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A Systematic Literature Review: The Recent Advancements in AI Emerging Technologies and Agile DevOps

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Abstract: This systematic literature review investigates the advancements in AI emerging technologies and Agile DevOps practices throughout 2020. It extracted the data from five hundred articles to analyze 500 articles from leading journals and conference proceedings for this study, highlighting their significant developments in both fields. In AI, the focus was on the evolution of machine learning besides deep learning algorithms and their progress in natural language processing and AI-driven IoT applications. Concurrently, Agile DevOps practices saw increased adoption and adaptation, which is the need for remote work solutions and enhanced software development processes. The convergence of AI and Agile DevOps methodologies is evident and reflects a trend towards integrated and adaptive systems capable of addressing the demands of a rapidly evolving digital landscape. This review underscores the transformative impact of these technologies on various industries and suggests avenues for future research to explore their intersection and implications for continued innovation. Investigating these combined methodologies on organizational performance and project outcomes will provide valuable insights. Examining their challenges and best practices for implementing AI-driven Agile DevOps solutions in different industry contexts could guide future innovations.

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Keywords: Systematic Literature review, AI, Technologies, Agile, DevOps

1. Introduction

Artificial Intelligence has quickly evolved into a unique of the maximum change technologies of the 21st century, and its impact permeates various areas, from health systems and economics to industrial and entertainment [1]; the period leading up to 2020 witnessed significant advancements in machine learning and deep learning models. The innovations enhanced the capabilities of AI systems and emerged new applications previously thought to be science fiction [2]. As AI continues integrating extra emergent technologies of the Internet of Things and blockchain, 5G is poised to redefine the method interrelate with unparalleled computerization systems for efficiency and intelligence in our daily lives and industries. This overview explores the key progressions in AI that have shaped its current landscape and their implications for the future [3].

Among the biggest developments in AI are the maturity of supervised Learning and artificial intelligence methods. These advances have transformed disciplines, including image and voice identifications of human language analysis for statistical analysis. The machine acquires knowledge of data and enhances its accuracy continuously. Artificial intelligence models have been developed using neural networks that can handle large datasets for more accurate and efficient outcomes [4]. The convolutional neural and recurrent neural networks have become the backbone of AI applications, cutting-edge computer vision, and language translations [5]. These advancements have not quite drawn out the potential to drive its adoption across various industries, a cornerstone of modern technological progress. Their AI integration with other emerging technologies has opened new avenues for novelty and application. The convergence of AI with the (IoT) has led to the creation of smart environment devices that can communicate and make decisions autonomously [6]. AI-driven IoT systems optimize supply chains and predict equipment failures to enhance productivity via real-time data analysis in manufacturing. The infusion of AI-blockchain technology enhances refuge and photo in communications for industries like investment and supply-chain management [7]. The advent of 5G networks has further accelerated the deployment of AI applications, their full speed plus low latency to connectivity necessary for immediate AI processing at the edge. These integrations amplify AI's capabilities and set the stage for a future where intelligence is interconnected to systems to drive innovation across sectors [8].

Agile development practices established themselves as the dominant Methodology for software development across industries. Agile emphasizes iterative progress and flexibility, and collaboration systems have evolved from a niche approach to become the standard for managing complex software projects [9]. The rise of Agile can be attributed to a response to the fast-paced, ever-changing nature of technology and business requirements. Unlike traditional waterfall models, Agile allows teams to break down projects into smellers for easily manageable chunks to continuous integration and testing to response. This iterative tactic condenses the threat of task failure and ensures that the finishing product is aligned with user needs and market demands [10]. Agile has expanded beyond software development systems to influence practices in product management, marketing, and even organizational change, highlighting its versatility and broad applicability. Research questions: What were the key advancements in emerging AI technologies in 2020? How did Agile DevOps practices evolve in 2020?

The primary objective of systematic literature stands to explore and synthesize the recent advancements in popular AI emerging technologies and Agile DevOps practices that occurred in 2020. The study aims to identify key technological developments, innovations, and trends within these examination fields that have influenced various industries and contributed to the broader landscape of digital transformation [11]. To systematically review academic and industry literature, one must seek an all-inclusive understanding of how AI and Agile DevOps have evolved in reaction to the fast-changing technological and business environment of 2020 [12]. The scope of this review encompasses a wide-ranging collection of sources for peer-reviewed journal articles, conference papers for white papers, and industry reports published during or related to the year 2020. The review focuses on advancements in incorporating AI with further emerging technologies like IoT, blockchain, and 5G [13].

The provided literature review remains organized to examine the advancements of vogueish AI emerging technologies and Agile DevOps practices in 2020. The Introduction provides context and objectives for the review. The Methodology outlines the approach used for the literature search and selection. The core sections cover Advancements in AI Emerging Technologies and Agile DevOps, detailing key developments and their impact [14]. The Discussion analyzes the findings, and the Conclusion summarizes insights and suggests future research directions.

2. Methodology

This research systematically reviewed emerging AI technologies and agile DevOps in 2020. collected 500 articles for the literature review and used them as Review tools for SLR analysis. Extracted the data from 8 publishers (IEEE, Mdpi, Springer, ACM, Academia, Semantic Scholar, Elsevier, VMARE) to get the article data and make an SLR analysis.

