

TRENDS OF ARTIFICIAL INTELLIGENCE PATENT FILING: INDIAN SCENARIO & ITS LEGAL ASPECTS

Vijitha Rajan, Sreelakshmi M.S, Dr. I.G Rathish*

ABSTRACT

Artificial Intelligence (AI) has led to a rapid digital revolution, which is the ability of machines with intelligence to respond and solve problems like humans. AI has had a wide impact on the technological, economic and social aspects of the world. Artificial Intelligence touches every sphere across the globe, such that these expert systems are the most integral part of the new technology. Thus, it is essential to protect the human like intelligence as it is treated as an intellectual property.

This paper looks into the analysis of patents in AI related inventions filed in India between 2005 and 2018, with emphasis to the signal processing technology field in India. The paper helps gauge the technological advancements that India has achieved in the last 13 years, considered more prominent as per the latest WIPO analysis of trends.

Furthermore, the paper makes a clear categorization of all granted patents, pending patent applications and abandoned patent applications in comparison with the corresponding applications filed in the US and Europe, where high filing rates are witnessed.

* Ms. Rajan is a research fellow at IUCIPRS, CUSAT, and is a 'Woman Scientist' in the KIRAN IPR programme under the Department of Science and Technology, Government of India. She holds an M.Tech in signal processing engineering. She may be contacted at rajanvijitha@gmail.com.

Ms. Sreelakshmi received her Master's degree in electronics from CUSAT in 2016, followed by an LL.M in IPR from IUCIPRS, CUSAT. She is currently pursuing her Ph.D at IUCIPRS, with her current research focussing on problems in patentability of artificial intelligence related inventions. She may be contacted at sreelakshmims11@gmail.com.

Dr. Rathish is an Assistant Professor of the Inter-University Centre for IPR Studies (IUCIPRS), CUSAT. He is entrusted with the task of facilitating filing of patents amongst teaching and the research fraternity, and sensitisation of IPR across forums. He is also a registered patent agent and the co-ordinator of the IPR Facilitation Cell at IUCIPRS. He may be contacted at rathishig@gmail.com.

Moreover, the paper facilitates the study of the problems confronted by AI technology in legal as well as technological aspects, to file in India, that can help to enhance the filing and ultimately help to boost the technology in India.

*

INTRODUCTION

Artificial intelligence has led to the expansion of technology to the next level. No such technology in the recent times has made such an impact. It has witnessed an exponential growth in all fields of technology and is future ready. India is one of the fastest-growing economies in the world and an emerging technology hub. This has led to an increased filing of patent applications in India in the field of Artificial Intelligence.

I. EVOLUTION OF ARTIFICIAL INTELLIGENCE.

The ability of a computer system to take decisions without an external stimulus came to be known as artificial intelligence. The term ‘artificial intelligence’¹ was formally coined by Mr. John McCarthy, a computer scientist, at a conference in 1956. According to him, it was the notion of a program, processing and acting on information, such that the result is parallel to that of an intelligent person responding to similar inputs.

However, confusion may arise as to whether the results are an outcome of the machine’s own intelligence, or algorithms and commands. In order to find a solution, Sir Alan Turing proposed a test called the ‘Turing test’² to evaluate the thinking power of a machine. According to him if the response by a machine was similar to that by a human being during a conversation, it could be reasonably inferred that the machine was capable of thinking.

The term Artificial Intelligence has expanded over the years to encompass technology that erupted initially, followed by machine learning and by deep learning.

¹ Chris Smith et al., *The History of Artificial Intelligence*, 1–27 (2006).

