Journal of Online Engineering Education
ISSN: 2158-9658 Volume: 17 Issue: 1
Article Received: 24 January 2026 **Revised**: 14 March 2026 **Accepted**: 08 April 2026

A Comprehensive Study of Artificial Intelligence and Data Science: Models, Applications, and Challenges

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Abstract: The material that follows provides an overview of the many applications of data science and artificial intelligence (AI) in various sectors, with an emphasis on their possible benefits and limitations. AI has shown promise in the fields of healthcare, finance, education, smart cities, and the creation of illness treatments. In addition to the limitations imposed by deep learning methods, the study looks at a number of AI models, including ontological, statistical, hybrid, and biological models. The article also discusses applications of machine learning, bioinspired systems, and multivariate pattern analysis to the analysis and processing of massive datasets, as well as research on brain architecture and function. The literature review highlights the importance of addressing ethical and societal concerns related to AI.

Keywords*:* Artificial intelligence, Machine learning, Data Science, Bioinspired systems, Smart cities

1. INTRODUCTION

Artificial intelligence (AI) and data science have advanced significantly in recent years, transforming industries like banking, healthcare, and education [1, 2]. This increase has resulted in better decision-making processes, tailored recommendations, and more effective resource allocation due to the growing requirement for efficient data processing and analysis [3]. To fully realize the potential of these developments, however, a range of AI models and approaches must be comprehended and applied. With a focus on the major concerns listed below, this article seeks to give a thorough summary of the most recent advancements in data science and artificial intelligence: Deep learning, ontology, bio-inspired systems, large-scale data processing, analysis, and visualization, machine learning in neuroscience, and applications are a few instances of machine learning.

In contrast, ontology is a paradigm for artificial intelligence that allows the formal, hierarchical representation of knowledge. Ontologies are frequently used to support data structure, integration, and interpretation across a range of application areas. Approaches that are "bio-inspired," or influenced by biological processes, have established themselves as a significant source of AI innovation. Deep learning, an essential component of AI, has advanced significantly across a variety of applications by building and training deep neural networks that can identify intricate patterns and separate important pieces of data.

We will examine bio-inspired systems such artificial neural networks, genetic algorithms, and swarm optimization within the context of AI and data science. In a world of ever expanding data, processing, interpreting, and displaying massive datasets present significant challenges. We'll discuss how using machine learning techniques to solve these issues could lead to efficient data processing, advanced analysis, and practical data visualization. Advances in machine learning have greatly improved the field of neuroscience. We will examine how machine learning is used in neuroscience, including how to interpret brain data, simulate brain activity, and comprehend and evaluate brain architecture.

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Lastly, we will discuss the potential applications of artificial intelligence and data science to enhance health and wellness. This technology can be used for personal care, disease diagnosis, health monitoring, and general quality of life enhancement in a society that is becoming more technologically sophisticated and interconnected. This article seeks to provide a more thorough and in-depth examination of the latest advancements in artificial intelligence and data science while emphasizing its relevance to a range of sectors. via researching and deepening our comprehension of these challenges.

This study performs a thorough assessment of AI Applications and Implementations by examining the outcomes and benefits of AI case studies and data in fields like health, smart cities, and others, while accounting for any shortcomings or errors in use and implementation that can be found based on literature surveys. Concerns about privacy and data processing ethics, as well as associated flaws and shortcomings in existing AI models and data science methods, like problems with interpretation and exploration results, were also brought to light by the study.

2. RESEARCH METHODOLOGY

For this research, relevant publications about the concepts, applications, and limitations of data science and artificial intelligence (AI) were gathered and synthesized [4]. Using specific keywords like artificial intelligence, data science, machine learning, deep learning, and big data, a comprehensive search for relevant research is carried out in numerous online databases, such as Google Scholar, ScienceDirect, and IEEE Xplore. The study, which represents the development of data science and artificial intelligence, used references from 2010 to 2022 and 40 earlier studies from other countries as its main source of information and debate material.

After purchase, articles are reviewed and summarized based on their methodologies, ideas, and applications in a variety of fields, such as health, education, finance, and smart cities. This study aims to investigate the potential benefits of AI, such as the development of new medical treatments and therapies, as well as its shortcomings, particularly those related to deep learning techniques. The study intends to provide information on the real-world applications of data science and artificial intelligence in a variety of industries, the primary obstacles to their development and implementation, and the ways in which they might improve corporate efficiency.

