International Journal of Management, IT & Engineering
Vol. 8 Issue 10, October 2018,
ISSN: 2249-0558
Impact Factor: 7.119Journal Homepage: http://www.ijmra.us, Email: editorijmie@gmail.com
Double-Blind Peer Reviewed Refereed Open Access International Journal - Included in the International Serial Directories Indexed & Listed at: Ulrich's Periodicals Directory ©, U.S.A., Open J-Gate as well as in Cabell's Directories of Publishing Opportunities, U.S.A

MACHINE LEARNING AND ARTIFICIAL INTELLIGENCE

Author: Ramnik
Research Scholar,
Faculty of Computer Science,
Dr. Babasaheb Ambedkar Technological, University, Lonere.

ABSTRACT

Machine Learning is perhaps the most interesting ongoing innovations in Artificial Intelligence. Learning calculations in numerous applications that are we utilize day by day. Each time a web index like Google or Bing is utilized to look through the web, one reason that functions admirably is on the grounds that a learning calculation, one carried out by Google or Microsoft, has figured out how to rank pages. Each time Facebook is utilized and it perceives companions' photographs that are additionally AI. Spam channels in email saves the client from swimming through huge loads of spam email that is additionally a learning calculation. In this paper, a concise survey and future possibility of the tremendous utilizations of AI has been made.

The use of "AI" and "computerized reasoning" has gotten mainstream inside the last decade. The two terms are much of the time utilized in science and media, some of the time conversely, here and there with various implications. In this work, we plan to explain the connection between these terms and, specifically, to determine the commitment of AI to man-made reasoning. We survey pertinent writing and present a theoretical system which explains the job of AI to assemble (fake) wise specialists. Subsequently, we look to give more phrased lucidity and a beginning stage for (interdisciplinary) conversations and future examination.

INTRODUCTION

Artificial Intelligence was instituted in 1955 to present another discipline of software engineering. It is quickly and fundamentally changing the different spaces of our day by day lives as the market for AI advancements is requesting and thriving.

Artificial Intelligence (AI) carries with it a guarantee of certifiable human-to-machine association. At the point when machines become clever, they can get demands, interface information focuses and reach determinations. They can reason, notice and plan.

Man-made reasoning is a heavenly body of various advances cooperating to empower machines to detect, appreciate, act, and learn with human-like degrees of knowledge. Perhaps that is the reason it appears to be like everybody's meaning of man-made brainpower is unique: AI isn't only a certain something.

Savvy creation frameworks require inventive answers for increment the quality and supportability of assembling exercises while diminishing expenses. In this unique circumstance, man-made brainpower (AI) - driven advances, utilized by I4.0 Key Enabling Technologies (e.g., Internet of Thing, progressed installed frameworks, distributed computing, large information, intellectual frameworks, virtual and expanded the truth), are prepared to produce new modern standards.

In such manner, it is fascinating to recollect that the dad of man-made reasoning, John McCarthy, during the 1990s, characterized Artificial Intelligence as "man-made brainpower is the science and designing of making insightful machines, particularly astute PC programs". By and large, the expression "Artificial intelligence" is utilized when a machine reproduces capacities that people partner with other human personalities, for example, learning and critical thinking.

An Artificial Intelligence (AI) program is called Intelligent Agent. Savvy specialist will connect with the climate. The specialist can distinguish the condition of a climate through its sensors and afterward it can influence the state through its actuators.

The significant part of AI is the control strategy of the specialist which infers how the sources of info acquired from the sensors are meant the actuators, as such how the sensors are planned to the actuators; this is made conceivable by a capacity inside the specialist.

A definitive objective of AI is to foster human like knowledge in machines. Anyway such a fantasy can be refined through learning calculations which attempt to emulate how the human mind learns.

AI, which is a field that had outgrown the field of man-made brainpower, is of most extreme significance as it empowers the machines to acquire human like knowledge without express programming.

Anyway AI programs do the additional intriguing things, for example, web search or photograph

labeling or email against spam. In this way, AI was created as ability for PCs and today it contacts numerous sections of industry and fundamental science. There is independent mechanical technology, computational science. Around 90% of the information on the planet was produced over the most recent two years itself and the incorporation of AI library known as Mahout into Hadoop biological system has empowered to experience the difficulties of Big Data, particularly unstructured information.