2.1 Literature Search Strategy

The search strategy for this review was methodically intended to ensure a comprehensive and systematic exploration of recent advancements in AI emerging technologies and Agile DevOps practices for 2020 [15]. This section provides an in-depth explanation of the search process in the databases and sources of the specific keywords and search terms applied.

To gather a broad spectrum of relevant literature data from several key academic and industry publishers were utilized given listed:

- IEEE-Xplore: This database was selected for its extensive repository of engineering and technology literature of conference papers plus journal articles and standards [16-17]. IEEE Xplore is valuable for accessing research and developments in AI technologies; use this keyword to get information on Agile methodologies.
- Google Scholar: This widely used search engine for scholarly articles on Google Scholar was employed to ensure coverage of a wide range of publications not indexed in other databases [18]. It gives full access to a diverse set of research outputs of different books, and patents are free of cost.

- **ACM Digital Library: This source was chosen for computing and information technology literature. The ACM-Digital Library contains the richest collection of conference and journal articles, and its technical magazines are offered for both AI and Agile practices [19].**
- **Springer Link: This platform is included to access high-quality research articles and computer science and commerce books. Springer-Link allows the user to download and get comprehensive coverage of advancements in AI and Agile methodologies histories of data [20].**
- **Science Direct: Known for its vast collection of scientific and technical research articles, ScienceDirect was used to supplement the search with additional sources on AI technologies and Agile development practices [21].**

Specific keywords and search terms were employed to search for the relevant literature. These terms will be chosen based on capturing the most relevant and recent technological advancements.

2.2 Search Process

The search process involved using these keywords and search terms in various combinations across the selected databases. Boolean operators were employed to improve search results besides guaranteeing significance [22]. Table 1 shows the keywords as search terms, and the selection process for the proposed Figure 1 is given below.

Table 1: Keywords Search process

Keywords/Search Terms	Description Details
"AI advancements 2020"	To capture general advancements and innovations in AI technologies throughout the year 2020.
"Machine Learning 2020"	To focus on developments and trends specifically related to machine-learning algorithms and applications.
"Deep-learning Innovations 2020"	Toward identifying breakthroughs and new techniques in deep Learning.
"AI integration with IoT 2020"	To explore how AI technologies have been combined with the Internet of Things (IoT).
"AI and blockchain 2020"	To examine the intersection of AI and blockchain technologies and their combined impact.
"Agile Development 2020"	To find literature on the evolution and trends in Agile development methodologies.
"DevOps practices 2020"	To focus on advancements in DevOps practices, including tools and techniques.

"CI-CD advancements of 2020"	Toward identifying their developments in Continuous Addition of Continuous Deployments processes.
"remote Agile practices 20."	To describe and find the Agile methodologies that were adapted for remote-work environments.
"Agile and DevOps addition of 2020."	To review in what way Agile besides DevOps practices have been joined to evolve.

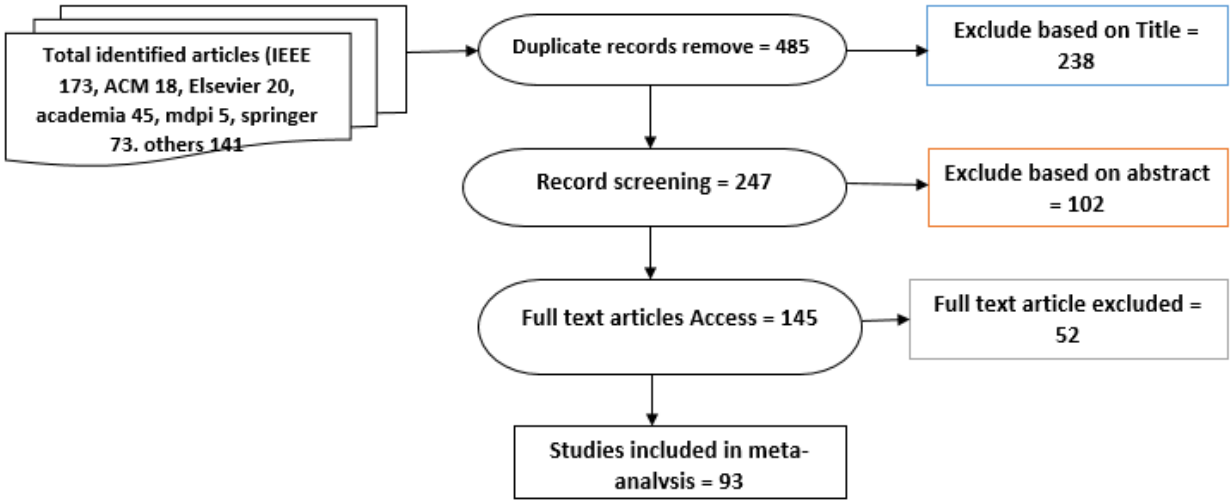

Figure 1: Selection process as Review

2.3 Inclusion and Exclusion Criteria

In a systematic review, Table 2 shows clear inclusion plus exclusion, which is crucial for the relevance of the quality of selected studies. This segment summarizes the specific criteria used to choose and filter the literature for this review on advancements in AI emerging technologies and Agile DevOps practices in 2020. The inclusion criteria remained designed to ensure the studies are relevant and credible for peer-reviewed sources published within the target year to focus on advancements in the specified fields [23]. Their exclusion criteria were established to filter out studies that did not meet those published standards outside the year 2020, lacked methodological rigor, and did not directly address their research questions [24]. By applying for a review, the aim is to present a high-quality synthesis of the most pertinent and impactful research from 2020.