The study of brain structure and function is merged with the investigation of how bioinspired systems, machine learning, and multivariate pattern analysis (MVPA) can handle and understand large datasets. In addition to highlighting significant research directions for the future and addressing ethical and societal issues related to AI, the study seeks to provide a comprehensive evaluation of the current state of data science and AI. The item taxonomy is shown in Figure 1.

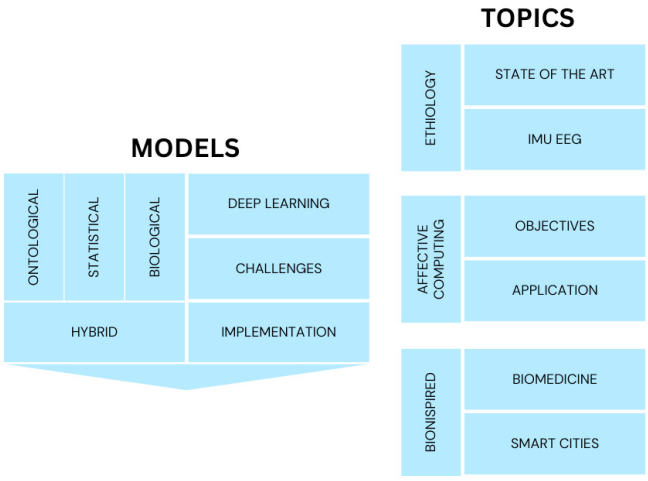

Fig. 1 Taxonomy of the review paper

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3. MODELS: ADVANCEMENTS IN DATA SCIENCE

Recent technical developments have led to substantial improvements in data science and artificial intelligence (AI). Deep learning, a branch of machine learning, is a potent technique for making inferences from big, complicated datasets without the need for explicit feature building. [5-7]. Natural language processing (NLP) is another useful technique that improves human-machine communication [8], [9]. AI and data science employ a variety of models, such as ontological, statistical, hybrid, and biological models, to process and analyze complicated datasets and produce more accurate prediction models. While non-explicit models learn from data without depending on expert conceptualization, ontological models are commonly employed in knowledge representation and the semantic web to organize information. [10]–[12].

Presenting the logic underlying the outcomes of non-explicit models can be challenging, particularly in sensitive domains like security or healthcare. To create dependable systems, more methods are required. Deep learning methods are difficult and costly, yet they can approximate any function given a large dataset. The applicability of these models to limited data sets is being investigated. While obtaining adequate datasets for some issues has been helpful, this is not always feasible. Non-explicit models may potentially fail with unbalanced datasets. Further research is needed to improve learning processes' efficacy and efficiency as well as their applicability for smaller datasets.

In conclusion, advances in AI and data science have produced more accurate prediction models as well as new models and methods for handling and evaluating complicated data. The results of non-explicit models are hard to explain, and more study is needed to solve this issue and increase the effectiveness and efficiency of non-explicit models.

4. DEEP LEARNING

Deep learning (DL), a branch of machine learning, uses artificial neural networks to achieve cutting-edge results in domains such as image identification, speech recognition, and natural language processing [13]–[16]. To address these challenges, researchers are looking into cutting-edge methods like transfer learning, generating synthetic data, and hybrid architectures like the Deep-SVM [17]–[19]. Additionally, autoencoders—unsupervised learning tools based on neural networks—may be improved by the application of an evolutionary design search method. Furthermore, the coding of possible responses may have a big influence on the learnt model. To make DL more comprehensible and useful for practical applications in sectors like healthcare and finance, more research is necessary.

5. ENTHOLOGY

The study of human civilizations and cultures' customs, values, and beliefs is known as ethnology [20], [21]. In contrast, electrophysiology uses EEG and inertial sensor devices to record and examine brain activity and physical movements in order to investigate the electrical properties of biological cells and tissues [22], [23]. Researchers can track changes in physical activity and cognitive function while learning more about brain activity by combining EEG and inertial sensors. Computational ethology and neuroethology utilize quantitative sensors and computer technologies to develop accurate models of behavior and brain activity and to pinpoint neural causal connections. Instead of focusing on human cognitive modeling, which has substantial sensory and computational hurdles, current approaches for human computational neuroethology (CNE) focus on robotic interactions.