In the 21st century, AI has become a significant space of exploration in all fields: Engineering, science, schooling, medication, business, bookkeeping, finance, promoting, financial matters, securities exchange, and law, among others. The scope of AI has developed gigantically since the knowledge of machines with AI abilities significantly affects business, governments, and society. They likewise impact the bigger patterns in worldwide supportability. Man-made reasoning can be valuable to settle basic issue for maintainable assembling (e.g., streamlining of energy assets, coordination, store network the executives, squander the board, and so on) in this specific situation, in keen creation, there is a pattern to fuse AI into green assembling measures for stricter ecological approaches. Truth be told, as said in March 2019 by Hendrik Fink, head of Sustainability Services at PricewaterhouseCoopers, "On the off chance that we appropriately join computerized reasoning, we can accomplish unrest as to manageability.

Artificial intelligence will be the main thrust of the fourth mechanical unrest". Subsequently, subfields of AI, for example, AI, normal language handling, picture preparing, and information mining, have likewise become a significant point for the present tech monsters. The subject of AI produces significant interest in mainstream researchers, by goodness of the consistent advancement of the innovations accessible today.

In the space of AI research the accentuation is given more on picking or fostering a calculation and leading analyses based on the calculation. Such exceptionally one-sided see lessens the effect or certifiable applications.

In this paper the different applications under the fitting class of AI has been featured. This paper puts forth an attempt to bring every one of the significant spaces of uses under one umbrella and present a more broad and reasonable perspective on this present reality applications. Aside from this two application ideas have been introduced forward. The field of AI is so tremendous and

consistently developing that it ends up being helpful in robotizing each feature of life.

MACHINE LEARNING

As indicated by Arthur Samuel Machine learning is characterized as the field of study that enables PCs to learn without being unequivocally customized. Arthur Samuel was popular for his checkers playing program.

At first when he fostered the checkers playing program, Arthur was superior to the program. Be that as it may, after some time the checkers playing program realized what were the acceptable load up positions and what were terrible load up positions are by playing numerous games against it. AI depicts a bunch of procedures that are generally used to tackle an assortment of true issues with the assistance of PC frameworks which can figure out how to take care of an issue as opposed to being unequivocally modified. By and large, we can separate among solo and administered AI. For the course of this work, we center around the last mentioned, as the most-generally utilized techniques are of regulated nature. Concerning administered AI, learning implies that a progression of models ("past experience") is utilized to assemble information about a given errand. Albeit measurable techniques are utilized during the learning cycle, a manual change or programming of rules or procedures to take care of an issue isn't needed. In more detail, (administered) AI methods consistently plan to fabricate a model by applying a calculation on a bunch of realized information focuses to acquire knowledge on an obscure arrangement of information.

A more proper definition was given by Tom Mitchell as a PC program is said to gain for a fact (E) concerning some undertaking (T) and some exhibition measure (P), if its presentation on T, as estimated by P, improves with experience E then the program is known as an AI program.

In the checkers playing model the experience E, was the experience of having the program messing around against it. The undertaking T was the errand of playing checkers. What's more, the exhibition measure P, was the likelihood that it dominated the following match of checkers against some new adversary.

In all fields of designing, there are bigger and bigger informational collections that are being perceived utilizing learning calculations. Along these lines, the cycles of "creation" of an AI model marginally fluctuate in their meaning of stages yet regularly utilize the three principle

periods of model commencement, execution assessment and sending: During the model inception stage, a human client characterizes an issue, plans and cycles an informational index and picks a reasonable AI calculation for the given undertaking. Then, at that point, during the presentation assessment, different boundary changes portraying the calculation are approved and a well-performing setup is chosen regarding its exhibition in addressing a particular undertaking. Finally, the model is conveyed and incorporated to address the undertaking on concealed information. Learning overall portrays a vital feature of a human's comprehension which "alludes to all cycles by which the tangible information is changed, decreased, explained, put away, recuperated, and utilized".

People measure a huge measure of data by using dynamic information that assists us with bettering comprehend approaching information. Because of their versatile nature, AI models can copy the psychological capacities of an individual in a disengaged way. Nonetheless, AI exclusively addresses a bunch of strategies that empower to learn designs in existing information, hence producing logical models that can be used inside bigger IT relics.

TYPES OF MACHINE LEARNING ALGORITHMS

Supervised Learning

This learning interaction depends on the correlation of figured yield and expected yield, that is learning alludes to processing the mistake and changing the blunder for accomplishing the normal yield. For instance an informational collection of places of specific size with genuine costs is given, then, at that point the regulated calculation is to deliver a greater amount of these right answers, for example, for new house what might be the cost.

Unsupervised Learning

Unaided learning is named as scholarly by its own by finding and embracing, in view of the information design. In this learning the information are separated into various groups and subsequently the learning is known as a bunching calculation. One model where grouping is utilized is in Google News (URL news.google.com). Google News bunches new stories on the web and places them into aggregate reports.

