, everything flows from there. So, AI systems cannot become this, become that. And then, as we saw in case of copyright, the same thing applies here as well. So, the black box nature of AI becomes a stumbling block.



Stakeholders in AI-Generated Output



- **Role of AI Creators**
 - Programmers, designers, and producers involved
 - Substantive role in AI-generated output
- **Allocation of Rights**
 - Unpredictable nature of AI output
 - AI creator's choices define the system, not the final output
- **Autonomy of AI Algorithms**
 - Increased autonomy strengthens the argument
 - Programmers can tweak algorithms to shape output



Then the roles of AI creators, allocation of rights, the same problems would arise. But you can increase the autonomy of AI algorithms, but that again won't fully solve the problem because, again, it's very difficult to prove that those who design the algorithms or enhance the autonomy could predict and then could also claim that everything was already foreseen.



IP Infringement and AI Development



- **Data Requirements for AI Training**
 - Significant amount of data needed
 - Potential IP protection on training data
- **Authorization and Exceptions**
 - Reproduction and communication require authorization
 - Relevant exceptions and limitations to copyright
- **Legal Proceedings**
 - Pending cases on internet scraping for generative AI art tools
- **EU AI Act Provisions**
 - Text and data mining exceptions for general-purpose AI models
 - Potential opt-out for right holders
 - Public availability of detailed summary about training content



But questionable things arise; a lot of issues emerge, and even IP infringement becomes part of AI development. We have seen some debates, some controversies, and some basic issues when we discussed 'using copyrighted data for AI development'. The discussion here and the issues here are very much parallel. In fact, they are not identical but very similar. So, text and data mining exceptions are applicable. Potential patent output for

right holders is applicable. Detailed summaries about training data are being made publicly available. And then the same problems as in copyright are also applicable here. So, the problem is that authorization and exceptions to patent law are similar to copyright but are very stringent because normally patent law does not use the fair use doctrine under any conditions or circumstances except in a very limited sense, and that limited sense can again be contested and has to be proven in a court. The "fair use limit" and the right under patent law are almost next to nothing or very limited. So, the copyright exemption for fair use may be very broad, but we cannot shift that to the patent act.



Impact of AI on Key IP Concepts

- **Inventiveness Standard under Patent Law**
 - Centers around the 'person skilled in the art' (PSA)
 - PSA's knowledge and skill depend on the technology field
- **Effect of Inventive Machines**
 - PSA standard may evolve to include inventive machines
 - Raises the bar for inventive step and patentability
- **Potential Consequences**
 - Could shake the foundations of the patent system
 - If everything becomes obvious, no room for patentable inventions



So, patenting as an innovative idea, concept, and practice has evolved over the past few centuries, with a lot of issues being debated again and again, along with a lot of questions being raised repeatedly; however, some of the fundamental ideas have also evolved. In the patent literature or patent law, a person skilled in the art or PSA is someone who is recognized as the gold standard. So the inventiveness standard relies on what a person skilled in the art knows from the prior art, or what the person skilled in the art can foresee, predict, understand, or extend; this is also a question of inventiveness in the patent act in the sense that an invention which a person skilled in the art can foresee or can say, "This is just an extension of that," whether that is patentable or not will be a disputable one. But then the PSA standard will have to evolve with the innovative machines, particularly the intervening machines when it comes to AI. And then, this will raise the bar for inventive step as well as patentability. So, if this is not done in a proper way, it will question and strike at the very fundamental foundation of the patent system because we know about the person skilled in the art as far as humans are concerned. But we do not know about the AI systems, what skills, or what the level of skill in the art we are talking about; we are not sure. And then the inventive machines can be very creative and very inventive. But will they be considered equivalent to PSA? We are not sure.



Use of AI in IP Practice



- **Increased Use of AI in IP Sector**
 - AI systems process and analyze vast amounts of data quickly and efficiently
 - Broad range of opportunities offered by AI technology
- **WIPO's Adoption of AI**
 - Automatic categorization of patents and trademarks
 - Prior art searches and machine translations
 - Formality checks
- **Benefits to Registrants**
 - AI suggests relevant classes of goods and services for trademarks/designs
 - AI aids in patent drafting and screening registers for existing registrations
 - Determines similarity of trademarks/designs and evaluates prior art



Coming to certain fundamental issues, AI in IP practice, irrespective of all the debates in copyright and patenting, has expanded. Because for the simple reason that AI has a fantastic capacity to analyse patent matches and then sort out and give things in the way we want, and more importantly, AI can also read thousands and thousands of patent documents and then also say this is the prior art from these possible patent documents. It's also possible that AI can identify what I put in some 100 or 200 patent documents. It can identify the whole patent document after reading everything. It can identify and then give me some graphs or some trees if I want it to develop further.