Although motion artifacts and electromagnetic fields can make it challenging to detect low magnitude and noisy effects in brain-computer interfaces, wireless EEG can be used in clinical investigations. Researchers now capture synchronized body motion and EEG signals during daily activities using wireless EEG recording devices, inertial motion systems, and image-based eye recognition. Ethogram analysis is then used to assess performance. Combining brain sensor inputs with motion capture equipment can enable quantitative modeling

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in some strictly regulated laboratory conditions, but using these technologies on humans poses issues with their technological, ethical, and ecological feasibility.

6. BIOINSPIRED SYSTEM

The application of machine learning techniques in the biomedical field has grown significantly in recent years, especially in the interpretation of electrophysiology and EEG data [25]. Deep learning and convolutional neural networks are two methods used to find significant patterns in EEG data that can aid in the diagnosis and treatment of neurological disorders [26]. For example, these algorithms can be used to find patterns in EEG data that indicate the presence of epileptic seizures, leading to more precise diagnosis and treatment choices [27], [28]. Smart cities use bio-inspired systems to reduce energy consumption, control traffic flow, and enhance public safety [29].

In order to regulate traffic lights and modify traffic patterns in real time, these technologies might mimic the actions of biological systems like swarm movements or ant colonies. This enhances the efficiency of the transportation system and reduces air pollution and traffic congestion. Bio-inspired systems can also be used to predict and prevent criminal activity in high-risk locations by evaluating data from many sources, such as security cameras, social media, and police records, and finding patterns of criminal activity to effectively allocate law enforcement resources. Particle swarm optimization, ant algorithms, and artificial immune systems are some examples of nature-inspired computational methods used to solve challenging technical and scientific issues [30–33].

Unique evolutionary computing methods, bio-inspired approaches based on plant and animal behavior, and the fusion of bio-inspired approaches with other metaheuristics are all covered in this course. Two examples of biomedical applications of bio-inspired approximation techniques are the bacterial antibiotic resistance algorithm and the Koniocortex Like Network (KLN) [34], a bio-inspired artificial neural network that models biological neuron properties to perform deep learning on datasets exhibiting high-order biological brain properties. The KLN has a lot of potential for synthetic inputs and is being studied for how well it handles difficult real-world challenges.

7. MACHINE LEARNING IN BIG DATA ANALYSIS, PROCESSING AND VISUALIZATION

Due to the massive volume of data generated daily, machine learning (ML) has become an essential technology for processing, interpreting, and visualizing big data. ML algorithms are especially useful in industries like banking and healthcare because of their capacity to examine massive datasets and identify complex patterns, trends, and correlations in data. ML algorithms in video surveillance may evaluate video data in real-time, identify odd or suspicious activity, and notify law enforcement of possible crimes or incidents. [35]–[38]. ML has proven successful in producing dynamic and understandable visual representations of complicated data through data visualization, which helps people recognize patterns and insights in the data.

Deep learning (DL), which makes use of ANN topologies like convolutional neural networks (CNN), is one of the most effective machine learning techniques. CNN has proven essential in visual comprehension applications such image processing, computer vision, natural language processing, speech recognition, and remote sensing [39, 40]. CNNs are able to identify various object kinds and components in visual datasets by learning low-level attributes in the early neural layers and high-level features in later layers. CNNs are also employed in medical image analysis and content-based image retrieval (CBIR) [41], where they can extract features to determine the dissimilarity between test and database images and improve magnetic resonance (MR) image resolution using super-resolution techniques based on DL methods.

Machine learning (ML) has a big impact on society, especially in the medical industry where supervised learning algorithms may provide predictions that help doctors. It is expected that as machine learning (ML) technology advances, its integration with big data analysis, processing, and visualization will increase the accuracy and efficiency of data analysis and play a bigger role in a number of future sectors.