Table 2: Inclusion and Exclusion Criteria

Criteria	Inclusion	Exclusion
Publication Date	Studies published in 2020	Studies published before or after 2020

Relevance to Research Questions	Directly addresses advancements in AI or Agile DevOps	Irrelevant to the research questions or tangentially related [26]
Source-Types	Peer-reviewed articles besides conferences-papers and industry reports [25]	Non-peer-reviewed sources
Methodological Rigor	Clear methodological approach (empirical research, case studies, systematic analyses)	Insufficient methodological detail or unclear approach
Language	Published in English	Published in languages other than English
Impact and Citations	Highly cited papers and those from reputable journals/conferences	Papers with low citation count and lesser-known sources
Duplicates and Redundancies	Unique and non-redundant studies [27]	Duplicated or redundant studies [27-28]

2.3 Data Extraction and Analysis

The process of extracting the relevant information from the selected studies in their several systematic steps to the data gathered for comprehensive and pertinent to the research objectives [29].

1. **Selection of Studies: After conducting the literature search process, studies are first screened based on titles and abstracts are easy to determine their relevance to the exploration questions. Studies that see the inclusion criteria have been published in 2020, and advancements in AI technologies or Agile DevOps practices are nominated for full-text reviews [30].**
2. **Full-Text Review: A detailed full-text review is conducted for each designated paper to extract relevant information [31]. The key aspects of each study are documented in the research focus of Methodology, as well as key findings and conclusions. This step ensured that only studies providing valuable insights into advancements in AI and Agile DevOps were included.**
3. **Data Extraction: Information was systematically extracted from each study using a predefined data extraction form [32]. This form included fields for:**
    - **Study Details: Author(s), publication year, source, and publication type.**
    - **Research Focus: Specific advancements or innovations discussed in the study.**
    - **Key Findings: The main outcomes and contributions of the study are related to AI technologies or Agile DevOps practices.**
    - **Methodology: Research methods and techniques used in the study.**
    - **Relevance: The study's relevance to the research questions and objectives.**
4. **Quality Assessment: Each study was assessed for quality and relevance based on methodological rigor, sample size, and relevance to the review questions [33]. Studies with robust methodologies and significant findings were prioritized 33.**

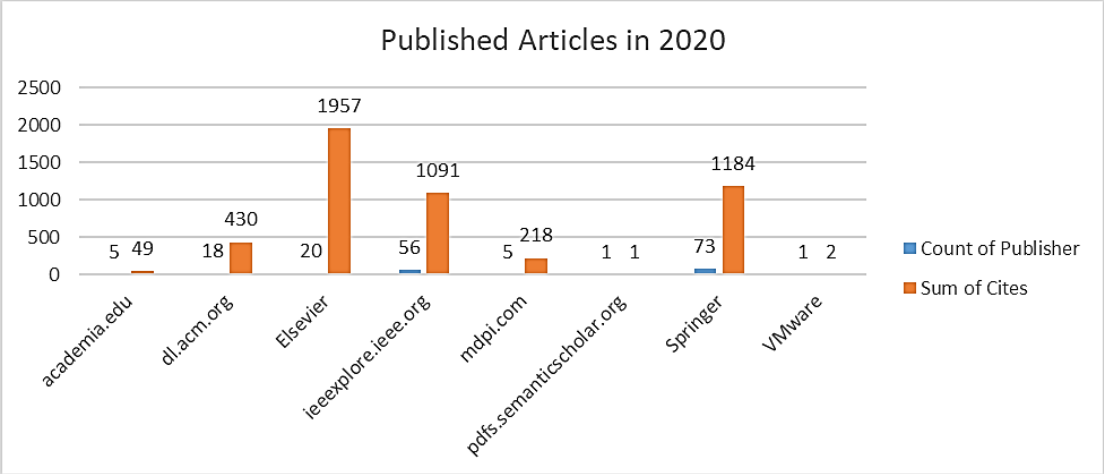

Figure 2: Published Articles in 2020

Figure 2 shows the publication ratio of articles in 2020 there. Blue represents the published, and orange shows the sum of cities of articles. The highest range of Elsevier citations is 1957, the highest IEEE range is 1091 cites, and Springer cites 1184.