What exactly are the inventions, what are the inventive steps, what are the major patents, what are the key patents, or which patents have been repeatedly cited in all the patents? Those sorts of analyses AI can do fabulously and fantastically, so organizations like WIPO are using AI for categorizing patents and trademarks, for prior art searches, for machine translations, and for formality checks. This is very legitimate; we would be surprised only if WIPO doesn't do it. But coming down to the national level, national patent offices and registers of copyright and others are also extensively using patent-related IP systems and IP tools. Because they aid in the correct classification of the inventions as to which category, discipline, or type they belong. Whether it would come under nanotechnology, chemistry, or physical sciences. They will be able to identify and say those things. And then for patent screening and drafting, AI could also be used. More importantly, I can use AI to identify the trademarks that have been registered earlier so that if I file a trademark, I should not find out after the examination that a trademark is very similar to, identical to, or seems to be derived from this, so it can't be granted. So, AI can help in a lot of pre-filing, pre-patent application filing, pre-copyright claiming, or more importantly, in IP practice. AI can help everyone: the patentee, the one who applies for a patent, the IP attorney, the patent office, and also the people who contest and challenge the patents already granted.



AI and IP Law Interaction



- **Traditional Scope of Intellectual Property (IP) Law**
 - Historically focused on human creations
- **Technological Evolution in AI**
 - Challenges the anthropocentric view of IP law
- **Contentious Questions**
 - Should authorship and Inventorship extend to AI systems?
 - Who should acquire ownership rights for AI-generated content?
- **Arguments Vs. Arguments**
 - Valid points exist for and against extending IP rights to AI
 - Middle position or muddled position?
- **Preservation of IP Law Foundations**
 - Need for caution against hastily altering IP law
 - Do we know enough to bring radical changes
 - Can we anticipate technology developments
 - Look before you leap lest later you weep



So, the traditional scope of IP law is focused on human creation; the technological evolution of AI is now challenging it, and authorship is the big question. Again, arguments versus arguments; both sides have a lot of arguments, but the creative, non-creative, human, and non-human aspects of these debates and contentions are important. In the process of understanding and debating them, we should not hastily alter the foundations of patent law or IP law. Because right now, what we know is not sufficient to come up with drastic changes either in terms of standards, criteria, or the fundamental parameters in both the copyright and patent Acts. And more importantly, today we won't be able to even predict what sort of technological developments will come; and then since we won't be able to predict the technological developments, we cannot develop a system that is 100% future-proof. That is not possible; we cannot fully anticipate, but we can still try to work out certain things, more like, test to see whether it works and then go one step further. Rather incremental or marginal changes might be a desirable option until we know enough about AI's creativity, AI's invention, inventor rights, inventorship, and then we cross-check and arrive at a fundamental consensus on some key issues. If not all the countries agree on each and every thing, there are some exemptions that countries can give. Those exemptions are different, but the fundamental criteria should be clarity on it. So, the better approach or the better advice here would be to think carefully before you leap; otherwise, if we relax the norms, patentable inventions and patent applications will zoom because AI, with creative and inventive capacity, will create thousands and thousands of patent applications. However, the system will find it very difficult to cope with such volumes. Imagine 10,000 patent applications being filed by a single company with a team of 10 people using an AI-based system focused solely on writing the patent applications and then claiming inventions. What would happen then? Because AI can derive the prior art, it can also try to cook up something as novel; it can also be trained to cook up something as inventive, and then dump it on the patent office. The patent system will collapse if the AI system is used even to accept certain things.



Ai's Impact on Patent Law Debates



- **AI Outperforming Human Intelligence**
 - AI excels in narrow tasks
 - Expectations of AI matching or exceeding human intelligence
- **Slower Pace of AI-Driven Transformation**
 - Transformation in innovation processes slower than predicted
 - Less visible impact on patent law and policy
- **Increase in AI Technology Patenting**
 - Dramatic rise over the past twenty years
 - Within largely unchanged patent law framework
- **Ongoing Questions in Intellectual Property**
 - Can a machine-generated invention be patented?
 - Should a machine-generated invention be patented?