² *Id.*

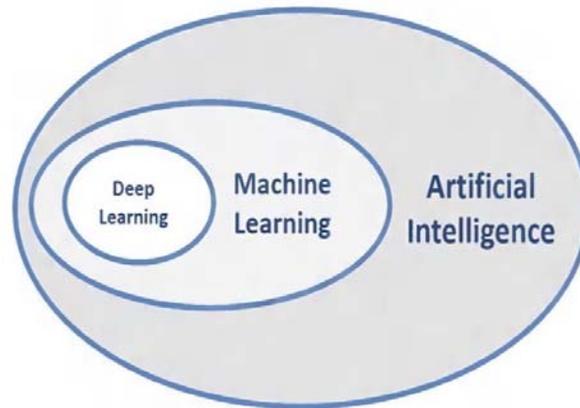


FIG 1: Classification of AI³

AI exists when a machine has cognitive capabilities such as problem solving and learning from experience. Machine learning is a subset of AI that enables the machine to learn by itself. Deep learning⁴ is a subset of machine learning based on artificial neural networks that learn from experience on large data sets. Artificial neural networks, as the name implies, resemble the neural network of the human brain in structure and the mode of processing information.

II. HOW DOES DEEP ARTIFICIAL NEURAL NETWORK CAPTURE THE AI-DRIVEN WORLD?

Machine learning⁵ can be supervised, in the sense, the algorithm enables to feed the labelled data to train the machine and finally achieve the classification and differentiation. Or it can be semi-supervised where the algorithm enables categorization of unlabelled images and the results are fed back as training data. Semi-supervised training⁶ is usually done when there is not enough labelled data to produce an accurate model. Eventually, machine learning can also be unsupervised, where the AI system is presented with unlabelled and uncategorized

³ HCAI, *What is the difference between Artificial Intelligence (AI), Machine Learning (ML) and Deep Learning (DL)?*, <https://human-centered.ai/2017/11/11/difference-ai-ml/>.

⁴ Özgür Genç, *Notes on Artificial Intelligence, Machine Learning and Deep Learning for curious people*, TOWARDS DATA SCIENCE (Jan. 26, 2019), <https://towardsdatascience.com/notes-on-artificial-intelligence-ai-machine-learning-ml-and-deep-learning-dl-for-56e51a2071c2>.

⁵ Kristian Kersting, *Machine Learning and Artificial Intelligence: Two Fellow Travelers on the Quest for Intelligent Behavior in Machines*, 1Front Big Data 1(2018).

⁶ *Id.*

data and the system's algorithm is meant to identify these datasets by clustering based on characteristics where no human intervention is required during the program's execution. This unsupervised learning or deep learning transforms the machine learning ultimately to the next level, which simulates the human brain itself. Its perception of the problem and the subsequent solutions gives an indication of the machine emulating human brain behaviour. Thus, the AI technology has found diverse applications in image recognition, sound recognition, recommender systems, natural language processing etc.

The scope of the study covers the patent filing trends of AI related inventions, more specifically deep neural network in image processing on the basis of WIPO statistics⁷ and also the analysis of the same in different jurisdictions. An analysis of patent applications in India, Europe and PCT to examine the legal difficulties faced by the applicants was carried out.

The remainder of this paper is organized as follows: Part-A of the paper explains the methodology followed to take the patent application samples. Part-B of the paper covers patent landscape according to the latest WIPO trends. Part-C of the paper focuses on the strategic patent analysis filed during the period from 2005 to 2018. Part-D describes the invention which is taken as the case study. Part-E concludes the paper with the measures to take for the improvement of patent filing which in turn encourages more filings in the field of AI related inventions.

A. Methodology

The pilot study is based on primary data. Primary data consists of granted Indian patents and pending applications obtained from the Indian patent office website during 2005 to 2018. A keyword-based search on the Indian Patent office (INPASS) was carried out to identify the patents relevant to the field of AI related inventions with special focus on deep neural network in image processing. The study was restricted to the period from 2005 to 2018, as section 3(k) was inserted in the Patents Act 1970, in the amendment made in 2002 which prevents software related inventions from being patented in India. In the year 2005, an amendment was made to the Patents Act 1970, to make patents in all fields of technology

⁷ World Intellectual Property Organization, *WIPO Technology Trends 2019: Artificial Intelligence* (2019), https://www.wipo.int/tech_trends/en/artificial_intelligence/.

comply with TRIPS. The combinations of the keywords viz. neural network, deep learning, deep artificial neural network, artificial neural network, unsupervised learning and image processing was carried out using the 'AND' & 'OR' logical operators.