Reinforcement Learning

Reinforcement learning depends on yield with how a specialist should make moves in a climate

in order to amplify some thought of long haul reward. An award is given for right yield and a punishment for wrong yield. Support taking in contrasts from the administered learning issue in that right information/yield sets are rarely introduced, nor problematic activities unequivocally amended.

Recommender Systems

Recommender frameworks can be characterized as a learning procedures by uprightness of which online client can alter their destinations to meet client's preferences. For instance, online client can get a rating of an item or/and related things when he/she looking through a things in view of the current recommender framework. That is the reason it changed the manner in which individuals discover items, data, and surprisingly others. There are primarily two methodologies: content based proposal and synergistic suggestion, which help the client for acquiring and mining information, making keen and novel proposals, morals. Most web based business website utilizes this framework.

A FRAMEWORK FOR UNDERSTANDING THE ROLE OF MACHINE LEARNING IN ARTIFICIAL INTELLIGENCE

In order to understand the interplay of machine learning and AI, we base our concept on the framework of Russel & Norvig. With their differentiation between the two objectives of AI application, acting and thinking, they lay an important foundation.

Layers of agents

When attempting to comprehend the job of AI inside AI, we need to take a point of view which has an emphasis on the execution of wise specialists. We require this viewpoint, as it permits us to plan the various assignments and segments of AI to the abilities of shrewd specialists. On the off chance that we respect the abilities of reasoning and acting of a wise specialist and make an interpretation of this into the terms of programming plan, we can reason that the acting capacities can be viewed as a frontend, while the reasoning part can be viewed as a backend. Computer programmers normally rigorously separate structure and capacity to take into consideration greater adaptability and freedom just as to empower equal turn of events. The frontend is the interface the climate collaborates with. It can take numerous structures. On account of clever specialists it very well may be an exceptionally conceptual, machine-coherent web interface, an

intelligible application or even a humanoid layout with explained articulation abilities.

For the frontend to connect with the climate, it requires two specialized parts; sensors and actuators. Sensors recognize occasions or changes in the climate and forward the data through the frontend to the backend. For example, they can peruse the temperature inside a mechanical creation machine or read visuals of an association with a human. Actuators then again are segments that are liable for moving and controlling a system. While sensors simply measure data, actuators act, for example via consequently purchasing stocks or changing the looks of a humanoid. One could contend that the Turing test happens at the cooperation of the climate with the frontend, all the more unequivocally the blend of sensors and actuators assuming one need to test the specialist's AI of acting humanly. In spite of each frontend having sensors and actuators, it isn't of significance for our work what the exact frontend resembles; it is simply applicable to take note of that a backend-autonomous, exemplified frontend exists. The backend gives the vital functionalities, which portray the thinking abilities about a canny specialist. In this manner, the specialist needs to learn and apply learned information.

In outcome, AI is applicable in this execution layer. While in regards to the instance of managed AI, we need to additionally separate between the interaction task that is building (=training) satisfactory AI models and the cycle task that is executing the sent models. Hence, to additionally comprehend the job of AI inside astute specialists, we refine the considering layer specialists into a learning sub layer (model structure) just as an executing sub layer (model execution). Consequently, we respect the important execution for the learning sub layer as the learning backend, while the executing sub layer is meant by the executing backend.

Continuum betweenHuman Involvement and Machine Involvement

With regards to the executing backend and the learning backend, it's difficult of significance if and how hidden AI models are refreshed—yet what amount robotized the fundamental cycles are. Each AI task includes different cycle steps, including information source determination, information assortment, and preprocessing, model structure, assessing, conveying, executing and improving. While a conversation of the individual advances is past the extent of this paper, the self-rule and the computerization of these assignments as an execution inside the specialist is quite compelling in every essential undertaking of the AI lifecycle.

For example, while the execution of a once-assembled model can be reasonably effortlessly computerized, the robotized ID of a satisfactory information hotspot for another issue or retraining just as a self-instigated model structure are more troublesome. Thusly, we need to see the human inclusion in the fundamental AI errands of a savvy specialist. While it is difficult to define an unmistakable boundary between all potential types of human inclusion in the AI applicable undertakings of an insightful specialist, we see this marvel rather as a continuum. The continuum ranges between none or little specialist self-rule with full human association on the one limit just as the full specialist self-rule and no or minimal human inclusion for the conveyed task on the other. For instance, a shrewd specialist with the assignment to self-sufficiently drive a vehicle considering the traffic signs as of now demonstrates a serious level of specialist self-sufficiency.

