Expert Q&A on Using Artificial Intelligence (AI) Patent Prosecution Tools

by Practical Law Intellectual Property & Technology

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An expert Q&A with Curtis Altmann at Hoffmann & Baron and Ian Schick at Paximal on artificial intelligence (AI)-based tools for patent preparation and prosecution practice. The Q&A addresses the state of available AI tools for various aspects of patent practice, including invention documentation, prior art searches, drafting patent applications, and practice management, the current benefits and risks of these tools, and the outlook for their improvement and adoption by patent counsel.

Artificial intelligence (AI) is a term used to describe computer technology with the ability to perform tasks traditionally performed by humans, which can include:

- Analyzing data to reach conclusions about it, find patterns, and predict future behavior.
- Learning from data and adapting with experience to perform certain tasks better over time.

Attorneys are already using AI-based tools for a wide range of tasks, including legal research, discovery, document review, and due diligence. Attorneys must carefully balance the benefits and efficiencies of relying on AI tools with their potential risks and imperfections.

By embracing AI, innovative law departments can better serve their clients and respond to the rapid changes transforming the legal profession. For more information on how law departments use AI and other kinds of technology to increase efficiency, see Practice Notes, Using Artificial Intelligence in Law Departments and Using Technology to Increase Law Department Efficiency.

Using AI in law practice may be a daunting proposition. Still, attorneys have an ethical duty to keep up with changes in the law and legal practice, including the benefits of using technology (see ABA Model Rule 1.1, Comment 8). For additional key ethical considerations for in-house counsel using AI, see Practice Note, Artificial Intelligence and Legal Ethics and Standard Document, Artificial Intelligence and Legal Ethics: Presentation Materials.

Practical Law asked two patent attorneys for their insights on the state of AI tools for patent prosecution, including documenting inventions, patentability searches, patent drafting, prosecution, and practice management. Curtis Altmann is a partner at Hoffmann & Baron, focusing on patent prosecution and portfolio development. Ian Schick is Chairman and Chief Innovation Officer at Paximal and a former Big Law patent attorney. Paximal develops AI technology to automate certain patent processes, including patent document preparation. They discuss the benefits, risks, and future of AI tools for patent prosecution.

For an overview of key legal issues relating to the use, acquisition, and development of AI, see Practice Note, Artificial Intelligence Key Legal Issues: Overview.

For a collection of Practical Law resources to assist attorneys in identifying potential legal issues concerning AI, see Artificial Intelligence Toolkit.

What Is the State of AI-Based Tools for Patent Prosecution?

Attorneys have traditionally been slow in adopting new technologies for their practice. However, tools that rely on AI are transforming law practice, including patent practice, making it necessary to adopt appropriate tools as they become more reliable and effective for key tasks along the patent procurement pipeline.

Compared to other areas of law, patent practice is advanced in AI adoption. This is likely due to a few factors, including that the practice deals with high-value, high-volume documents, there is a vast amount of patent training data available in the public domain, and patent practitioners are technically minded, which increases the chances of these experts leaving practice to start an AI company focused on patent services. Soon, these tools will be crucial in all except the most complex legal and strategic tasks.

Developers have already made large strides with AI patent tools, which address most patent prosecution tasks in varying degrees. None of these are perfect, and human review and intervention are key. While attorneys differ in their current adoption of AI tools, they generally agree that these tools will fundamentally alter patent practice and its business model because repetitive document generation goes to the core profit of patent practice. AI has the potential to greatly reduce the number of patent attorney billable hours for document preparation and other practice tasks. This may drive firms increasingly toward alternative fee arrangements, although some attorneys may not view this as a benefit until more nimble practitioners undercut existing price structures. The compelling efficiencies of AI will eventually overcome intransigence. Nimble firms and attorneys carefully but aggressively adopting these tools will likely fare the best.

Because of the pace of AI tool development across all patent practice, even less tech-savvy patent counsel must stay apprised of developments and evaluate and implement appropriate tools to improve and streamline their practice.

Which Patent Prosecution Tasks Are Currently Handled by AI Tools?