B. Patent Landscape

According to the WIPO report⁸, more than half of all identified AI patents were published in the last five years. The WIPO report, Technology Trends 2019: Artificial Intelligence offers a comprehensive overview of current trends in the AI patent landscape. Machine learning tops the list and includes forty percentages of all identified patents for AI techniques. Machine learning also heads the list in terms of year-on-year growth rate in patent filings for AI techniques followed by Logic programming and Fuzzy logic: Machine learning: 28%, Logic programming: 19%, Fuzzy logic: 16%. Digital identification (image recognition) leads the field in terms of total patents filed as it comprises forty-nine percentages of all identified patents. However, in terms of year-on-year growth rate in patent filings, the pacesetters are quite different as Robotics: 55%, Control methods: 55%, Planning/scheduling: 37%, Computer vision: 24% Most AI patents are not restricted to just one field: Nearly 70% of AI-related inventions mention multiple AI techniques or functional applications working together. In commercial applications, Telecommunication (15%), Transportation (15%), Life & Medical Sciences (12%), Personal devices, computing and human computer interaction (11%) is reported. Based on data from 2013 to 2016, the industries where patent filings are seeing the most annual growth are Smart cities: 47%, Transportation: 33%, Agriculture: 32%, Computing in government: 30% and Banking & finance: 28%. These are the top industries currently putting AI technology to work. Top patent assignees of AI technology according to WIPO data, are IBM (8290 patents), Microsoft (5930 patents), Toshiba (5223 patents), Samsung (5102 patents) and NEC (4406 patents). As of 2014, the top three patent offices for AI patent filings are, in order: China, United States and Japan. India is emerging as a new target for patent filing.

A representative field of AI was selected in the present study to explore the patent status as illustrated in the methodology section. The search strategy returned 129 patent applications, of which only four applications were granted. The patent details of the same are provided in Table 1. The remaining patents were either abandoned, refused, withdrawn or is under

⁸ *Id.*

examination. A very low (about 3.1%) conversion rate paints a bleak picture for AI related patents in India. This gives an indication that patents are not easy to obtain for AI related inventions in India. However, it cannot be a general statement as this study has focused only on AI related inventions on deep neural network in image processing in India.

PATENT NUMBER	TITLE OF THE INVENTION	APPLICATION STATUS		
		INDIA	USA	EUROPE
250905	Neural Network Using Spatially Dependent Data for Controlling a Web-Based Process	GRANTED	GRANTED	GRANTED
247628	A Method and Apparatus for Selection of Neural Network Ensemble for Processing Well Logging Data	GRANTED	GRANTED	N/A
256496	Apparatus and Method for Estimating State of Charge of Battery Using Neural Network	GRANTED	GRANTED	N/A
196315	An Artificial Neural Network Based Data Monitoring System	GRANTED	PENDING	PENDING

TABLE 1

Another aspect was to look at the applications refused, withdrawn or abandoned in India, the corresponding application of which was granted in either the US or the European Union. The results are presented in Table 2. Surprisingly only five such refused/withdrawn or abandoned applications surfaced for which corresponding patents were granted in either the US or European Union. This could primarily be due to different exceptions to patentability standards followed in various jurisdictions. However, the applications corresponding to the Indian patent applications which are under examination in US and European Union have not been looked into in detail.