Nonetheless, if the specialist is stood up to with another traffic sign, the learning of this new situation may in any case require human contribution as the specialist probably won't have the option to "totally learn without help from anyone else". In this manner, the vital contribution of people, particularly in the reasoning layer (= executing backend and learning backend), is of significant premium while portraying AI and the basic AI models. The level of self-sufficiency for each progression of AI can be examined and may assist with describing the self-rule of a specialist as far as the connected AI undertakings.

Examination needs for AI empowered man-made brainpower. The introduced structure of AI and its job inside astute specialists is as yet on a theoretical level. Notwithstanding, given the false impressions and uncertainty of the two terms, we see potential for additional examination with the point both to explain the phrasing and to plan an unknown area for AI empowered man-made reasoning.

To start with, empiric approval just as constant, iterative advancement of the structure is fundamental. We need to recognize different instances of smart specialists across various disciplines and to assess how well the system fits. It is fascinating to perceive how reasonable and scholastic AI empowered Artificial Intelligence projects guide to the structure, and, besides even evaluate what portion of such undertakings works with learning specialists and which with non-learning specialists. Moreover, such cases would assist us with acquiring a superior

comprehension of the essential human association in cutting edge shrewd specialists—and, subsequently, decide the "degree" of self-governance while in regards to all viewpoints (acting, executing, learning) of such specialists.

Second, one part of interest is decrease the fundamental contribution of people. As expressed previously, we consider this to be as a continuum between human association and specialist self-sufficiency. Two prospects come promptly to mind. The strategies for move AI manage conceivable outcomes on the best way to move information (i.e., models) from one source climate to an objective climate. This could to be sure assist with limiting human association, as additional examination in this field could show prospects and application-arranged procedures to use move AI for robotized adaption of novel or changed errands. Also, viewing previously conveyed models as a feature of the backend-layer, it is of interest how the models are assembled at first, however how to manage changes in the climate. The purported subfield of idea float holds numerous potential outcomes on the most proficient method to recognize changes and adjust models—nonetheless, fields of effective application stay uncommon.

RECENT PROGRESS

A considerable lot of the thoughts which outline the present AI frameworks are not new; the field's factual underpinnings date back hundreds of years, and analysts have been making AI calculations with different degrees of refinement since the 1950s. Notwithstanding, as of late, there have been critical advances which have expanded the exactness and unwavering quality of AI. These advances have made existing advances, for example, voice or picture acknowledgment programming, more helpful, and have made the way for a more extensive scope of expected applications. Notwithstanding algorithmic advances, which have expanded specialized capacities, the advancement made in this field owes a lot to the expanding accessibility of information and of processing power. Practically 90% of the world's information is assessed to have been delivered inside the most recent five years. This inexorably rich information climate has given the crude material to use in preparing AI frameworks. On the off chance that one considers AI frameworks as calculations that gain from models, there has been a blast in certain spaces over the most recent couple of years in the arrangements of accessible models on which they can be prepared.

In one occurrence of this, transparently open material from YouTube can be utilized to prepare AI frameworks to perceive regularly happening designs in pictures, like felines. Many progressed AI frameworks require huge figuring power to help their insightful abilities. The expanded capacity of PCs to deal with this information has likewise been vital to supporting ongoing advances. For instance, while processors during the 1970s could do 92,000 directions each second, the processors in cell phones today can do billions of guidelines each second. Following what has been called Moore's Law; the handling force of PCs has endlessly expanded in late many years, generally multiplying at regular intervals. The capacity to handle a lot of information, and to utilize this to settle on expectations or choices, makes AI a critical apparatus in a wide scope of uses, including those dependent on picture acknowledgment or voice acknowledgment.

MACHINE LEARNING IN DAILY LIFE

The term 'AI' isn't unified with high notability for the general population; research by the Royal Society and Ipsos MORI showed that just 9% of individuals remember it. Be that as it may, numerous individuals know about explicit uses of AI, and cooperate with AI frameworks consistently. Normal applications incorporate business recommender frameworks, virtual individual associates, picture preparing, and a scope of different frameworks which are unavoidable, without numerous individuals monitoring the insight in the engine. While large numbers of the great profile propels in the field have been connected to gaming, and normally the triumph of a PC over a human rival, the utilizations of AI are a lot more extensive. Its capacities incorporate example acknowledgment, abnormality location, and bunching.

Recommender Systems: Suggesting Productsor Services

Recommender frameworks – frameworks that suggest items or administrations based on past decisions – are among the most broadly perceived use of AI, regardless of whether experience with the hidden innovation is low. Recommender frameworks use examples of utilization, and communicated inclinations, to foresee which items or administrations are probably going to be alluring to the client. It is AI that measures information from past buys, and the acquisition of others, and utilizations this to recognize examples and make forecasts. Such frameworks are utilized in a scope of online retail conditions, including Amazon and Netflix. They can likewise

be utilized to advance specific kinds of content to online media clients, for example, reports that relate to a client's spaces of interest.