So, the AI's impact, if AI outperforms human intelligence, will lead to AI excelling in narrow tasks but not in broad, significant inventive-step areas. Then comes the whole show of AI-driven transformation and fundamental questions in IP. So, can a machine-generated invention be patented? Should a machine-generated invention be patented? This is again a question that Dr. Thaler tried to come to grips with repeatedly. Unfortunately, he was not very successful.



Generative AI's Impact on IP & Innovation



- **Introduction to Generative AI**
 - Public awareness through tools like ChatGPT
 - Generates new content based on learned data
- **Definition of Generative AI**
 - AI algorithms generating new outputs from trained data
- **Transformative Features**
 - Rapid self-improvement at scale
 - Generation of new outputs using existing data
 - Amplification and extension of human capabilities
- **Economic Impact**
 - Potential to transform economic activity unpredictably
 - Promises or threats depending on perspective



On the other hand, generative AI's impact is also equally important, which we have already seen in the use of copyright; this is also equally true to a great extent in patents.



Four Responses to AI



- **Traditional Human-Centered Notion of Invention**
 - Patent system provides incentives to people to invent and innovate
- **Proposals for Patent Law Responses to AI-Generated Inventions**
 - No unique patent law response needed for transformative emerging technologies
 - Patents should remain tied to human inventors
 - Pragmatic responses to AI disruption with modest changes to existing patent law
 - Arguments for AI neutrality and patenting AI-generated inventions



So, the four responses to AI when it comes to patent law can be summarized like this. This, again, is somewhat of a simplification because the picture is a little more complex than that. The fundamental idea is that the patent system exists as an incentive mechanism to promote innovation and invention so that people can invent and innovate, and society can benefit. So, if the societal benefit from innovation is the idea, we need to identify the inventor who should be given an incentive. So, there are four broad views. Right now, no unique patent law response is required. We can continue to run the show as it is, trying that with human inventors. Some ideas say let us be pragmatic. Let us not be too rigid or too human-centric or close our eyes: No patent based on AI, no patenting for inventions based on AI systems. Let us close our eyes and then think about what would happen if we keep on thinking like that.

The system may face more problems in the future than it is facing now, so take a pragmatic response, come up with some modest changes to the existing patent law, but then don't drastically change it; there are also certain arguments like AI neutrality and AI-generated inventions. AI is a technology; patent law is technology neutral, whether your patent relates to neurotechnology, nanotechnology, mechanical engineering, electrical engineering, or any discipline in science and engineering. As long as the criteria are met, you are not talking about the discipline under which AI patents can be granted. We don't talk like that, so let's consider the technology neutrality in patents. Particularly when it comes to interdisciplinary innovations, you need insights or work from different disciplines, knowledge from various fields is essential. Let us look at that as the key point of neutrality and then say that we will extend the same to AI, and as a consequence, patents for AI-generated inventions should be granted. This is the view.



Arguments for No Change To Patent Law



- **Patent Law's Response to Emerging Technologies**
 - Patent law is designed to be technology and industry neutral
 - Historically accommodated technologies like software, biotechnology, and genetics
- **AI and Patent Law**
 - AI has fit within existing patent law frameworks
 - AI may change the cost of innovating and the role of human inventors
 - Central inquiry remains incentivizing human invention



But the argument not to change patent law is also equally strong because patent law is designed to be technology and industry neutral. Historically, technologies like software, biotechnology, and electrical systems have been accommodated. So, we need not think that AI will be a major challenge right now. AI has to fit within the patent law, which is possible. AI changes the cost of innovating, the role of human inventors. So, the central inquiry of patent law is not technology-oriented. The central inquiry or central concern of patent law is not whether this technology or that technology; it is meeting the human requirement, that should be incentivized. So, if there is a need, if that is the fundamental idea of patent law, don't jump and say we are going to change patent law because a new, dazzling technology has come with so many things. Let us not rush. This is one view.