APPLICATION NUMBER	TITLE OF THE INVENTION	APPLICATION STATUS		
		INDIA	USA	EUROPE
2071/DEL/2009	Estimating an Achievable Power Production of a Wind Turbine by Means of a Neural Network	ABANDONED	GRANTED	N/A
5025/DELNP/2007	Identify Data Sources for Neural Network	REFUSED	GRANTED	N/A
778/MUM/2005	Artificial Neural Network Guessing Method and Game	ABANDONED	-	-
2614/DELNP/2004	Improved Performance of Artificial Neural Network Models in The Presence of Instrumental Noise and Measurement Errors	WITHDRAWN	GRANTED	GRANTED
1789/DELNP/2009	Intelligence Network Anomaly Detection Using A Type II Fuzzy Neural Network	ABANDONED	ABANDONED	GRANTED

TABLE 2

The aforementioned context reveals the prior importance of AI technology, and how within AI technology deep neural network dominates with diverse applications. AI conceived as

intellectual property, is indicated by the number of patent applications filed in the field in India, analysis of which paves the way for gauging effective technical advancements in India.

C. A Strategic Patent Analysis

The real world of automation with intelligent machines is no more an imagination with the advent of AI technology. India, considered one of the fastest growing economies in the world right now, is emerging to be a major technology hub for generating AI related innovations. India, the second most populous country in the world, faces many challenges to survive and thrive in a global market with AI initiatives⁹. Despite a large section of the population having exposure to AI technology, few are aware of the technicality and patentability issues that AI is confronting.

This strategic analysis of patents filed in the area progresses to figure out these issues by studying specific cases in detail.

The remaining applications are pending in India and the reasons for the same are out of the scope of this study and require a separate investigation. The following is a detailed discussion of the case shown in Table 2, application number 1789/DELNP/2009¹⁰, which was abandoned in India and the US, but was granted in the European Union.

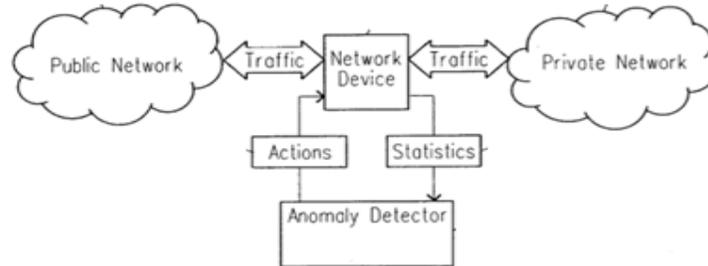
D. Intelligence Network Anomaly Detection Using A Type Ii Fuzzy Neural Network

The present invention protects a private network (FIG.2) from an anomaly attack using a type II fuzzy neural network. For that a network device used to escalate corrective actions is interfaced with anomaly detector. Current networking devices use either any preventive measures to detect and correct the anomalies or can correct only after the damage has happened. The present invention detects and corrects at the time of an attack using network statistics. The existing techniques may not perform very well because they depend on intimate knowledge about the cause of the attack/anomaly before they can recognize the attack/anomaly and take corrective actions to correct the symptoms of the attack/anomaly. Also, these techniques need to take small amount of corrective actions despite the degree of

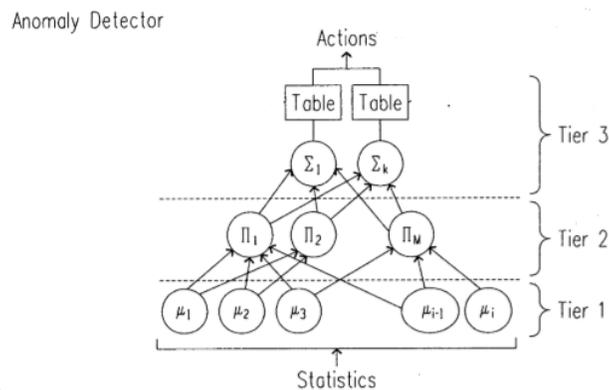
⁹ NITI Aayog, National Strategy for Artificial Intelligence #AIforall, (2018), <https://niti.gov.in/sites/default/files/2019-01/NationalStrategy-for-AI-Discussion-Paper.pdf>

¹⁰ India Patent No. 1789/DELNP/2009 (abandoned), <https://patents.google.com/patent/US20080083029A1/en>.

attack/anomaly, unless the network administrator specifically defines each degree of the attack that they wish to solve. This invention suggests escalating actions until the symptoms of attack begin to disappear.