In general, highly repeatable tasks are good candidates for AI. These include nearly all administrative tasks, routine client communications and document preparation, and bulk data analysis. Bad candidates for AI include tasks that heavily depend on creativity, judgment, or human touch, such as direct client contact, having a comprehensive understanding of the client's business and business needs, portfolio strategy and matter-specific strategy, and overseeing legal work product.

The patent prosecution tasks currently best addressed by AI assistance include aspects of patentability searches, patent drafting and review, and prosecution workflow management. These tools are improving quickly. Patent prosecution counsel should therefore consider and monitor tools across the prosecution pipeline (see What Are Important Considerations When Evaluating AI Patent Prosecution Tools?).

Invention Identification and Documentation

AI tools are available to assist with invention identification and harvesting, documentation, and inventor interviews. For example, it is possible to automate potential invention identification within a company's research and development activities by analyzing data and patterns and suggesting areas where new inventions may be present or possible. AI tools can also:

- Automatically generate invention disclosure forms-based information provided by the inventors or discovered through automated harvesting.

- Transcribe inventor interviews, ensuring that all details are accurately recorded. These tools can also help translate the various technical language used by inventors into a more uniform format.

Patent Search and Analysis

Developers and attorneys have emphasized AI-assisted tools for patent search and analysis tasks. Many products can now sift through vast amounts of patent data to identify relevant **prior art**, assess the novelty and non-obviousness of an invention, and generate a search report. AI tools can also support product clearance and **freedom-to-operate** (FTO) analyses. In addition to commercially available tools, the USPTO, for example, is developing an AI-based similarity search tool that reads a patent application as a search input (see New PE2E Search Tool Using AI Search Features (Jan. 11, 2022)) and a classification tool that automatically determines a patent application's Cooperative Patent Classification (CPC) based on the application's content.

However, AI search tools' underlying dataset and operational details can be opaque, and their subjectivity can lead to false positives that can dilute relevant results and false negatives that leave the attorney in the dark. Other factors include:

- Whether the relevant prior art has been digitized and is searchable. Some older references may:
    - be available only on paper or in an unsearchable format or database; or
    - require effective chemical structure or sequence searching depending on specialized search queries and interfaces and effectively cataloged literature.

- Potentially biased results stemming from biased or outdated training data. For example, much historical patent and scientific literature has been reinterpreted over time or called into question.

Together, the benefits and challenges of AI-assisted search mean that:

- Their use and effectiveness depend on the specific search purpose and the level of rigor required for the situation. AI can most easily add value on its own when carrying out a fast, low-cost search.

- For optimal results, attorneys should use AI tools in combination with traditional search and analysis methods, including an iterative combination of AI and conventional semantic search tools.

Beyond a basic prior art search, available AI tools perform tasks including providing summaries, trends, and analytics. For example:

- Organizing and summarizing results. Given the large number of results returned in a typical search, organizing the information into a digestible, reviewable format is critical. AI can significantly assist the initial phase of a patentability review by reading, summarizing, and auto generating a table or other output based on the attorney's instructions.

- In addition to gathering and presenting the information, an effective AI tool may be able to refine the results in real-time as the reviewer separates the relevant reference from the chaff. At the same time, as an AI system reviews the materials in context, it may simultaneously update the search to capture missed references and eliminate existing hits (and annotate the reasons for exclusion for later review as needed). As the review proceeds, the AI is expected to continually re-rank the results.

Challenges remain for:

- Search input and prompt engineering. Generating the appropriate search terms and developing the "prompt" (the input) remains more art and experience than science. There is a developing body of knowledge on appropriately structuring search prompts. Prompt guides are available for non-patent tasks and are expected for patent searches.

- Actual patentability legal determinations, including obviousness under 35 U.S.C. § 103 based on what a hypothetical **person of ordinary skill in the art** (POSITA) would understand and do. Ideally, AI could avoid human hindsight bias by limiting its review to the prior art available as of a certain date. However, it is unclear whether it could reliably mimic a POSITA. One possibility is to suggest prior art reference combinations that a person would then analyze under Section 103.