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8. MACHINE LEARNING IN NEUROSCIENCE

In the field of neuroscience, machine learning techniques have shown great utility in identifying brain structures and functions that are difficult to recognize by hand [44], [45]. For example, they have been crucial in finding biomarkers for Alzheimer's disease, which has allowed for earlier detection and treatment. Furthermore, machine learning (ML) is increasingly being applied to the study of electroencephalogram (EEG) data [46], where it has assisted in identifying patterns of brain activity linked to depression, leading to the creation of novel therapies and treatments. Deep learning (DL) techniques, which are renowned for their effectiveness in image processing, are frequently used for the analysis of functional magnetic resonance imaging (fMRI) data [47–49].

This technique enables the computation of functional connectivity models, the extraction of properties, and the identification of patterns. Certain methods must be used in order to understand how the DL algorithm works and the characteristics it detects. Preprocessing techniques affect how effectively classification and feature extraction algorithms work as well as how well visual images are evaluated. Using 3D DatSCAN-SPECT images, DL techniques have improved the accuracy of Parkinson's disease (PD) diagnosis. CNNs fed with isosurface images perform better than DatSCAN images, while isosurfaces generated from photographs give descriptive data for mimicking the geometry of the striatum. CNN saliency and activation maps can also be used to calculate regions of interest. Autism has also been diagnosed using DL methods.

The limits and ideal circumstances of machine learning approaches are examined in order to supply vital information to the scientific community analyzing data. In general, machine learning techniques have great potential to enhance the diagnosis and treatment of neurological disorders.

9. APPLICATIONS FOR CARE AND WELL-BEING

AI has revolutionized the education sector by offering individualized and adaptable learning solutions. In order to adapt the learning content and delivery to each learner's specific learning needs, intelligent learning guidance systems may evaluate student performance data. This approach improves academic performance while increasing motivation and student involvement. Additionally, the usage of chatbots and other AI-powered technology, including language translators, makes it easier for students and instructors to communicate and expands access to multilingual educational materials. The way we teach and learn could be drastically changed by the application of AI in education.

Wang et al.'s 2021 study demonstrated the potential benefits of data science and AI development. This study shows that machine learning algorithms can diagnose cardiac issues more accurately than traditional techniques. The study shows how applying artificial intelligence might increase the precision of medical care and diagnosis. In another case study, the Memorial Sloan Kettering Cancer Center's Watson for Oncology AI platform used machine learning to suggest cancer treatments. Physicians have used the procedure to analyze patient data and choose the best course of action.

A case study from Case Studies demonstrates how AI and data science are being used in the field of education: Khan Academy, an online learning platform, uses AI to offer choices for learning content that are tailored to the needs and preferences of its users. As a result, students learn more effectively and independently. Applications of AI and data science can essentially be used for a range of educational goals, such as tailored learning, virtual educational assistants, and the analysis of educational data. The manufacturing and finance sectors are just two of the many industries that are impacted by the application of AI and data science.

AI will also be used by JPMorgan Chase to identify financial transaction fraud. By analyzing transaction patterns and behavior, AI systems can detect dubious transactions and protect consumers from financial crime. In the manufacturing industry, AI and IoT technologies can be applied at every stage of the supply chain to boost productivity, cut expenses, and reduce risks. It's common knowledge that Boeing uses artificial intelligence and data analysis to optimize their aircraft manufacturing process. By using sensor data and

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machine learning algorithms, businesses can improve production planning, reduce the number of product defects, and increase production efficiency.

10. FINDINGS AND CONVERSATION

Due to the daily exponential growth in data, machine learning (ML) has become increasingly important in the analysis, interpretation, and presentation of massive datasets. ML algorithms have demonstrated the ability to effectively handle and analyze large datasets, making it possible to find complex patterns, trends, and correlations in data that are challenging to detect with traditional techniques. This is particularly useful in sectors that need to process large volumes of data, including banking and healthcare.

By evaluating video data and instantly identifying suspicious or unusual activity, machine learning algorithms have been used in video surveillance systems to improve public safety. This enables law enforcement to respond quickly and prevent mishaps or crimes. Furthermore, ML systems can be trained to identify specific items or individuals, enhancing monitoring precision and efficacy.

11. CONCLUSION

A thorough description of the findings from an article review on the application of data science and artificial intelligence in various domains is given in the results and discussion sections. There are still societal and ethical issues, despite the growing recognition of the potential advantages of AI and data science. Numerous AI applications in fields including healthcare, education, finance, and smart cities are found by looking through related publications. Ontological, statistical, hybrid, biological, and deep learning techniques are employed in addition to other AI models. Deep learning's shortcomings and challenges include the need for massive datasets and the incapacity to evaluate outcomes.