FIG 2¹¹

The anomaly detector uses a three-tiered type II fuzzy neural network (FIG3) where the first tier has multiple membership functions (A membership function (MF) is a curve that defines how each point in the input space is mapped to a membership value (or degree of membership) between 0 and 1) that collects network statistics about the health of a network device and processes those numbers into metrics 0 and 1. The second tier has multiple summers, each of which interfaces with selected membership functions to obtain their metrics and then outputs a running sum. The third tier has multiple aggregators each of which aggregates the sum from selected summers and computes a running average that is compared to fuzzy logic control rules (located within an if-then-else table) to determine a particular course of action which the network device can follow to address the symptoms of an attack.

FIG 3¹²

¹¹ *Id.*

¹² *supra* note 10, at fig.2, <http://ipindiaservices.gov.in/PatentSearch/PatentSearch/ViewPDF>.

The anomaly detector uses artificial intelligence as type II fuzzy neural network to introduce a measure of adaptability in the anomaly detection process. The type II fuzzy neural network is different from a traditional neural network in that its conditions for learning are heuristic (means an approach to problem solving or self-discovery) whereas the traditional neural network uses complicated adaptive filters for solving the problems. These simple heuristics allow for undefined numerical errors in adaptation which is called as “fuzziness” and it is this fuzzy nature which allows the anomaly detector to solve a problem by discovering without necessitating the precision of data, which is required by a traditional neural network.

The invention is filed across different countries like China, Europe, France, Germany, Italy, Japan, South Korea, Spain, United Kingdom and the United States of America through the Patent Corporation Treaty (PCT), and is granted in all these countries except the US and India. The present case study addresses the approach of European, US and Indian jurisdictions towards the patentability of this invention.

D.1. Critical Analysis of Patentability standards

The standard criteria of patents are Novelty, Inventive Step, Industrial application, and Non-patentability issue upon which the analysis of patents is conducted as whether the invention is patentable or not. The particular case filed in Europe, US and India is analysed on the basis of the four standards according to the first examination report of the country’s own jurisdiction and tabulated as shown in Table 3.

Name of the Country	Application Number	Novelty	Inventive	Industrial application	Non-patentability issue
Europe	EP07843575A	NO	NO	YES	
US	11/536842	-	-	-	
India	1789/DELNP/2009	NO	NO	YES	Yes

Table 3. Observations on the patentability standards basis the first examination report

D.2. Comparison of jurisdictions on the basis of FER

D.2.1. NOVELTY

Prosecution in Europe and India

According to Article 54 of European Patent Convention,¹³ an invention shall be considered to be new if it does not form part of the state of the art. According to the international search report and international preliminary examination report, the present invention does not meet the criteria of novelty under Article 54 of EPC and Article 33(2) of PCT because the subject matters of filed claims 12¹⁴ and 14¹⁵ describe the steps for addressing a symptom of an attack which is already referred to in a prior document.¹⁶ In Europe, the main claims 12 and 14 which had been confronted with objections regarding novelty were deleted by the applicant during the course of amendment.

On the other hand, in India the definition of “new invention” as described in The Indian Patents Act 1970 under section 2(1)(l), after the 2005 amendments, as

“any invention or technology which has not been anticipated by publication in any document or used in the country or elsewhere in the world before the date of filing of patent application with complete specification, i.e. the subject matter has not fallen in public domain or that it does not form part of the state of the art”.

In India according to FER,¹⁷ the filed claims 12 and 14 lack novelty as the subject matter involves the existing techniques like collecting a plurality of network statistics, processing each into a fractional value, taking and aggregating a plurality of inferences that is given to an if-then-else decision rule table to address the symptom of the attack which is not novel as per

¹³ EUROPEAN PATENT OFFICE, Convention on the Grant of European Patents (European Patent Convention (5 Oct. 1973)).