Organizing Information: Search Engines and Spam Filtering

AI likewise gives the consequences of inquiries entered in web indexes, like Google. These frameworks take the words entered as a feature of an inquiry, discover words and expressions that have something very similar or profoundly comparable implications, and utilize this data to anticipate the right pages to react to that question.

Spam identification frameworks can likewise utilize AI to channel messages. In this application, the framework is prepared utilizing an example of reports, which are named spam and non-spam, to recognize messages and direct them to the right envelopes. In this preparation interaction, the framework can figure out how the presence of explicit words, or the names of various senders, and different attributes, identify with whether the email is spam. At the point when conveyed in the live framework, it utilizes this figuring out how to group new messages, refining its preparation when clients recognize inaccurate arrangements.

Voice Recognition and Response: Virtual Personal Assistants

Natural language processing and speechrecognition systems can match the patternsof sounds produced in human speechto words or phrases they have alreadyencountered, by distinguishing betweenthe different audio-footprints of thesesounds. Having identified the words used,they can then translate this to text, or carryout commands.

Computer Vision: Tagging Photos andRecognizing Handwriting

AI can uphold progressed picture acknowledgment frameworks and PC vision. Such vision expects PCs to have the option to identify and investigations visual pictures, and to connect mathematical or representative data with those pictures.

In web-based media applications, picture acknowledgment can be utilized to label items or individuals in photographs that have been transferred to a site. Comparable picture acknowledgment frameworks can likewise be utilized to perceive filtered transcribed material, for instance to perceive the addresses on letters or the digits on check. Gaming frameworks, which distinguish developments or signals made by clients as a component of their play, likewise use AI through PC vision. The framework is prepared to recognize what a 'body' resembles, and

afterward utilizes this preparation to connect with its clients.

Machine Translation: Translating Text intoDifferent Languages

Utilizing machine interpretation, PC frameworks can naturally change over text or discourse from one language into another. Endeavors in this field date back to essentially the mid 1950s21, in any case, once more, it is ongoing advances in the field that have made these methods all the more extensively helpful. There now exists a scope of ways to deal with this undertaking, including factual, rule-based, and neural organization based strategies. Today, machine interpretation is utilized in explicit interpretation applications for cell phones, social and customary media, and in global associations that need to recreate archives in countless dialects.

Detecting Patterns: Unusual Financial Activity

Because of its capacity to examinations enormous datasets, AI can be utilized to distinguish designs in information which probably won't be gotten by human experts. A typical use of its example acknowledgment capacities is in the misrepresentation recognition frameworks related with Visa use or other installment frameworks. Utilizing the ordinary exchange information from countless clients, calculations are prepared to perceive regular examples of expenditure. Utilizing this information for every client, it can likewise realize what makes an exchange pretty much prone to be false, like the area, size or timing of expenditure action. Then, at that point, if a client shows a strange example of expenditure, the framework can raise a banner and the action can be questioned with the client.

CONCLUSION

People have consistently tried to construct an agreeable life, the verification of this lies in the way that we have consistently relied upon machines to complete our work all the more effectively, in a quicker and more proficient way. In the past machines have been utilized to diminish the difficult work required complete a task, yet as of now, with the appearance of AI people try to assemble machines which are solid as well as shrewd and henceforth AI has arisen to turn into a space of study that is ever in the blossom. AI has not recently made the machines self-governing, presenting the idea of independent registering; however it has likewise diminished the consistent carefulness clients are needed to keep upon the applications. In this paper, examines the four classes of AI for example regulated learning, solo learning, and support

learning and recommender framework and furthermore presents the various applications under them. Aside from that two proposed applications to be specific data time machine and virtual specialist have been advanced. The primary reason for AI is to foster calculations that aid the formation of smart machines subsequently decreasing the positions of the software engineers as the machine learns at the appropriate time of time to work on its presentation. Albeit a great deal of headways have been made in this field still then there exists glaring limits in the informational index from which machine learns. It very well may be corrected by continually staying up with the latest as learning is a nonstop interaction. Aside from this issue, an extraordinary number of distributions on AI assess new calculations on a small bunch of disconnected benchmark informational indexes. Despite this load of inadequacies AI has tackled shifting issues of worldwide effect. AI has demonstrated to be immeasurably helpful in an assortment of fields, for example, information mining, man-made reasoning, OCR, insights, PC vision, numerical advancement, and so forth and its significance will in general remain ever on the increment. AI hypotheses and calculation are roused from the natural learning frameworks where the presentation relies upon factors like the measure of accessible information, the learning history and experience, and so on, and subsequently help clarifying human learning. The utilizations of AI are consequently ceaseless it actually stays a functioning field of examination with enormous advancement choices and a promising future.