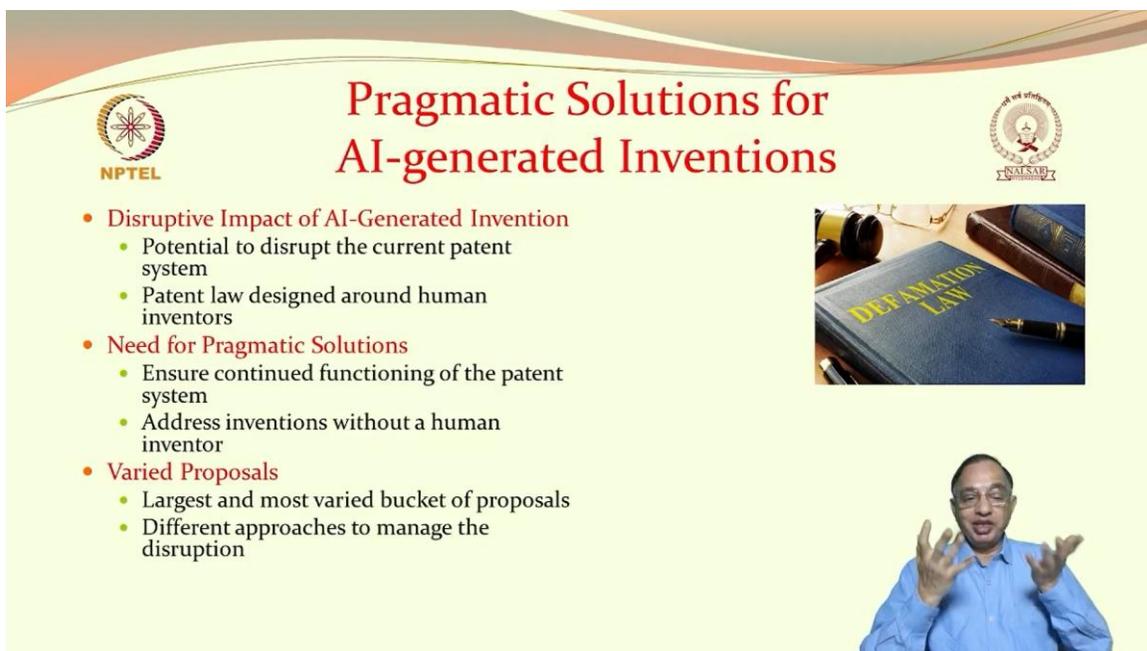
Human-Centered Nature Of Invention



- **Focus on Human-Centered Invention**
 - Importance of human centrality in the patent system
 - Justifications for human-centered patent law
- **Professor Gervais' Argument**
 - Goal of patent law is to foster human development
 - Patent law should support and encourage human invention
- **Guidance by Human Progress**
 - IP rights in AI should be guided by human progress
 - Not just the acceleration of AI or growth of Silicon Valley fortunes
- **Support for Human-Centered Progress**
 - Human-centered IP system supports progress of science and useful arts



The other view, which again states that the human-centred nature of the invention and the importance of human creativity are very obvious. On the other hand, Professor Denald Garvais, a well-known IP expert, one of the top-ranking IP experts in the world with rich experience, has written many books and authored numerous important articles on patents, particularly in different branches of IP. So, he says the goal of patent law is to foster human development. So, patent law should support and encourage human inventions. And then IP rights and AI should be guided by human progress. And then the idea here is not to create more AI-based companies or make Silicon Valley giants even more billionaires, more powerful, and richer. If we can think in terms of human-centred progress, then a human-centred IP system supports the progress of science and useful arts. So, based on those criteria, we can rethink the entire debate. That is what one of the ideas proposed by people, including Professor Gervais, talks about: the human-centred nature of invention, not the human as inventor.



The slide features a title in red text: "Pragmatic Solutions for AI-generated Inventions". On the left is the NPTEL logo, and on the right is the IIT Gandhinagar logo. The main content is a bulleted list:

- **Disruptive Impact of AI-Generated Invention**
 - Potential to disrupt the current patent system
 - Patent law designed around human inventors
- **Need for Pragmatic Solutions**
 - Ensure continued functioning of the patent system
 - Address inventions without a human inventor
- **Varied Proposals**
 - Largest and most varied bucket of proposals
 - Different approaches to manage the disruption

There is an inset image of a blue book titled "DEFAMATION LAW" with a pen resting on it. In the bottom right corner, there is a video inset of a man in a blue shirt gesturing with his hands while speaking.