¹⁴ *supra* note 10.

12.A method for addressing a symptom of an attack, said method comprising the steps of:

Collecting a plurality of network statistics;

processing each of the collected statistics into a fractional value;

drawing a plurality of inferences by summing a plurality of unique sets of the fractional values which are associated with processed collected statistics; aggregating the plurality of inferences; and

making a decision in view of the aggregated inferences and an if-then-else decision rule table to address the symptom of the attack.

¹⁵ Claim 14: The method of claim 12, wherein said attack is a transmuting worm which implements a plurality of biological algorithms.

¹⁶ U.S. Patent No. 2004/250124 (issued Sep. 12, 2004), <https://patents.google.com/patent/US20040250124>.

¹⁷ *supra* note 10.

the examination. No replies were filed by the applicants to the objections raised according to the examination report.

Prosecution Analysis

The invention describes an existing method to solve the symptom of an attack over the network. It claims a method, as discussed above, which is already followed in the prior art document¹⁸. The method in the prior art involves measuring a property of traffic entering in the network and analysing the property using fuzzy logic algorithm. The method also explains the traffic, in which the traffic comprised packets of a certain protocol type, and analysing the property involves analysing the ratio of a number of the packets of the certain protocol type entering the network to a total number of the packets of the traffic entering the network using one or more fuzzy membership functions. Thus, the examination under both the jurisdictions shows the accurate points to object the claims stating novelty.

D.2.2. INVENTIVE STEP

Prosecution in Europe and India

It is stated in Article 56 of EPC that

“An invention shall be considered as involving an inventive step if, having regard to the state of the art, it is not obvious to a person skilled in the art. If the state of the art also includes documents within the meaning of Article 54, paragraph 3, and these documents shall not be considered in deciding whether there has been an inventive step.”

In Europe, the invention faced objections in claims 1¹⁹, 5-7²⁰ and 12-14 where, from the prior arts, the implementation of fuzzy inference systems using neural networks is well known in art. In the examiners' analysis dependant claims 5-7, 13 and 14 involve steps which lack additional technical features whereas claim 8 is new and has an inventive step as it solves the problem of improving the responsiveness of the system to rapid traffic changes. The applicants amended their claims in response to the objections by replacing type II fuzzy

¹⁸ *supra* note 16.

¹⁹ Claim 1: An anomaly detector comprising a type II fuzzy neural network that tracks symptoms of an attack and suggests escalating corrective actions until the symptoms of the attack begin to disappear.

²⁰ Claim 5: The anomaly detector of Claim 1, wherein said attack is a transmuting worm which implements a plurality of biological algorithms.

6. The anomaly detector of Claim 1, wherein said attack is an unexpected attack.

7. The anomaly detector of Claim 1, wherein said attack is an expected attack.

neural network with control structure in claim 1 and other claims accordingly. The section 2(1)(ja) of the Indian patent act 1970²¹ deals with the inventive step:

“Inventive step” means a feature of an invention that involves technical advances as compared to the existing knowledge or having economic significance or both and that makes the invention not obvious to a person skilled in the art.”

In India, same objections were raised, as in Europe, for the same claims but the applicants didn't respond to the objections.

Prosecution Analysis

In response to the objection on inventive step raised by the examiner, the applicant amended the claims by replacing the term “type II fuzzy neural network” with “control structure” in claim 1, to overcome the objections involving the inventive step. However, it can be argued that even if the new term was added, the original dependant claims 5-7, which were amended as claims 4-6 still define simply an enumerate attack that may be handled by the system of claim 1 which fails to showcase any additional features. Further, original claim 8²² is shown to involve an inventive step as per the examiner's report. However, the amended claim 7 which states that each of the calculated average is based on a unique set of metrics and a rate of change of unique set of metrics, solves the problem by improving the responsiveness of the system to sudden traffic changes.