The issue with deep learning algorithms is that they require large amounts of data. Large and representative datasets, for example, are required in some situations, such as facial recognition, in order for the model to successfully train and produce accurate results. For example, it is difficult to understand the results of highly complex simulated neural tissue models in non-explicit models. Another integrity problem in real-world AI measurements that adds to the instability of the results from AI models is incomplete, inaccurate, and unrepresentative data. In the healthcare industry, strong security measures are necessary to protect patient data and stop unauthorized access. This problem can be resolved with the use of privacy algorithms or data encryption techniques. When applying AI in real-world contexts, data integrity and dependability are issues.

For example, incomplete, inaccurate, or unrepresentative data may lead AI models to provide inaccurate conclusions; therefore, it is essential to correctly collect, clean, and handle data to guarantee its high quality. worries about security and privacy when using AI. For example, when used in the healthcare industry, robust security measures are needed to protect private patient information and stop unauthorized individuals from accessing it. This problem might be solved with the use of privacy algorithms or data encryption techniques. Neurologists utilize machine learning to treat neurological illnesses and investigate the structure and function of the brain. It ensures that machine learning techniques may be used to extract significant patterns from EEG data in order to study human behavior.

Biologically inspired systems have the potential to help create more effective and sustainable urban environments as well as new therapies and cures for a range of illnesses. AI is also used to improve human health and wellness, such as in cellular fitness and sleep monitors. AI is also used in education to provide a personalized learning experience and in the home to enhance living conditions. In conclusion, data science and artificial intelligence (AI) have enormous potential for a range of industries, but further research and development are required to ensure its safe and moral application.

REFERENCES

[1] V. Whig, B. Othman, A. Gehlot, M. A. Haque, S. Qamar, and J. Singh, “An Empirical Analysis of Artificial Intelligence (AI) as a Growth Engine for the Healthcare Sector,” in *2022 2nd International Conference on*

Advance Computing and Innovative Technologies in Engineering, ICACITE 2022, Institute of Electrical and Electronics Engineers Inc., 2022, pp. 2454–2457. doi: 10.1109/ICACITE53722.2022.9823607.

[2] K. Thiagarajan, C. K. Dixit, M. Panneerselvam, C. A. Madhuvappan, S. Gadde, and J. N. Shrote, "Analysis on the Growth of Artificial Intelligence for Application Security in Internet of Things," in *Proceedings of the 2nd International Conference on Artificial Intelligence and Smart Energy, ICAIS 2022*, Institute of Electrical and Electronics Engineers Inc., 2022, pp. 6–12. doi: 10.1109/ICAIS53314.2022.9742985.

[3] I. Kaur, Y. Kumar, and A. K. Sandhu, "A Comprehensive Survey of AI, Blockchain Technology and Big Data Applications in Medical Field and Global Health," in *Proceedings of International Conference on Technological Advancements and Innovations, ICTAI 2021*, Institute of Electrical and Electronics Engineers Inc., 2021, pp. 593–598. doi: 10.1109/ICTAI53825.2021.9673285.

[4] K.-K. Lai, M.-L. Lin, S.-B. Chang, and C.-F. Hsu, "The Study of Taxonomy and Evolutional Trends of Relevant Literatures on Patent Analysis," in *PICMET 2007 Proceedings*, 2007, pp. 22–30.

[5] M. G. Haricharan, S. P. Govind, and C. N. S. V. Kumar, "An Enhanced Network Security using Machine Learning and Behavioral Analysis," in *2023 International Conference for Advancement in Technology, ICONAT 2023*, Institute of Electrical and Electronics Engineers Inc., 2023. doi: 10.1109/ICONAT57137.2023.10080157.

[6] P. Suyal, S. Dutt, R. Sharma, and L. Mohan, "An Agile Review of Machine Learning Technique," in *Proceedings of the 2022 11th International Conference on System Modeling and Advancement in Research Trends, SMART 2022*, Institute of Electrical and Electronics Engineers Inc., 2022, pp. 75–79. doi: 10.1109/SMART55829.2022.10047305.

