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Standing Committee on the Law of Patents

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REPORT ON THE SHARING SESSIONS ON THE USE OF ARTIFICIAL INTELLIGENCE AND OTHER TOOLS FOR EFFECTIVE PATENT EXAMINATION PROCEDURES

Document prepared by the Secretariat

INTRODUCTION

1. Pursuant to the decision of the Standing Committee on the Law of Patents (SCP) at its thirty-fifth session, held in Geneva from October 16 to 20, 2023, the present document contains a report on the sharing session on the use of artificial intelligence (AI) for patent examination procedures, held on October 17 and 18, 2023 during SCP/35, and the sharing session on the use of various tools, including AI, for effective patent examination procedures, held on October 15, 2024 during SCP/36.[1]

[1] Presentations made during the sharing sessions are available at: https://www.wipo.int/meetings/en/details.jsp?meeting_id=75414 (SCP/35) and https://www.wipo.int/meetings/en/details.jsp?meeting_id=80917 (SCP/36). Webcasting and automatically generated World Intellectual Property Organization speech-to-text transcripts of the sharing sessions are available at: https://webcast.wipo.int/video/SCP_35_2023-10-17_PM_120868, https://webcast.wipo.int/video/SCP_35_2023-10-18_AM_120874, and https://webcast.wipo.int/video/SCP_36_2024-10-15_PM_123694.

Sharing session at SCP/35

Presentations

Delegation of France

2. The Delegation of France reported that the National Institute of Industrial Property (Institut National de la Propriété Industrielle – INPI) had been using AI for the automated allocation of patent examinations to examination teams and to individual examiners since 2019. Its first model, for supervised learning, was supplied with a data collection that included 150,000 patents published by INPI in French. A recent improvement on the model added a predictive step for the technology subclass using a Bidirectional Long Short-Term Memory neural model. The new model had an accuracy rate of 92 per cent, compared to 80 per cent for the previous model.

3. One of the challenges in patent administration was the multi-level patent classification system. For one patent application, there could be more than 60,000 subgroups available under the International Patent Classification (IPC) system, with a single primary code and several secondary codes. More sophisticated models were required to handle the multi-level classification system. For its part, INPI focused on the Extreme Multi-label Text Classification (XMTC) to move towards automation of the system. INPI conducted a feasibility study with various models including XML-CNN, Parabel, and BERT for Patents, and collaborated with research institutes using XMTC.[2] It was important to supply the models with a vast and high-quality dataset to ensure that they could function as accurately as possible. The amount of data fed into the new model included 300,000 patents from INPI internal databases and patents published by the European Patent Office both in French and English.

4. The latest model for patent classification developed by INPI had been used during the previous few months and was undergoing a performance evaluation for further developments. The model used two formats: (1) light XML, and (2) attention XML. Each format processed three types of data input: (a) title, abstract, and description, (b) title and description, and (c) title and claims. Large patent datasets were used, which required significant background work in order to fill the data gaps. With two formats processing three data inputs, there were six different prediction results. All the predicted results were consolidated, and the ones with the best scores in terms of certainty were selected to be used by the model. The model offered over 70 per cent reliability at that time.

World Intellectual Property Organization

5. The Representative of the International Bureau of the World Intellectual Property Organization (WIPO) presented PATENTSCOPE, a search system that provided access to more than 100 million documents in various languages. It also comprised WIPO Translate, a machine translation tool that incorporated neural machine translation technology. The history of the development of machine translation would provide a good example of the history of AI, which had evolved from traditional AI (rules-based machine translation) to a machine learning-based approach (statistical machine translation) and, more recently, to modern AI (neural machine translation).

6. At WIPO, AI was supervised using a deep learning model (supervised learning). In other words, for each input, there would be a corresponding output (answer), resulting in paired datasets. By processing numerous examples during the training process, the AI had learned to predict the outcome based solely on an input. PATENTSCOPE had delivered machine

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[2] See page 6 of the presentation, at: https://www.wipo.int/edocs/mdocs/scp/en/scp_35/scp_35_quality_b.pdf.

translation performance which was either superior or competitively accurate when compared with other commercial machine translation tools. Recent enhancement of PATENTSCOPE had enabled direct translation between Chinese, Japanese and Korean, without relying on a pivot language. Beyond PATENTSCOPE, WIPO had also trained models for other purposes, such as on-demand translation of WIPO websites from English into other languages and translation of content inside databases such as WIPO GREEN. Recently, WIPO released a product called PCT-FATE, which also used WIPO Translate. Each week, all PCT documents had been fed into PCT-FATE to be translated into English.