²¹ INDIAN PATENT OFFICE, *The Patent Rules* (2003), http://www.ipindia.nic.in/writereaddata/Portal/IPORule/1_70_1_The-Patents-Rules-2003-Updated-till-23-June-2017.pdf.

²² Claim 8 : A method for addressing a symptom of an attack, said method comprising the steps of: collecting a plurality of network statistics; and processing each of the collected network statistics into a metric which is a fraction of the collected network statistic divided by a theoretical maximum of the collected network statistic; calculating a plurality of averages each of which is based on a unique set of the metrics and a rate of change of the unique set of the metrics; aggregating a unique set of the calculated averages; and comparing the aggregated calculated averages to values in an if-then-else decision rules table to determine an action to address the symptom of the attack.

D.2.3. INDUSTRIAL APPLICATION

Prosecution in Europe and India

Article 57 of EPC deals with industrial application and it is defined as:

“An invention shall be considered as susceptible of industrial application if it can be made or used in any kind of industry, including agriculture.”

In India, industrial application is described in Section 2(1)(ac) of the Indian Patent Act, 1970 as:

"capable of industrial application", in relation to an invention, means that the invention is capable of being made or used in an industry;

No objections were raised under this section in both the jurisdictions.

D.2.4. NON-PATENTABILITY

Prosecution in Europe and India

Since AI technology involves various mathematical models and logical algorithms, the aspect of patentability of the inventions in a country needs to be examined according to the guidelines for computer related inventions or computer implemented inventions issued by the patent office coming under its own jurisdiction. The rules for subject matter eligibility in both India and EPO are based on statutory provisions.

The EPO applies the rule for subject matters not considered to be patent eligible set forth in Article 52 of the EPC which lists out the inventions not eligible for patentability as discoveries; scientific theories and mathematical methods; aesthetic creations; schemes, rules and methods for performing mental acts; playing games or doing business; and programs for computers; presentations of information. The examination report follows the guidelines of computer implemented inventions. The EPO guidelines²³ from 2018 onwards include a new section under mathematical methods (G-II.3.3), relating to artificial intelligence and machine learning which are based on computational models and algorithms for clustering, regression, classification and dimensionality reduction. The computational models and algorithms involve neural networks, genetic algorithms, support vector machines, k-means, kernel regression and discriminant analysis that are *per se* of an abstract mathematical nature,

²³ EUROPEAN PATENT OFFICE, *Guidelines for Examination in the European Patent Office*, (Nov. 2018).

regardless of whether they can be "trained" on the basis of training data. Hence the new guidelines propose to examine whether the claimed subject matter has a technical character as a whole, as support vector machine or neural network usually refer to an abstract model lacking the technical character. Hence the invention is considered only if the classification methods serve a technical purpose. The training set and training the classifier may also contribute to the technical character of the invention.

In India, the rule for subject matter eligibility, CRI 2017²⁴ is set forth in subsection 3(k), 3(l), 3(m), 3(n) and 3(o). No guidelines exist specifically for AI, patenting guidelines on Computer Related Inventions are mentioned in section 3 of the Indian Patent act 1970.

(3) The following are not inventions within the meaning of this act:

- (k) a mathematical or business method or a computer programme per se or algorithms;
- (l) a literary, dramatic, musical or artistic work or any other aesthetic creation whatsoever including cinematographic works and television productions;
- (m) a mere scheme or rule or method of performing mental act or method of playing game;
- (n) a presentation of information;
- (o) topography of integrated circuits;

With reference to section 3(k) computer programmes are placed in the same category of mathematical methods, algorithms and business methods. In 2005 the parliament rejected the 2004 patent ordinance. In that ordinance section 3(k) read as *“a computer programme per se other than its technical application to industry or a combination with hardware; a mathematical method or a business method or algorithms”*. By rejecting the ordinance, the parliament shows that technical application to industry and combination with hardware does not make a computer programme patentable.