Future test is to foster development computerized solution at basic condition utilizing AI idea, which can limit the mistake in finding.

REFERENCES

- ✓ "The Washington Post," "Transcript of MarkZuckerberg's Senate hearing," 2018. [Online].Available:https://www.washingtonpost.com/news/theswitch/wp/2018/04/10/transcript-of-markzuckerbergs-senatehearing/?utm_term=.4720e7f10b41.
- ✓ Z. Waseem and D. Hovy, "Hateful Symbols or Hateful People? Predictive Features for HateSpeech Detection on Twitter," in Proceedings ofthe NAACL Student Research Workshop, 2016, pp.88–93.
- ✓ W. Warner and J. Hirschberg, "Detecting hatespeech on the world wide web," Proceeding LSM'12 Proc. Second Work. Lang. Soc. Media, no. Lsm,pp. 19–26, 2012.

- ✓ H. Chen, W. Chung, J. Qin, E. Reid, M. Sageman, and G. Weimann, "Uncovering the dark web a case study of jihad on the web," Int. Rev. Res. Open Distance Learn., vol. 14, no. 4, pp. 90–103, 2013.
- ✓ H. Fujii and S. Managi, "Trends and priority shifts in artificial intelligence technology invention: Aglobal patent analysis," Econ. Anal. Policy, vol. 58,pp. 60–69, 2018.
- ✓ "University of Wisconsin," "Mark Zuckerberg :How to Build the Future," Interview Transcript,2016. .
- ✓ Information Commissioner's Office, "Big Data,artificial intelligence, machine learning and dataprotection," Data Protection Act and General Data Protection Regulation, 2017. [Online]. Available: https://ico.org.uk/media/fororganisations/documents/2013559/big-data-ai-mland-data-protection.pdf.
- ✓ J. A. Brink, "Big Data Management, Access, and Protection," Journal of the American College of Radiology, vol. 14, no. 5, pp. 579–580, 2017.
- ✓ T. Nawrocki, P. D. Maldjian, S. E. Slasky, and S.G. Contractor, "Artificial Intelligence andRadiology: Have Rumors of the Radiologist'sDemise Been Greatly Exaggerated?," Academic Radiology, 2018.
- ✓ C. F. Camerer, "Artificial intelligence andbehavioral economics," in Economics of ArtificialIntelligence, University of Chicago Press, 2017.
- ✓ S. J. Russell and P. Norvig, Artificial Intelligence: A Modern Approach, 3rd ed. 2015.
- ✓ T. Hastie, R. Tibshirani, J. Friedman, and J.Franklin, "The elements of statistical learning: datamining, inference and prediction," Math. Intell., vol. 27, no. 2, pp. 83–85, 2005.
- ✓ Tzanis, George, et al. "Modern Applications of Machine Learning." Proceedings of the 1st Annual SEERC Doctoral Student Conference–DSC. 2006.
- ✓ Horvitz, Eric. "Machine learning, reasoning, and intelligence in daily life: Directions and challenges." Proceedings of. Vol. 360. 2006.
- ✓ Mitchell, Tom Michael. The discipline of machine learning. Carnegie Mellon University, School of Computer Science, Machine Learning Department, 2006.

- ✓ Ball, Gregory R., and Sargur N. Srihari. "Semi-supervised learning for handwriting recognition." Document Analysis and Recognition, 2009. ICDAR'09. 10th International Conference on. IEEE, 2009.
- ✓ Valenti, Roberto, et al. "Machine learning techniques for face analysis." Machine Learning Techniques forMultimedia. Springer Berlin Heidelberg, 2008. 159-187.
- ✓ Al-Hmouz, Ahmed. "An adaptive framework to provide personalisation for mobile learners." (2012).
- ✓ Al-Hmouz, Ahmed, Jun Shen, and Jun Yan. "A machine learning based framework for adaptive mobile learning." Advances in Web Based Learning–ICWL 2009. Springer Berlin Heidelberg, 2009. 34-43.
- ✓ Thore Graepel ―Playing Machines: Machine Learning Applications in Computer Games‖, ICML 2008 Tutorial - 5 July 2008, Helsinki, Finland.
- ✓ Broder, Andrei, and Vanja Josifovski. "Introduction to computational advertising." (2010).
- ✓ Cunningham, Sally Jo, James Littin, and Ian H. Witten. "Applications of machine learning in information retrieval." (1997).
- ✓ Kaur, Harjinder, Gurpreet Singh, and Jaspreet Minhas. "A Review of Machine Learning based Anomaly Detection Techniques." arXiv preprint arXiv:1307.7286 (2013).
- ✓ Wiese, Bénard, and Christian Omlin. Credit card transactions, fraud detection, and machine learning: Modelling time with LSTM recurrent neural networks. Springer Berlin Heidelberg, 2009.
- ✓ Kumar, Vinod, and Dr Om Prakash Sangwan. "Signature Based Intrusion Detection System Using SNORT." International Journal of Computer Applications & Information Technology 1 (2012).
- ✓ Shen, Shunrong, Haomiao Jiang, and Tongda Zhang. "Stock market forecasting using machine learning algorithms." (2012).
- ✓ Pang, Bo, Lillian Lee, and Shivakumar Vaithyanathan. "Thumbs up?: sentiment classification using machine learning techniques." Proceedings of the ACL-02 conference