Patent Application Drafting

Major and continuing advances in patent drafting AI tools include those for:

- Reviewing and proofing draft applications.

- Drafting patent documents.

The patent application proofreading abilities of off-the-shelf AI solutions are time-tested, with the first appearing over 15 years ago. These tools review existing patent draft patent documents for patent-specific errors. For example, they can identify dependency and antecedent basis issues, and internal consistency. Automated proofreaders can thoroughly check for these issues in seconds, with a near-negligible error rate. Automated proofreading should be a part of every practicing patent attorney's routine. Some clients may view not using automated patent-specific proofreaders in favor of manual review as potential bill padding.

Patent drafting tools create specification content and drawings based on invention information. These tools are reaching wider adoption, although there is a wide gap between the relatively advanced stage of available tools for drafting mechanical and computer-implemented inventions compared to drafting applications for inventions in the unpredictable chemical and life sciences technologies.

Early versions converted attorney-written claims to "mechanical-writing content" in patent applications, for example "copy-paste-massage-type" content like the claims summary and simple drawing figures like basic system diagrams and flowcharts. These tools proved to be highly consistent and reliable in creating robust patent application "shells." However, they often fell short in terms of customizability, leaving them relevant only to select technology areas or even specific patent portfolios. Nevertheless, at least for the engineering arts, these automated content generators have been fully embraced over the past several years by the most profitable and fastest growing patent practices. Many of these tools were developed in-house for specific high-volume portfolios, while third parties created others and have broader applicability across entire technology sectors.

Using invention disclosure materials as inputs, **generative AI** is closing the gap between what the early patent content generators could achieve and file-ready patent applications. However, at least for the unpredictable technologies, generative AI tools available off-the-shelf today are generally perceived as not providing content at the level of an experienced patent attorney. However, AI drawing tools are emerging that can generate advanced figures well beyond basic flowcharts and system diagrams.

Well-designed generative AI can be programmed to follow strict guidelines and protocols when drafting patent documents. This means it can be set to avoid adding any information not explicitly provided by the inventor. More reliable than human drafters, AI can be tailored to not introduce its own ideas or concepts into the patent application. Instead, it can be restricted to using only the information provided by the inventor to generate the necessary content. This can ensure that all the material in the patent application originates from the inventor, thereby minimizing the risk of inventorship disputes.

For biotech inventions, AI tools can analyze genetic sequences or chemical structures to assess the novelty and non-obviousness of a biotech or pharma invention. These tools can also help prepare patent applications by generating text and figures that accurately describe these complex processes.

Soon, generative AI tools for patent application preparation may cause the market value of patent application preparation to drop, forcing industry-wide adoption. This transition may take longer for biotechnology and life sciences patent applications. Still, patent attorneys will continue to play a crucial role in reviewing, amending, and validating AI-generated content to ensure it meets all legal and technical requirements.

Patent Practice Management

Available AI tools can:

- Prepare and manage **information disclosure statements** (IDS) by automatically identifying and categorizing relevant prior art references, generating IDS forms, and tracking submissions to the USPTO.
- Assist with preparing office action responses, including response shells and prosecution "packages" with relevant prior art documents and forms. Emerging tools promise to further assist with responses to office actions by analyzing the examiner's objections and generating suggested responses.
- Process USPTO office actions and other correspondence, playing the paralegal role by reading the document and docketing resulting due dates and action items.
- Perform patent portfolio management, including analyzing the portfolio to identify strengths and weaknesses, suggest strategies for maximizing the portfolio's value (for example, through initial filing decisions), licensing opportunities, and portfolio pruning.

Is the Invention's Technology Category Important for AI Tools' Effectiveness?

AI tools for tech and computer-implemented inventions are mature and widely available. For patent drafting, AI tools may be on the verge of becoming the norm. They are highly effective in conducting patentability searches, as they can quickly sift through vast amounts of digital patent data to identify relevant prior art.

On the other hand, AI tools for inventions in the chemical and life sciences technologies face additional hurdles. There has been less development effort to date in creating tools focused on these technologies. Complex biological or chemical processes can be more difficult for AI tools to analyze in a search. The non-patent literature is extensive and includes overlapping studies with different outcomes.