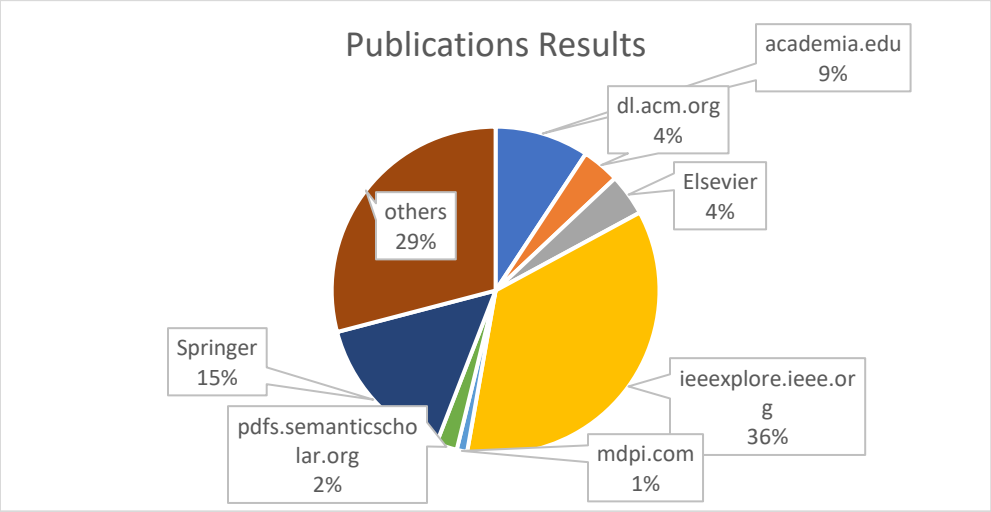

Figure 3: Publication results chart

Figure 3 displays the percentage of publication in publisher's academia at 9%, ACM at 4%, Elsevier at 4%, Springer at 15%, and IEEE's highest range publication is 36%. Table 3 shows the results from the extracted dataset.

Table 3: Results from an extracted dataset

Rank No	Publisher	Initial Results	After Title Screening	After Exclusion and Inclusion
1	academia.edu	45	44	43
2	dl.acm.org	18	14	16
3	Elsevier	20	16	18
4	ieeexplore.ieee.org	173	50	18
5	mdpi.com	5	5	5
6	pdfs.semanticscholar.org	10	11	1
7	Springer	73	62	67
8	others	141	138	70
9	total articles	485	340	238

3. Advancements in AI Emerging Technologies

Advancements in emerging AI technologies have significantly shaped various industries' landscapes, forcefully limiting whatever technologies and algorithms can realize. Over recent years, AI has moved beyond theoretical research to practical applications that revolutionize sectors like healthcare, finance, transportation, and manufacturing. In 2020, AI advancements increased the sophistication of machine algorithms using deep models [34-35]. These models have become more efficient and capable of complex procedures of natural-language processing for image recognition and prognostic analytics to be performed at high accuracy and speed. One of the critical areas of progress has been the mixing of developing technologies like the Internet of Things and blocks-chain being used. AI-driven IoT solutions have enhanced data collection and analysis and automation of smarter systems in industries ranging from smart cities to agriculture [36]. The convergence of AI and blockchain has also opened new avenues for securing AI-driven processes for the integrity of decentralized AI applications.

3.1 Machine Learning and Deep Learning

These two Artificial Intelligence (AI) subdivisions have attracted much interest and funding because of their ability to transform a wide range of sectors. As a branch of artificial intelligence, machine learning is concerned with creating techniques in which machines understand and make judgments using data requiring specific programming [37]. Deep Learning is a highly specialized branch of computer science that uses multi-layered neural systems to simulate the layout and operation of the human mind [38]. This allows for studying and comprehending the complex trends seen in vast data, and Figure 4 shows the AI technologies.

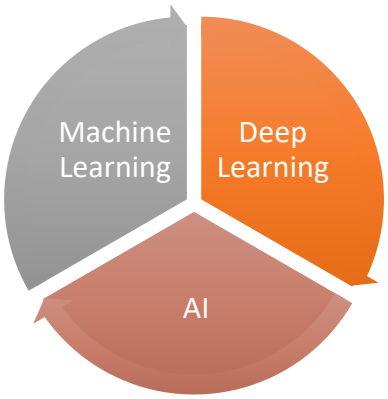

Figure 4: AI Technologies

- **Machine Learning: Machine learning, also called ML, relies on the basic idea that permits equipment to gain insight from information and to enhance as time passes. This can be accomplished through various teaching methods, such as unsupervised and supervised Learning [38]. Supervisory Learning is a model trained on data; the right result is given for every input from the user for a model to acquire about the connections among them. Unsupervised modeling handles raw data in which the simulation seeks structures and groups inside the information [39]. Reinforcement learning represents a form of acquiring during which a robot learns about making selections for manipulating a situation and getting positive or negative consequences centered on its behaviors. Current advances in ML include increasing interest, which enhances prediction accuracy by combining many models while creating gradient-boosted techniques X-G Boost and Light-GBM because of their effectiveness and performance to established standard practices [40]. The notion of transfer learning using a model trained to second comparable performance has decreased the amount of effort and processing power needed in fields with a dearth of labeled information.**