7. In addition to machine translation, WIPO developed a patent classification tool, primarily based on the IPC system. The Organization had trained the tool through the use of nearly 30 million documents, mostly with titles and abstracts. The tool used a neural network for classification. At the subclass level, the level of accuracy was high, reaching the 90 per cent range for the first four characters of the classification. Even at full granularity, down to the subgroup level, the level of accuracy remained at approximately 80 per cent, which was deemed a good starting point.

8. A recent project had involved image segmentation, a process for the splitting of a single image containing several figures into separate images, each with one in a single figure. Although that process might seem straightforward, it was quite complex, especially when dealing with hand-drawn images. Large language models (LLMs) were also being explored, with further projects including the Vienna Classification Assistant and automatic transcript generation for the WIPO Webcast. The Vienna Classification Assistant was a public tool that allowed users to upload a picture or image, which was then classified according to the Vienna Classification. On the WIPO Webcast, a system generated fully automatic transcripts, which were uploaded after WIPO conferences and made publicly available without human intervention.

9. WIPO owned and trained its own AI system in order to have a specialized system for specific tasks and domains, which were highly customized to provide better quality results. In addition, the use of an internal system was the only way to ensure that high standards of confidentiality were met. Some systems, such as WIPO Translate, could be shared with the intellectual property (IP) offices of Member States. It should be noted that successful projects, especially those involving AI, were business-driven. A thorough understanding of the relevant task was required, along with a focus on being as specific as possible. Conducting evaluations of systems was also important. With regard to training the system, the more data that was fed into a particular area, the better the outcome of the training process.

Statements made from the floor

Delegation of Uganda

10. The Delegation of Uganda noted that use of AI by patent offices appeared to be concentrated in the developed world. A holistic approach, including developed and developing countries, was needed to address the complexities of AI and data governance and to ensure that no one was left behind.

Delegation of Yemen

11. The Delegation of Yemen said that while automatic patent classification could have many advantages, particularly in terms of quality and productivity, it remained a costly option with high human resources requirements, making it particularly inaccessible to least developed countries (LDCs). Furthermore, automatic translation might not always be suitable for legal texts, which could lead to problems.

Delegation of the Czech Republic

12. The Delegation of the Czech Republic said that, in the light of the high potential of AI in IP management and in enhancing the services provided to users of the IP system, the Industrial Property Office of the Czech Republic had increased the integration of AI in various activities. One such activity was the enhancement of its public services. The office was in the final stage of implementing an automated IP helpdesk, a service that employed text-to-speech and speech-to-text technologies, allowing users to communicate with a chatbot. The service would be further developed based on the evaluation of a pilot project. Another activity involved the implementation of a new search tool that could enable non-professional users to conduct prior art searches using plain text description of the inventions, project briefs and similar material. The search engine would also be utilized internally for the automated classification of patent documents.

Delegation of Germany

13. The Delegation of Germany said that the German Patent and Trademark Office (Deutsches Patent- und Markenamt – DPMA) had developed a cognitive search tool using AI methods for prior art search, in partnership with an external partner. The tool had been employed in patent examination practices since 2019, with search options available in German and English. All published German patent documents on record had been used for training purposes over a two-year period, and a set of English documents used for training had been expanded to include all United States-granted patents since 1990. However, results in the English search continued to be lower than those in the German version. DPMA had therefore worked on enhancing the phrase analysis and vectorization of the English language documents on record, with a focus on the semantic analysis of composite terms. Additionally, the size of the searchable full-text database of DPMA had increased over the previous two years.

14. DPMA had begun utilizing WIPO Translate for the automatic translation of new incoming patent documents in Asian languages, as well as existing patent documents in the database. As a result, the full-text translation of nearly all national patent publications by China, Japan, and Korea, for which an original full-text document was available, had been incorporated into the database. Additionally, approximately 75 per cent of the international patent documents published by WIPO in one of the three languages had been included. In other words, at that time, over 100 million full-text documents were available for cognitive search by DPMA in English, including approximately 75 million patent documents in the three languages. DPMA was in the process of retranslating the full-text documents in the database using an updated version of the translation software.