on Empirical methods in natural language processing-Volume 10. Association for Computational Linguistics, 2002.

- ✓ Liao, Shih-wei, et al. "Machine learning-based prefetch optimization for data center applications." Proceedings of the Conference on High Performance Computing Networking, Storage and Analysis. ACM, 2009.
- ✓ Haider, Peter, Luca Chiarandini, and Ulf Brefeld. "Discriminative clustering for market segmentation." Proceedings of the 18th ACM SIGKDD international conference on Knowledge discovery and data mining. ACM, 2012.
- ✓ Haider, Peter, Luca Chiarandini, and Ulf Brefeld. "Discriminative clustering for market segmentation." Proceedings of the 18th ACM SIGKDD international conference on Knowledge discovery and data mining. ACM, 2012.
- ✓ Haykin, Simon, and Zhe Chen. "The cocktail party problem." Neural computation 17.9 (2005): 1875-1902.
- ✓ Clarke, Bertrand, Ernest Fokoue, and Hao Helen Zhang. Principles and theory for data mining and machine learning. Springer Science & Business Media, 2009.
- ✓ Kononenko, Igor. "Machine learning for medical diagnosis: history, state of the art and perspective." Artificial Intelligence in medicine 23.1 (2001): 89-109.
- ✓ Caragea, Cornelia, and Vasant Honavar. "Machine Learning in Computational Biology." Encyclopedia of Database Systems (2009): 1663-1667.
- ✓ Cho, Sung-Bae, and Hong-Hee Won. "Machine learning in DNA microarray analysis for cancer classification." Proceedings of the First Asia-Pacific bioinformatics conference on Bioinformatics 2003-Volume 19. Australian Computer Society, Inc., 2003.
- ✓ Wagstaff, Kiri. "Machine learning that matters." arXiv preprint arXiv:1206.4656 (2012).
- ✓ Shoeb, Ali H., and John V. Guttag. "Application of machine learning to epileptic seizure detection." Proceedings of the 27th International Conference on Machine Learning (ICML-10). 2010.
- ✓ Gao, Jim, and Ratnesh Jamidar. "Machine Learning Applications for Data Center Optimization." Google White Paper (2014).

- ✓ Haider, Peter, Ulf Brefeld, and Tobias Scheffer. "Supervised clustering of streaming data for email batch detection." Proceedings of the 24th international conference on Machine learning. ACM, 2007.
- ✓ Sebastiani, Fabrizio. "Machine learning in automated text categorization." ACM computing surveys (CSUR) 34.1 (2002): 1-47.
- ✓ Bratko, Andrej, et al. "Spam filtering using statistical data compression models." The Journal of Machine Learning Research 7 (2006): 2673-2698.
- ✓ Xiong, Liang, et al. "Anomaly detection for astronomical data." (2010).
- ✓ Guyon, Isabelle, and André Elisseeff. "An introduction to variable and feature selection." The Journal of Machine Learning Research 3 (2003): 1157-1182.
- ✓ Hou, Shujie, et al. "SVM and Dimensionality Reduction in Cognitive Radio with Experimental Validation." arXiv preprint arXiv:1106.2325 (2011).
- ✓ Hwang, Kyu-Baek, et al. "Applying machine learning techniques to analysis of gene expression data: cancer diagnosis." Methods of Microarray Data Analysis. Springer US, 2002. 167-182.
- ✓ Luca Silvestrin, ―Machine Learning in Biology‖, Universita degli studi di Padova.
- ✓ Magoulas, George D., and Andriana Prentza. "Machine learning in medical applications." Machine Learning and its applications. Springer Berlin Heidelberg, 2001. 300-307.
- ✓ Bruegge, Bernd, et al. "Classification of Software Engineering Artifacts Using Machine Learning."
- ✓ Shhab, Areej, Gongde Guo, and Daniel Neagu. "A Study on Applications of Machine Learning Techniques in Data Mining." Proc. of the 22nd BNCOD workshop on Data Mining and Knowledge Discovery in Databases, Sunderland, UK. 2005.
- ✓ Boyarshinov, Victor. Machine learning in computational finance. Diss. Rensselaer Polytechnic Institute, 2005.
- ✓ Seyed Omid Sadjadi and John H. L. Hansen, ―Unsupervised Speech Activity Detection Using Voicing Measures and Perceptual Spectral Flux‖, IEEE signal processing letters, March 2013.