- **Deep Learning uses multi-layered neural networks of machine learning (ML) aspects to learn hierarchy depictions of input. These chains have transformed domains, including AI, speech recognition, and language processing algorithms. Neural network models (CNNs) with Recurrent neural networks are capable of learning the spatial hierarchies of information, and they are now the main tool used for processing images and videos. RNNs are more sophisticated variants in Transformers in LSTM (long-short-term memory) networks that have significantly enhanced serial data processing advances in forecasting time series for the modeling of languages [41]. Models called Transformers are a major accomplishment in Deep Learning (DL) that have revolutionized Natural Language Processing; unlike traditional RNNs, they can process entire sentences or paragraphs while capturing complex dependencies across the text. Based on the NLP tasks, models like BERT, GPT-3, and T5 are translations of summarizations besides question-answering [42]. These models understand context better and can generate human-like text, paving the way for advanced AI applications in customer service, content creation, and software development.**

- **Artificial Intelligence (AI): Artificial intelligence (AI) is a more general growth that includes deeper Learning, machine learning automation, and trained systems processing. AI aims to build systems capable of doing duties, usually for the cognitive ability to comprehend spoken words in identifying patterns, resolving issues, and coming to choices [43]. AI is not just about creating intelligent systems but about understanding the nature of intelligence itself. AI has evolved significantly since its inception, moving from rule-based systems that require explicit programming to more flexible and adaptive systems. Early AI systems had limited reliance on predefined rules and logic, making them brittle and unable to grip the erraticism and difficulty of real-world surroundings. The advent of ML and DL has transformed AI systems toward learning from statistics and advanced their recital over times of AI is powerful and versatile.**

The advancements in cutting-edge ML besides DL have led to an explosion of applications across various domains. In healthcare, ML models investigate therapeutic images to predict disease outcomes and promote drugs in modeling complex biological interactions. ML algorithms are at the core of autonomous driving technologies in the automotive industry so that their buses reflect their environment and are directed securely [44]. In and DL are transforming risk assessments for fraud detection and algorithmic trading accurate predictions and insights.

3.2 Integration with Other Emerging Technologies

The merging of Artificial Intelligence to extra developing tools in the Internet of Things (IoT) plus blockchain and 5G, besides cloud computing, is creating new opportunities and transforming industries across the globe [45-46]. These integrations enhance individual technologies, drive innovation, create new business models, and address complex challenges in various sectors. Figure 5 shows the AI Emergent Technologies.

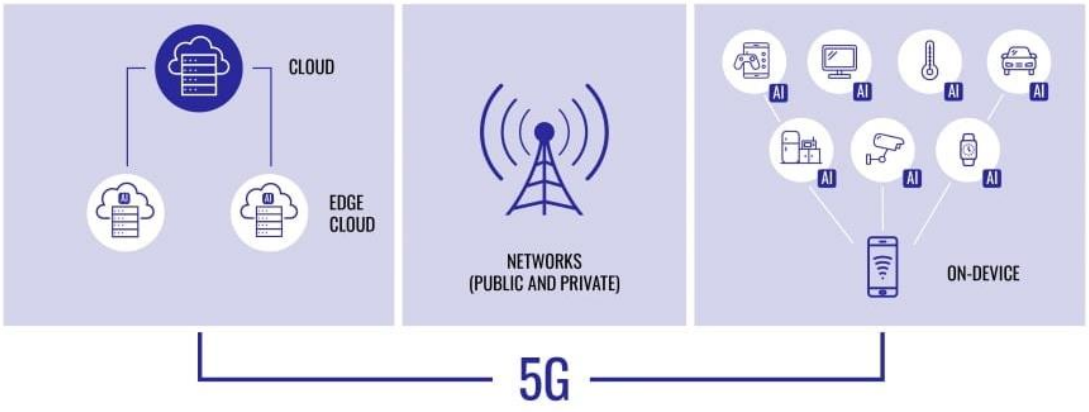

Figure 5: AI Emergent Technologies

- **AI and Internet of Things (I0T): Massive volumes of information are produced in cameras plus detectors of networked devices on Internet of Things devices. Actual data analysis using algorithms based on AI can yield insightful conclusions for improved operations for future maintenance. Based on artificial intelligence for intelligent production can track the condition**

of machinery and anticipate problems prior to and plan repair to save unavailability [47]. Smart cities that use their AI and IoT to work together to manage traffic are optimizing energy usage to enhance the public by analyzing figures from innumerable bases, trendy traffic cameras, and environmental sensors.

- AI and Blockchain: These combinations of AI and blockchain technology are transforming how data is managed for sharing and secured. Blockchains deliver a dispersed and secure framework to store and verify info so AI can analyze and process this data to make informed decisions. In the supply chain management system of blockchain, the transparency and traceability of goods are optimized, while AI can optimize inventory levels and predict demand [32-48]. AI can be used to augment the refuge of blockchain networks and classify patterns that are potential threats or fraud. Integrating AI and blockchains is also being explored in areas such as healthcare for secure patient data management and finance for automating smart contracts.

- AI and 5G: The rollout of 5G networks significantly enhances the capabilities of AI applications, decreases latency due to increased network reliability, and increases transmission rates. The latter is over applications utilizing AI, such as simulated reality of mixed reality and self-driving cars that need to interpret information immediately. Tech uses 5G, which AI can use to process data from connected devices almost immediately for responsive and accurate decision-making [12-9]. In autonomous vehicles in 5G, their rapid communication between vehicles and infrastructure is critical for safe navigation and collision avoidance. In healthcare, AI applications can support real-time remote monitoring and telemedicine to improve patient outcomes.