15. Since March 2023, DPMA had been implementing a pre-search algorithm that utilized an AI-based cognitive search based on the file number of a particular application under examination. The search query was generated using the description, claims, and title in the application. The pre-search algorithm returned a list of patent documents with the metadata. In cases where a lack of novelty of invention had previously been established by the examiners, there was an approximately 40 per cent chance that at least one of the top 50 ranked German language documents found by the pre-search algorithm also indicated the lack of novelty. The algorithm could serve as a qualified entry point for examiners in their prior art searches.

WIPO

16. In response to the questions raised by the Delegation of Yemen on automatic patent classification, the Representative said that if a model had been trained and the system was available, it could be made accessible. One advantage of using automated patent classification was the consistency it would provide, especially considering that there were 70,000 potential subgroups. In terms of quality, machine translation could not replace human translation.

However, it was important to use the system in a fit-for-purpose manner, in accordance with factors such as urgency and required quality of the translation.

Delegation of France

17. The Delegation of France said that INPI was using automatic patent classification in conjunction with translation programs. Moreover, by combining patent classification with translation, INPI might be able to classify patents in languages other than French.

Delegation of the United States of America

18. The Delegation of the United States of America said that the United States Patent and Trademark Office (USPTO) had employed machine learning in two areas of patent examination: prior art search and patent classification. To facilitate prior art searching, the USPTO had developed AI capabilities, namely the "more like this" and "similarity search" functions. Both capabilities began with an anchor patent document, such as an issued patent or published application, and returned a list of domestic and foreign patent documents that were similar to the anchor document. The AI algorithm then determined the similarity between the anchor document and a list of documents based on the text and classification symbols of the anchor document. "Similarity search" also enabled examiners to refine the results by focusing on specific classification symbols, paragraphs, sentences, or even words within the anchor patent document. The AI capabilities had been improved over time based on feedback from examiners. To foster transparency, patent applicants had been notified in a search report in cases where one of the AI tools had been utilized during a patent examination. With regard to the automated classification of patent documents, USPTO launched a tool that would automatically review the entire text of a patent application and suggest classification symbols to be assigned to that application. The tool also had a claim-specific classification capability that identified the symbols associated with individual claims. Examiners had provided feedback on using the tool for quality control purposes.

Delegation of Singapore

19. The Delegation of Singapore stated that, following positive results from a collaboration with AI Singapore on the use of AI models for patent classification and prior art searches, the Intellectual Property Office of Singapore (IPOS) would launch a pilot program in 2024. IPOS had taken into consideration that, while AI had the potential to decrease the number of tasks undertaken by examiners, it was also necessary to implement robust measures to ensure quality. Without such measures, there was a risk that examiners, particularly those who were less experienced, might rely too heavily on the AI system for speed, inevitably compromising the quality of decisions.

Delegation of Australia

20. The Delegation of Australia said that IP Australia had utilized an automated patent classification service to perform a preliminary classification of patent applications according to the IPC system to distribute them among examination sections. The service employed natural language processing to analyze the contents of each patent application and a machine learning model to predict the relevant technology groups within the appropriate patent examination section. In terms of natural language processing, IP Australia had developed a foreign examination report features analysis functionality that utilized natural language processing to identify and extract relevant objection and citation information from foreign examination reports on related applications identified by a patent family member analyzer tool.

21. In terms of the machine learning model, IP Australia had employed an automated preliminary search tool and a patent family member analyzer tool. The automated preliminary search tool performed an automated search of published patent applications as well as non-

public patent applications from the internal databases of IP Australia using automatically generated search queries. Patent citations were presented to examiners and put in order of relevance as determined by a machine learning algorithm. The patent family member analyzer tool retrieved published family member information from a patent application and presented it in a way that allowed for easy visual comparison of the claim sets. The machine learning model analyzed the claims and calculated how closely they were related, allowing examiners to identify closely related family members.