The present case study highlights the objections that were encountered by the applicants from the examiners based on first examination report under patent ineligible subject matter. In

²⁴ OFFICE OF THE CONTROLLER GENERAL OF PATENTS, DESIGNS AND TRADEMARKS, *Guidelines for Examination of Computer Related Inventions (CRIs)* (2017), http://www.ipindia.nic.in/writereaddata/Portal/Images/pdf/Revised__Guidelines_for_Examination_of_Computer-related_Inventions_CRI_.pdf.

India, claims 1-18 of this invention are non-patentable under section 3(k) and Section 3(m). The method claims do not disclose any apparatus/structural component to carry out the method steps. The method as such would constitute an algorithm hence not patentable, as it falls under the purview of section 3(k) of the Patents act 1970. Also, the absence of hardware in the method claims renders the subject matter to a method of mental act that falls under the scope of section 3(m) of the Patents Act 1970. Also, the claims that define the method/apparatus configured to execute mathematical methods lack inventive features, thus making it fall within the scope of section 3(k) of the Patent Act 1970. Therefore, the said claims in the invention are not patentable.

Prosecution Analysis

Claim 8 (amended claim 7) involves mere calculations of averages based on unique set of metrics and rate of change of unique set of metrics, similar to a mean value calculation. Also, no hardware is described to carry out the method steps in the present invention. So, it can be considered as a combination of mathematical methods and scheme, rule and methods for performing mental acts as per Articles 52(2)(a) and 52(2)(b) respectively. As a result, even though claim 8(amended claim 7) overcomes the hurdle of inventive step criteria, it fails to prove its patent eligibility under Article 52(2) of EPC. In the present case study, the examiners in Europe strictly followed the procedure for the grant of patents on the basis of Convention on the Grant of European Patents (European patent convention) but they failed to review the invention according to the guidelines specific to computer implemented inventions. The inference is framed out of their absence in raising objections in patent eligibility issue of the subject matter, whereas in India the examiners correctly pointed out the issue of non-patentability. The possible reason for the applicants not responding to the objections is that they realised that their invention was not patentable. Another possibility could be the lack of guidelines for dealing with inventions pertaining to AI. Such guidelines could help examiners to analyse the invention in a better dimension and applicants to implement the invention in a more specific structure as well.

CONCLUSION

Artificial intelligence (AI) has advanced enough to do reasoning and decision-taking in machines implementing AI itself rather than humans. The advanced technologies used in AI like monitoring, decision making, responding can be carried out without human intervention. Moreover, AI can handle vast amount of data and can be trained to simulate the mental processes of humans when the constructed system is intelligent.

AI finds its application in the patent world as prior-art search, which identifies similarities between patent documents, thus saving the human effort and time in doing such work. Among the two subsets of AI, machine learning and deep learning, as we discussed earlier, deep learning takes much longer to get trained but the opposite is true at the testing stage. It will give a better output in no time with real time data. This makes the AI software stand alone among the other software.

Most of the patents filed in India during this period are either in pending/refused/abandoned stage, while they have been granted in other countries. This may be the effect of CRI guidelines followed by India, in which no special consideration is given to AI technologies, especially deep learning which is used significantly in the signal processing field. Whereas in Europe, the latest guidelines of EPO set the standards to measure AI and machine learning in inventions under G-II, 3.3.1.

Thus, the mentioning of AI related inventions in EPO guidelines facilitates the inventors to generate AI related inventions and it gives clarity to an examiner while analysing the patent documents in a more appropriate way. The situation is different in India as there is no standard established in the guidelines for examining AI related inventions. So, the examiners may consider AI inventions as one among the other computer related inventions without giving them a distinct category which they deserve. Therefore, it is a matter of prolonged concern that AI inventions should be dealt diligently while deciding patentability due to their software centric nature. Hence, extra attention should be paid towards AI and machine learning that put patentable subject matter in a place that it is in harmony with the current state of technology.

**