- AI and Cloud Computing: Cloud computing plays a serious part in the deployment and scalability of AI applications. In cloud infrastructure, organizations can access powerful AI tools and platforms without the need for significant on-premise resources. This democratization of AI is in businesses of all sizes, adopting AI technologies and integrating them into their operations [19-49]. Cloud-based AI services are machine learning platforms with the computational power needed to prepare multifaceted models besides processing great datasets. This integration benefits industries like AI, which stands for actual fraud detection and risk management of AI-driven analytics to help personalize customer experiences.

- Impact on Various Industries and Sectors: The union of AI with these emerging uses of technologies profoundly impacts various industries. In manufacturing, the combination of AI and IoT is the development of smart factories that can operate with AI-driven systems that optimize the production of processes and reduce waste. In the health sectors, incorporating AI with blockchain and 5G improves patient care through security in real-time data sharing and telemedicine [50]. The financial industry is leveraging AI and blockchain to ensure the security and efficiency of AI and cloud computing transactions, which are classy data analytics and personalized financial services.

In the automotive industry, integrating AI with 5G accelerates the development of autonomous vehicles in data processing and communication between vehicles and infrastructure, enhancing safety and efficiency. Retail is also being transformed by AI with IoT and cloud computing for more personalized shopping experiences, optimizing their inventory and improving supply chain efficiency.

3.3 Ethical Considerations in AI

Ethically, AI technologies develop progressively into countless features of societies, and their ethical considerations have emerged in critical areas of Discussion. Furthermore, Figure 6 shows the ethical considerations of AI. AI systems have the potential to significantly impact individuals and communities for important questions about their fairness in accountability for transparency in data privacy [7-50]. Addressing these ethical issues toward AI is industrialized and arranged to benefit humanity to minimize damage.

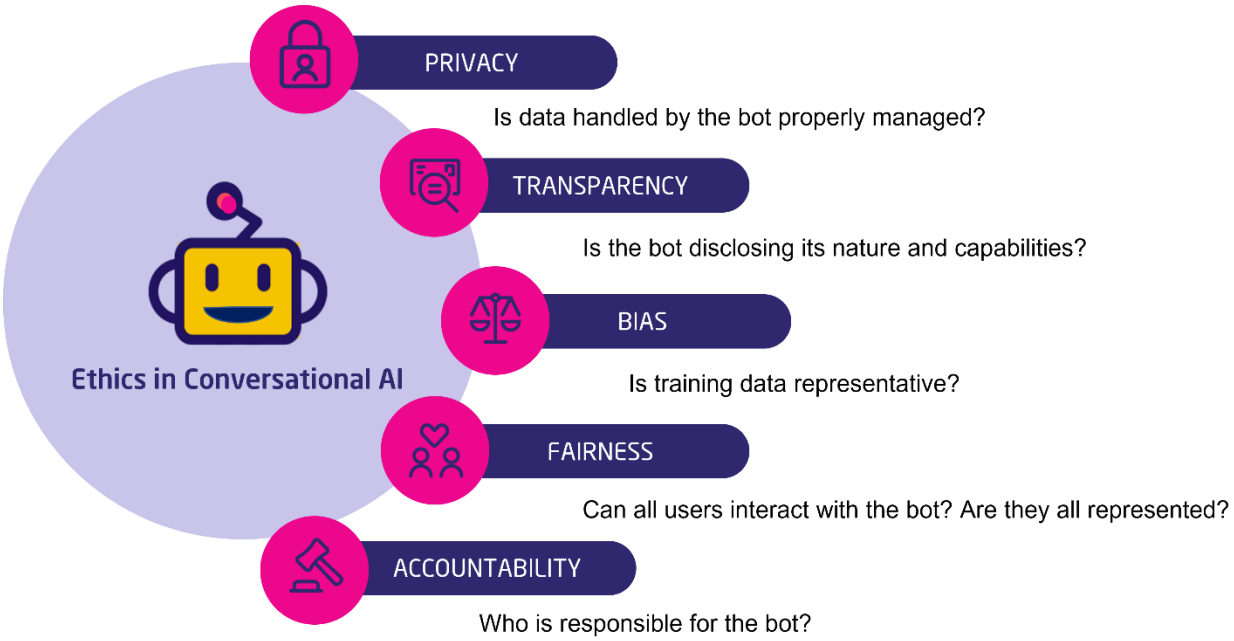

Figure 6: Ethical Consideration of AI

1. **Bias in AI: The problem of discrimination constitutes one of the greatest ethical worries in artificial intelligence (AI). Machine learning systems frequently train on big data sets that reflect societal prejudices, which can lead to incorrect results whenever these machines are implemented. Automated facial gadgets have been demonstrated to exhibit a greater rate of errors for people with a darker complexion of racial discrimination based on race [51]. AI algorithms employed in recruitment procedures may unintentionally favor demographics across the board in maintaining existing disparities.**