22. In addition, IP Australia had utilized the machine learning model to enhance the outcome-based directions process by prioritizing directions based on the circumstances of the applicant. The model directed applicants to request an examination in cases where their IP strategy was more developed and corresponding family member applications had progressed through the examination stage in other jurisdictions. The long-term vision for the foreign examination report features analysis functionality tool included the capacity to indicate to an examiner if an objection raised in a foreign examination report should also be raised under Australian law.

Delegation of China

23. The Delegation of China reported that the China National Intellectual Property Administration (CNIPA) Trademark Office had adopted AI-based technology to improve information and communication technology development. The automatic patent classification system had been implemented online, and the search function was based on AI technology, enabling natural language search and image search functionalities. During the examination of Chinese applications, automated classification, automated translation, and image identification tools were utilized to assist examiners in effectively concentrating on core functionalities.

Delegation of Poland

24. The Delegation of Poland said that, in January 2021, the Patent Office of the Republic of Poland had implemented an AI-based system as part of the GovTech Polska program. The program implemented a system adopted by an AI algorithm with an explainable AI solution, allowing users to see why a specific patent document was classified in a manner proposed by the algorithm. The system was called an “auto patent”, and it served to identify trained keywords with patent descriptions and to assign the patent application to the appropriate classes based on those keywords. Simultaneously, the system would monitor the number of cases assigned to examiners and distribute subsequent cases proportionally among them. The average classification accuracy of the “auto patent” had reached 92 per cent.

Delegation of the Russian Federation

25. The Delegation of the Russian Federation expressed appreciation for the substantive results achieved by WIPO Translate. The international patent system promoted the principle of multilingualism within WIPO, and such success in high-quality machine translation was important not only for patents but also for industrial designs, utility models, and trademarks.

Delegation of France

26. The Delegation of France noted that the present information-sharing session had demonstrated the different delegations’ interest in the issue of AI in general, and specifically the tools that could facilitate patent examinations. It would be useful to reconvene such a session in the future, in order to become familiar with the progress made by the different offices.

Third World Network (TWN)

27. The Representative of the Third World Network said that, while the primary argument in favor of using AI for patent examination related to saving time, it was important to recognize that

many countries had incorporated Trade-Related Aspects of Intellectual Property Rights (TRIPS) flexibilities into their patent laws, which also covered the scope of patentability. The excessive reliance on the international search report and the international preliminary examination report within the Patent Cooperation Treaty (PCT) system at the time had hampered the comprehensive prior art searches, leading to the issuance of patents that might have run contrary to the patent laws in many countries. To address the scope of patent protection existing in different countries, it was essential to tailor prior art searches to align with the provisions of national patent law. The use of AI systems raised concerns over the potential for harmonizing patent laws by undermining the provisions of national patent law, bearing the danger of an influx of patent monopolies that did not align with the scope of patentability provisions under domestic patent status. That presented a significant challenge for resource-constrained countries dealing with both communicable and noncommunicable diseases. Therefore, using AI to expedite examination and searches might have come at a significant cost in terms of public health and access to medicine. Developing countries should approach the use of AI with caution and carefully consider the integration of TRIPS flexibilities into their patent law while promoting generic competition.

Sharing session at SCP/36

Presentations

Delegation of Japan

28. The Delegation of Japan said that the 2022 action plan for the utilization of AI technology was undergoing revision. Meanwhile, the implementation phase for patent classification tasks and prior searches, including conceptual searches and ranking of patent documents, was projected to commence in the fiscal year 2024 in light of changes in technological trends and rapid revolution of government policies in the area of AI. During that period, proposals for solutions would be examined, and technical demonstrations would be conducted. The implementation phase was scheduled for the fiscal year 2025 and would incorporate the following elements: patent classification assignments; concept searches; advanced searches; and use of an LLM.

29. Advanced search tools based on conceptual searches, including a Boolean-search system, would also be implemented. Those tools might allow examiners to prioritize examination of the most pertinent documents through utilization of a conceptual search/re-ranking system. Furthermore, information originating from drawings would be instrumental to obtaining relevant drawings. A machine learning model would also be employed to determine the similarity of the drawings with the claimed inventions.