The relevant scientific terminology adds another level of complexity for these technologies because of the different terms in use that may be synonymous or represent different levels of specificity. New applications require complex planning and drafting to satisfy the enablement and written description requirements of 35 U.S.C. § 112. Additionally, these patent applications often require a significant amount of non-text equations, formulas, tables, and embedded drawings. It is unclear when AI will reach the threshold to draft an effective specification in the biotech and pharmaceutical fields.

What Are Important Considerations When Evaluating AI Patent Prosecution Tools?

Patent attorneys should continually monitor the availability and performance of relevant tools. Key considerations include:

- Whether the tool can be customized to fit a given practice's specific needs and workflows. The tool vendor should provide comprehensive support and training for their tool, be readily available to answer questions, resolve issues, and provide guidance on using the tool effectively.
- How the AI tool functions and how patent counsel can effectively apply it to patent preparation or prosecution.
- Whether they include robust security measures to protect your data.
- The expertise of the tool's developers, who should:
    - possess a deep and intimate understanding of patent law practice, including the nuances of patent preparation and prosecution;
    - have a proven technical expertise in relevant AI applications;
    - understand the latest developments in patent law and adapt their tools accordingly; and
    - provide evidence of successfully providing patent services to firms or companies, such as case studies or testimonials from satisfied clients.

What Are the Key Risks and Pitfalls Associated with Current AI Tools?

The key risks for practitioners using AI tools relate to system limitations and the user's potential overreliance based on a failure to understand the tool's operation and limitations. Specific risks and concerns include:

- The completeness and accuracy of the AI tool. A related concern develops from the continued development of important aspects of patent law, which could render the system inaccurate unless it is consistently updated.

- Input quality. The corresponding output can also be flawed if input data is incomplete, inaccurate, or biased. This may lead to missed opportunities, incorrect analyses, and potential legal issues. For example, the user prompt to a **large language model** is critical to output quality. For information on prompts, see Practice Note, IT Basics: Generative AI and Large Language Models: Overview: Prompt Engineering.

- The level of human involvement. No AI tool can eliminate attorney legal expertise, strategy, review, and input. Users may become overly reliant on AI tools and neglect to apply their own knowledge and judgment.

Attorneys should carefully consider ethical issues raised by these risks. The ABA model rules of ethics addressed these issues as early as 2012, providing in ABA Rule 1.1 comment 8, that lawyers should "keep abreast of changes in the law and its practice including the benefits and risks associated with relevant technology." Counsel should view AI as a legal assistant requiring supervision under ABA Model Rules 5.1 and 5.3. In 2019, the ABA adopted Resolution 112, clarifying Rule 5.3 to specifically encompass non-human assistants, stating that "lawyers are obligated to supervise the work of AI utilized in the provision of legal services…" AI does not replace the judgment and final review of an attorney, and attorneys should be wary and skeptical and carefully review any AI-generated work product, particularly at this early stage of AI development. To meet this burden, attorneys must become familiar with and have a general understanding of what AI can do and carefully vet the developers of any AI system. Patent counsel can reduce ethical issues by ensuring that the attorney controls and is accountable.

For more information on ethical considerations for in-house counsel using AI, see Practice Note, Artificial Intelligence and Legal Ethics and Standard Document, Artificial Intelligence and Legal Ethics: Presentation Materials.

What Are Your Predictions for the Future of AI in Patent Prosecution?

The pace of uptake of the most transformative AI tools for search and patent drafting may differ based on the invention technology, with more rapid adoption of tools directed to computer-implemented and mechanical inventions. Tools for life sciences, chemical, and other unpredictable technologies face additional hurdles in function, risk mitigation, and reluctance by attorneys.

Patent practice will eventually transform as the profit center for practitioners shifts from document production to higher-value strategic legal advice. Both senior and junior attorneys will have a reviewing role. The nature of patent practice and patent attorneys means that this shift may occur faster than in other fields of legal practice. This does not mean the demise of patent lawyers but rather a shift in the business model and attorney function.