[7] I. Azzouz, B. Boussaid, A. Zouinkhi, and M. Naceur Abdelkrim, "Multi-faults classification in WSN: A deep learning approach," in *Proceedings - STA 2020: 2020 20th International Conference on Sciences and Techniques of Automatic Control and Computer Engineering*, Institute of Electrical and Electronics Engineers Inc., Dec. 2020, pp. 343–348. doi: 10.1109/STA50679.2020.9329325.

[8] R. E U and R. P C, "A Review of Different Approaches in Natural Language Interfaces to Databases," in *Proceedings of the International Conference on Intelligent Sustainable Systems (ICISS 2017)*, 2017, pp. 801–804.

[9] J. Shah, M. Sagathiya, K. Redij, and V. Hole, "Natural Language Processing based Abstractive Text Summarization of Reviews," in *Proceedings of the International Conference on Electronics and Sustainable Communication Systems (ICESC 2020)*, 2020, pp. 461–466.

[10] T. P. Sales, N. Guarino, G. Guizzardi, and J. Mylopoulos, "An Ontological Analysis of Value Propositions," in *Proceedings - 2017 IEEE 21st International Enterprise Distributed Object Computing Conference, EDOC 2017*, Institute of Electrical and Electronics Engineers Inc., Oct. 2017, pp. 184–193. doi: 10.1109/EDOC.2017.32.

[11] Y. Wand and R. Weber, "An Ontological Model of an Information System," *IEEE Transactions on Software Engineering*, vol. 16, no. 11, pp. 1282–1292, 1990, doi: 10.1109/32.60316.

[12] R. G. V, R. V. M, B. Y. M, and S. E. S, "Using Ontological Approach in Tutoring Integrated Expert Systems," in *Proceedings of the 2nd Russian-Pacific Conference on Computer Technology and Applications*, 2017, pp. 145–150.

[13] K. Zhu and T. Zhang, "Deep Reinforcement Learning Based Mobile Robot Navigation: A Review," *Tsinghua Sci Technol*, vol. 26, no. 5, pp. 674–691, 2021.

[14] A. Agarwal and S. Meena, "A Comparative Study of Deep Learning and Machine Learning Algorithm for Sentiment Analysis," in *2022 3rd International Conference on Issues and Challenges in Intelligent Computing Techniques (ICICT)*, IEEE, Nov. 2022, pp. 1–7. doi: 10.1109/ICICT55121.2022.10064544.

[15] J. S. Bhatt and M. V. Joshi, "Deep Learning in Hyperspectral Unmixing: A Review," in *International Geoscience and Remote Sensing Symposium (IGARSS)*, Institute of Electrical and Electronics Engineers Inc., Sep. 2020, pp. 2189–2192. doi: 10.1109/IGARSS39084.2020.9324546.

[16] B. Seetharamulu, B. Naresh, K. Reddy, and K. Bramha Naidu, "Deep Learning for Sentiment Analysis Based on Customer Reviews; Deep Learning for Sentiment Analysis Based on Customer Reviews," 2020.

[17] P. Dubey, A. Mishra, and B. K. Saha, "Sentiment Analysis Using SVM and Deep Neural Network," in *Proceedings of the 3rd International Conference on Computing Methodologies and Communication (ICCMC 2019)*, 2019, pp. 952–957.

[18] S. Hafeez and N. Kathirisetty, "Effects and Comparison of different Data pre-processing techniques and ML and deep learning models for sentiment analysis: SVM, KNN, PCA with SVM and CNN," in *2022 1st International Conference on Artificial Intelligence Trends and Pattern Recognition, ICAITPR 2022*, Institute of Electrical and Electronics Engineers Inc., 2022. doi: 10.1109/ICAITPR51569.2022.9844192.

Journal of Online Engineering Education
ISSN: 2158-9658 Volume: 17 Issue: 1
Article Received: 24 January 2026 **Revised**: 14 March 2026 **Accepted**: 08 April 2026

[19] I. Rebai, Y. Benayed, and W. Mahdi, "Improving of open-set language identification by using deep SVM and thresholding functions," in *Proceedings of IEEE/ACS International Conference on Computer Systems and Applications, AICCSA*, IEEE Computer Society, Mar. 2018, pp. 796–802. doi: 10.1109/AICCSA.2017.119.