- ✓ Hafiz Malik, ―Acoustic Environment Identification and Its Applications to AudioForensics‖. IEEE Transactions on Information Forensics and Security, Vol. 8, No. 11, November 2013.
- ✓ Acoustic Factor Analysis For Robust Speaker Verification, Fellow, IEEE. IEEE Transactions On Audio, Speech, And Language Processing, Vol. 21, No. 4, April 2013.
- ✓ Mark J. Weal, Danius T. Michaelides, Kevin Page, David C. De Roure, Fellow, IEEE, Eloise Monger, and Mary Gobbi. , ―Semantic Annotation of Ubiquitous Learning‖, Environments IEEE Transactions On Learning Technologies, Vol. 5, No. 2, April-June 2012.
- ✓ EJ Horvitz, J Apacible, R Sarin, L Liao - arXiv preprint arXiv:1207.1352, 2012 - arxiv.org
- ✓ https://www.coursera.org/learn/recommender-systems
- ✓ Z. Zheng, L. Zheng, and Y. Yang, "Pedestrianalignment network for large-scale person reidentification,"arXiv Prepr. arXiv1707.00408,2017.
- ✓ M. Jorge, J. P. Leal, S. S. Anand, and H. Dias,"A study of machine learning methods for detecting user interest during web sessions," in Proceedingsof the 18th International Database Engineering &Applications Symposium on - IDEAS '14, 2014, pp. 149–157.
- ✓ T. M. Mitchell, W. Cohen, E. Hruschka, P.Talukdar, J. Betteridge, A. Carlson, B. D. Mishra,M. Gardner, B. Kisiel, J. Krishnamurthy, N. Lao,K. Mazaitis, T. Mohamed, N. Nakashole, E. A.Platanios, A. Ritter, M. Samadi, B. Settles, R.Wang, D. Wijaya, A. Gupta, X. Chen, A. Saparov,M. Greaves, and J. Welling, "Never-EndingLearning," AAAI Conf. Artif. Intell., pp. 2302–2310, 2015.
- ✓ E. Liebman, M. Saar-Tsechansky, and P. Stone,"Dj-mc: A reinforcement-learning agent for musicplaylist recommendation," in Proceedings of the2015 International Conference on AutonomousAgents and Multiagent Systems, 2015, pp. 591–599.
- ✓ F. Ruelens, S. Iacovella, B. J. Claessens, and R.Belmans, "Learning agent for a heat-pumpthermostat with a set-back strategy using modelfreereinforcement learning," Energies, vol. 8, no.8, pp. 8300–8318, 2015.

- ✓ M. Rostami, S. Kolouri, K. Kim, and E. Eaton,"Multi-Agent Distributed Lifelong Learning forCollective Knowledge Acquisition," arXiv Prepr.arXiv1709.05412, 2017.
- ✓ Y. Yu, A. Eshghi, and O. Lemon, "VOILA : An Optimised Dialogue System for InteractivelyLearning Visually-Grounded Word Meanings(Demonstration System)," in Proceedings of theSIGDIAL 2017 Conference, 2017, pp. 197–200.
- ✓ U. Fayyad, G. Piatetsky-Shapiro, and P. Smyth,"The KDD process for extracting useful knowledgefrom volumes of data," Commun. ACM, vol. 39, no.11, pp. 27–34, 1996.
- ✓ Y. Nagar and T. W. Malone, "Making businesspredictions by combining human and machineintelligence in prediction markets," Int. Conf. Inf.Syst. ICIS 2011, pp. 1–16, 2011.
- ✓ O. Russakovsky, L. J. Li, and L. Fei-Fei, "Best of both worlds: Human-machine collaboration forobject annotation," in Proceedings of the IEEEComputer Society Conference on Computer Visionand Pattern Recognition, 2015, vol. 07–12–June, pp. 2121–2131.