2. **Transparency in AI: The "black box" dilemma and openness are two more significant ethical issues with AI. Even for their creators, numerous AI models within neural systems function as impenetrable processes that are challenging to understand. In high-stakes fields like finances of medicine and law enforcement, AI choices can have far-reaching effects, and an absence of disclosure can breed mistrust in systems using AI. A rising trend called AI that can be explained seeks to improve the interpretability and understandability of AI systems and intends to overcome this problem [52]. XAI approaches aid in illuminating the decision-making process of AI individuals and groups to comprehend and validate the results generated by algorithms.**

3. **Data Privacy in AI: Data privacy is another critical ethical AI system necessitating massive expanses of information to purpose concerns about data that are easy to store and use. Privacy issues are particularly relevant in personalized advertising and social media, where sensitive personal information is involved. There is a risk that AI systems could be used to invade an individual's privacy, so collecting more info is necessary using data in ways that were not originally intended [52]. To mitigate threats to an organization's obligation, follow severe statistics privacy rules in the Unions and implement robust data supremacy practices. In their techniques of data, nameless and different privacy containers help defend persons' confidentiality AI schemes to do efficiently.**

4. **Accountability in AI: Accountability in AI is closely related to more autonomous converts, and it is progressively important to establish clear lines of responsibility for their actions. If an AI system makes a decision, it must be possible to determine who the developer accounts for the AI himself. This is challenging in cases where AI systems operate without human intervention, or the process is not fully understood [53]. Establishing accountability in AI requires clear ethical guidelines for regulatory frameworks and possibly new legal definitions of responsibility for AI-driven decisions.**

5. **Fairness and Inclusivity: Avoiding the escalation of current socioeconomic disparities requires algorithms to be equitable and accessible. This requires that AI technologies be available to all societal groups to eliminate bias in AI. Diverse participation in AI teams for research organization's development, considering many viewpoints, their design and implementation of AI systems are prerequisites for inclusiveness in creating AI systems. Initiatives must be taken that the advantages of AI are shared fairly for concentrating on the control of a small number of people.**

The ethical considerations in AI are complex and multifaceted and are free, involving issues of bias of transparency and data privacy as well as accountability and fairness [54]. Addressing these challenges requires collaboration between AI developers, policymakers, and ethicists for society. Addressing issues can harness the power of AI in a way that is responsible and beneficial to all.

4. Advancements in Agile DevOps

Advancements in Agile DevOps have significantly transformed software progress and IT actions for teamwork for increased speed, besides efficiency. Integrating Agile methodologies with DevOps practices has led to the continuous delivery and deployment of software, reducing the time from development to production. Key developments include the widespread adoption of systematized challenging and distribution procedures and the increased use of Infrastructure-As-Codes (IaC) for their automated management of infrastructure [55]. Their work of remote has driven the evolution of remote Agile distributed teams to collaborate effectively. These advancements have streamlined software development and enhanced the quality and reliability of applications, nurturing a philosophy of incessant development and rapid opinion.

4.1 Agile Evolution

The Agile methodology, which revolutionized software development, has its roots in the late 20th century to answer to the boundaries of out-of-date systems in heavyweight project management

methods like the Waterfall model. The need for more flexibility is in an iterative process of adapting to changing requirements and delivering quickly the birth of Agile and Figure 7 shows the Agile Evolution

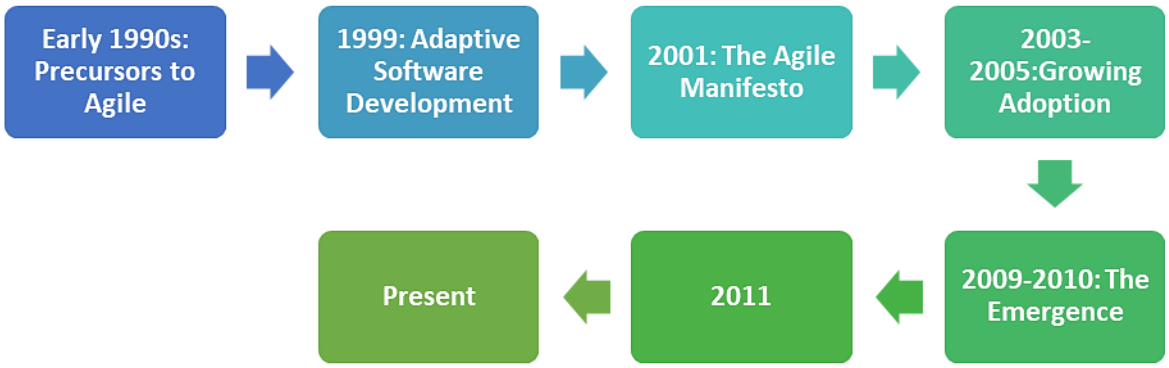

Figure 7: Agile Evolution

- **The early 1990s in Precursors to Agile: In the early 1990s, several software development methodologies emerged as the groundwork for Agile. Among these was Scrum, introduced by Ken Schwaber and Jeff Sutherland in 1995, and Extreme-Programming, developed by Kent-Beck, Ward Cunningham, and Ron-Jeffries. Scrum emphasized iterative development, frequent reviews, and a focus on delivering small to incremental changes rather than monolithic products [53]. XP is introduced following a couple of software designs for test-driven growth and continuous improving code quality and responsiveness to change.**