Some pragmatic solutions regarding the disruptive impact are going to emerge, particularly concerning human inventors. Let us look at pragmatic solutions that ensure the current functioning of the patent system, addresses inventions without a human inventor. This is a valid proposal. Different approach to managing the disruption suggests that inventions without a human inventor should be given consideration to determine whether they fulfil other criteria.



Patentability of AI-generated Inventions



- **AI-Generated Inventions and Patentability**
 - Some believe AI-generated inventions should be patentable
 - Approaches vary from modest changes to patent law to radical shifts
- **Radical Approach**
 - Machines as inventors for patentability purposes
- **Less Radical Approaches**
 - Adjustments for shared claim to invention
 - Broadened view of conception
 - Inventorship attributed to people using AI tools
 - AI as co-inventor or work for hire



Then AI-generated inventions should be patentable; approaches that modestly change the notion of machines as inventors for patentability purposes are very drastic. Less radical adjustment to shared claim: okay, a machine can be a co-inventor up to the share of 30% or 40%, depending upon the machine's contribution. And then you broaden the view of the idea of innovation and the innovative process. Innovator, inventorship addressed attributes to people using AI tools. But AI tools cannot be given inventorship. AI can be there as a co-inventor, can be second co-inventor but not the first co-inventor, or can be the third co-inventor but not the first inventor or the second co-inventor. The work for hire doctrine in patent law is very old, valid, and has stood the test of time, so AI can be listed as the co-inventor or as a work for hire. In a work for hire, I commission a person or ask a person who works for me to do something, so under the work for hire doctrine of patent law, it is also possible to accommodate AI. So that is one of the less radical approaches. But how can we translate these things into practice, particularly when the whole AI versus patent system is centred on one approach: a human-centric approach?



Regulatory Responses and Competition Law



- **Industry Concentration and Control**
 - Key AI assets include compute power, data, and human capital
 - Trends in industry concentration raise concerns
- **Broader Regulatory Response Needed**
 - AI disruption requires more than patent law changes
 - Antitrust law and governance principles of open access and data sharing are essential
- **Innovation-Friendly Macrostructure**
 - Patent law functions effectively with an innovation-friendly data economy
 - Macrostructure plays a pivotal role in the innovation ecosystem



Regulatory responses have also looked into competition law principles, and then we will examine competition law and AI in a different context, so we need to consider that AI disruption is not something that requires changes to patent law because, all said and done, AI is not something that revolves around patent law. It revolves around a broader macroeconomic structure where venture capital, big firms, national governments, investors, universities, and everyone else are stakeholders. So, the industry concentration control is one point, broadening the AI economy and AI innovations through incentivization and national strategies is another point, and then creating an innovation-friendly AI ecosystem, which will also be IP-friendly, is a third point. So, there are a lot of objectives when we talk about AI systems. So, the regulatory response to AI and the response in terms of IP in AI may be the same or may not be the same. Because the IP response to AI may also involve competition law. Whereas the pro-innovation approach to regulation may not view competition law as a key part of the strategy. In fact, we see that as a limiting factor for innovation to flourish. But we will have a session on competition law and AI.



Artificial Inventors Project & Legal Test Cases



- **Historical Context**
 - Sporadic legal attempts to patent thinking machines
 - Open question on patentability of machine-generated inventions
- **Artificial Inventors Project**
 - Formed by Professor Abbott and pro bono patent lawyers
 - Started filing legal test cases in 2019
 - Goal: Promote discussion and guidance on AI-generated discoveries
- **Patent Filings**
 - Filed patents for a warning light and a food container
 - Listed machine Dabus as the inventor
- **Legal Challenges**
 - USPTO rejection based on inventorship requirement



So, the artificial inventors project is a project that they wanted to test. Professor Abbott and then a series of pro-bono patent lawyers started filing in 2019 to promote discussion and guidance on AI-generated discoveries. This was like a test. This is like you float something and then test how it works. Or you develop something and then see how it runs. This is like a prototype testing. So, they filed a patent and then listed machine DABUS as the inventor, but it was rejected on the grounds that we have been discussing again and again: inventorship.



Next



- In the next session we will discuss inter alia, Generative AI and Patent/Patenting



In the next session, we will discuss generative AI and patents, and that will be the final session on AI and patents.