30. The Japan Patent Office (JPO) had published more than 40 case studies on examples of examination cases linked to AI-related technologies. An additional 10 cases had been added in March 2024, including on the topic of generative AI. A specialized internal team dedicated to facilitating examinations of AI-related inventions had been established in January 2021 and had collaborated across diverse technical fields to provide support for AI examination and knowledge on the latest AI technologies. Previously, AI examinations had been executed solely by examination officers responsible for the fields in which AI technology was frequently employed. After the establishment of the specialized team, at least one AI examination expert had been allocated to all examination offices. Moreover, as of April 1, 2024, the JPO instituted a new position for external experts, designated as AI advisors, with a view to supporting the examiners, including AI examination experts.

Delegation of France

31. The Delegation of France said that a department called "the lab" had been established within INPI in 2019. It was dedicated to frontier technologies, particularly AI. The goal was to improve the efficiency of internal processes and to create prediction models from the experiences of the institute and its databases. The patent department of INPI, composed of a group of engineer examiners, focused on developing macro solutions to meet the examination-related needs of the institute. Regular optimization of tools was planned, guided by the principles of effectiveness, rapidity by focusing on agile development (i.e. use the version currently available and improvise later), pragmatic implementation.

32. The Delegation then presented AI tools used in the patent department. With regard to the patent examination allocation, prior to 2019, the allocation of patent applications had been done manually, a repetitive task that was prone to error. In 2019, INPI had generated an AI tool based on text processing and machine learning for automatic examination allocation, trained using an internal database. The success rate of the tool was about 80 per cent. In December 2021, the tool had been improved with the deployment of a new deep learning model trained with additional and more recent data, increasing the success rate to 92 per cent. The tool enabled patent examination allocation to examiners and provided a Level 4 IPC classification, saving an estimated 20 to 30 hours per week. The tool for the classification of patent

applications had been developed in collaboration with an external research institute, using a larger amount of data for better quality. The tool had a 70 per cent precision rate and had been used by patent engineers since 2023. It was also used to train junior staff and to harmonize patent classification among examination teams, and to update statistics on technology trends.

33. Several non-AI automation tools had been developed internally in the patent department, including: a tool to identify and provide notifications of errors in documents; an automatic text analysis for claim support searches; a reference sign detection tool; a tool to compare different application versions; a conversion tool for images; and an IPC import from cited references. However, they constituted support tools, and did not replace examiners, who were responsible for evaluating and checking claim support applications.

34. With regard to trademarks, a tool for classification for figurative trademarks had been purchased, resulting in cost and time reductions. The tool had been developed to examine official gazettes, including historical gazettes that were only available in paper format. It also enabled the creation of a digital version of scanned formats. Furthermore, an anonymization tool had been developed to automatically anonymize certain documents through PDF analysis.

35. Lastly, INPI had various projects in its portfolio, including patent examination allocation and IPC classification, using both AI tools and non-AI automation tools. In that connection, valuing the work of examiners was essential.

Statements made from the floor

Delegation of the Czech Republic

36. The Delegation of the Czech Republic said that the integration of AI had been explored to enhance public services, including IP services. One such initiative was the development of an automated IP helpdesk, with text-to-speech and speech-to-text technology, which was undergoing internal testing. Further development of that tool would be based on the evaluation of the pilot project. A new research tool had also been developed to allow non-professional users to conduct a prior art search. Specifically, the tool aimed to make the search process more accessible and efficient for those who might not have expertise in IP or patent law. The success of those initiatives would depend on the ability of the tool to improve the user experience and to enhance the overall efficiency of IP services.

Delegation of Germany

37. The Delegation of Germany said that the classification of patent applications and prior art search were crucial steps in the patent examination process. To improve the efficiency and accuracy of those tasks, a cognitive search tool had been developed in cooperation with an external partner. That tool featured semantic search functions in German and English and had been continuously improved since 2019 through further training and updating of the cognitive models. A pre-search tool had also been developed, which provided a preliminary list of patent documents and served as a qualified entry point for further analysis. The tool had also improved the ranking of search results, with an approximate 40 per cent chance that the top 50 ranked German documents in the pre-search result already contained at least one relevant document. In addition, a next-generation version of the cognitive search tool had been developed, which would utilize a text-to-text model and on-premise LLMs. The tool would also feature an improvement in the phrasal analysis and vectorization of English language documents on record, with a focus on the semantic analysis of composite terms. AI-based support tools had also been tested for automatic summary generation, based on free translated documents provided by WIPO. With more than 100 million Asian full-text documents currently available, the use of AI-based tools was becoming increasingly important in the patent examination process.

Delegation of China

38. The Delegation of China said that, in January 2023, CNIPA had launched its intelligent patent examination and search system, which incorporated various AI technologies to improve the efficiency and accuracy of patent examination and search processes. The system featured intelligent semantic search, automatic patent classification, machine translation and image search, which provided smart tools for browsing and for establishing a unified translation database. It also integrated multiple intelligent auxiliary tools, including an Internet evidence platform, automatic generation of feature comparison tables, notification verification and intelligent assistance in drafting notifications. Thus, repetitive tasks involving examination of defects were done by such tools rather than by examiners.

39. Nonetheless, the deployment of AI tools had led to several challenges given the demand and the high expectations of relevant stakeholders. One of the main challenges was how to ensure a more science-based and rapid response to the continuously evolving demands of users. To address that challenge, the system needed to fully enhance the efficiency of capital, develop and deploy more scalable and sustainable infrastructure, establish a more comprehensive security protection system, and improve data security governance effectiveness. Additionally, it was crucial to continuously cultivate a specialized team of information management service professionals who could provide innovative thinking and adaptability to new technological developments. By addressing those challenges, the intelligent patent examination and search system could continue to improve and provide more efficient and accurate patent examination and search services.

Delegation of the United States of America

40. The Delegation of the United States of America said that the USPTO was integrating AI into the patent and trademark examination process with the goal of enhancing its efficiency. One way in which AI was used was in patent searches, where machine learning models were employed to identify relevant references. The “more like this document” and “similarity search” features retrieved and ranked documents based on similarity, allowing examiners to easily identify relevant prior art. Those tools helped examiners to make decisions, as they offered explainable AI outputs that clarified why specific documents were retrieved.

41. Aside from patent search, AI was also used in patent classification processes to classify relevant subject matter. The vision of the USPTO was to develop a system that would meet internal needs and international classification obligations. Some important lessons had been learned along the way, including with regard to the need to educate users on why such tools should have been incorporated into their workflow, and on when a process could be adjusted, or when an AI tool would not be useful. As a result, examiners could better understand the capabilities and limitations of AI and use it more effectively in the examination process.

Delegation of the Republic of Korea

42. The Delegation of the Republic of Korea said that, since 2022, AI had provided an output for main technology groups in patent classification. Entirely different classifications were needed, even for similar technologies, and AI had performed effectively in that regard. A survey had shown that there was a high level of satisfaction, at over 80 per cent, among examiners. AI-powered automated searches had been implemented for designs and trademarks since 2021 and for patents since 2022. The algorithms used were continuously refined to improve search quality.

43. In early 2023, KIPO had implemented an AI-driven patent administration innovation roadmap, integrating AI technology into the patent examination, trials and administrative procedures. Prior art searches and formality examinations were two areas in which AI had been successfully implemented. In December 2023, KIPO had developed a larger scale AI language model specialized in patent document processing. The model was expected to improve the accuracy and speed of the patent examination. AI was also applied to trial proceedings, formality checks and customer consultations. Moreover, AI automated formality checks and enhanced checkbook services to assist examiners with guidelines and frequently asked questions.

Delegation of Portugal

44. The Delegation of Portugal thanked the delegations of Japan and France for their presentations, and other Member States for their observations, which had provided an overview of the existing AI tools for patent examination and would help patent offices to improve and develop AI tools.

Japan Patent Attorneys Association (JPAA)

45. To address the problem of utilizing generative AI for patent-related tasks, the Representative of JPAA noted that they had formulated guidelines on the use of AI technologies for patent attorneys' businesses to enable success compliance with patent examination procedures. The guidelines contained cautions on the use of AI technologies in patent attorneys' businesses, with a view to avoiding potential risks. For instance, if a patent attorney entered information into a generative AI-based system, there was a risk of the loss of novelty of invention due to the leakage of confidential customer information. By following the guidelines, patent attorneys and other stakeholders could safely and effectively utilize AI technology in their businesses and patent examination procedures.

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