- **1999 of Software-Development: Jim-Highsmith and Sam-Bayer both developed Adaptive Software Development (ASD), which was another precursor to Agile that emerged in 1999. ASD has emphasized an iteration for the incremental tactic to software development for a cycle of speculation for an alliance for learning [54]. This approach acknowledged their uncertainty in software projects and prioritized flexibility over rigid planning.**

- **2001: The Agile Manifesto: The pivotal moment in the evolution of Agile came in February 2001, when 17 software creators met at Snowbird-ski restaurants in Utah. Kent Beck Martin Fowler, Robert C. Martin, and Jeff Sutherland were among them. These groups are frustrated with traditional development methodologies and seek to create a new approach that emphasizes collaboration of customer feedback and adaptability. The result of the meeting was the Agile Manifesto prepared a document that outlined four core standards and twelve ideologies that would define Agile values to underscore the importance of flexibility for communication and customer satisfaction, and it is a significant departure from the rigid of process-driven approaches that had dominated software development up to that point.**

- **2003-2005: Growing Adoption and New Frameworks for the journal of the Agile-Manifestos of Agile methods began to gain traction within the software development community in 2003, going back to the Crystal Clear methodology given by Alistair Cockburn [55]. One of the signatories of the Agile Manifesto introduced the name Crystal Clear, emphasizing peoples and their community of skills plus talents in communication as central to software for small teams working on non-critical systems.**

- **2009-2010: The Emergence of Scaled Agile as Agile gained popularity, organizations sought ways to scale Agile practices beyond individual teams. In 2009, Professor Dean Leffingwell presented the Scaled-Agile Framework for guidance on how to apply Agile principles at the enterprise level. Safe delivers aimed at bridging the gap between traditional management structures and large organizations by adopting Agile practices across multiple teams and projects.**

- **2011-Present: Continuous Evolution and Integration Over the past decades, Agile has continued with other methodologies and practices to meet the requirements of modern software development companies [56]. The rise of DevOps emphasized the integration of growth and processes teams of development of Agile DevOps performs that continuous integrations are continuous-delivery (CI/CD) for the automatic testing phase.**

In recent years, Agile's growth has expanded beyond software development into areas like marketing, HR, and project management, as well as its versatility and adaptability. The focus on business agility differs from Agile principles, which are applied across entire organizations to become a key trend for companies to reply swiftly to marketplace vicissitudes and client wants.

4.2 Integration with DevOps and CI/CD

Integrating Agile approaches with DevOps, besides Continuous integration and continuous deployment (CI/CD), has been a transformative development in software engineering, driving efficiencies in faster, more reliable software delivery [57]. This integration represents a significant evolution in how software is developed and tested to be deployed for auto-systems and continuous comment.

1. **Agile's Role in Software Development: Agile's inceptions emphasize the iterative developments of customer collaboration and responsiveness to change. Traditional Agile practices, primarily in the development phase, are less emphasized regarding the operational aspects of software delivery. This created a breach amongst advance and actions teams, called the "DevOps gap," where the code handover from development to operations is a slow and error-prone process [22-58].**

2. **The Emergence of DevOps: DevOps emerged to respond to these gaps and bring development (Dev) and operations (Ops) teams together to collaborate more throughout the software lifespan. The core principles of DevOps in the automation of processes using continuous monitoring to share responsibility for the product's success. DevOps are seeking to eliminate the silos between development and operations, a culture of both teams working together from the initial stages of development through to deployment and maintenance.**

3. **Continuous Integration and Continuous Deployment (CI/CD): CI/CD is a set of practices within the DevOps framework that focuses on automating the software development process to ensure express and dependable delivery of code is used where the deployment is automated but requires manual approval to go live [59]. The CI/CD pipelines help ensure new codes are always deployable, reducing the risks and effort associated with software releases.**

The amalgamation of Agile with DevOps also presents challenges. Establishments must invest in the right tools and infrastructure to support automation and continuous delivery. The cultural system shifts are necessary for teams to adopt a mindset of shared responsibility and continuous Learning.

Implementing it requires a strong emphasis on security so the haste of transfer does not compromise the security of the software. Incorporating safety practices into the CI/CD pipelines is crucial to maintaining the integrity and safety of the developed applications.

5. Comparative Analysis of Studies

Rapid technological advancements have catalyzed significant changes across various domains, with Artificial Intelligence (AI) and Agile DevOps emerging as two pivotal areas [60]. These developments reshape businesses and drive new opportunities and efficiencies across multiple sectors [3-58]. The comparatively based analysis is given in table 4 below.

Table 4: Comparatively Analysis

Category	AI Emerging Technologies	Agile DevOps
Focus Area	AI innovations include machine learning, deep Learning, IoT, and blockchain.	Streamlining software development and operations through automation and collaboration [11].
Key Developments	AI integration with IoT and 5G. Developments in ML and DL-algorithms	Continuous-Integrations/Continuous Deployments (CI-CD) pipelines [15].
Impact	Enhanced automation in various sectors. Improved decision-making through AI-driven insights.	Faster time to market for software products [20].
Collaboration	- Convergence of AI use of emerging technologies like IoT plus blockchain to 5G.	Integrated workflows between development and operations [25].
Challenges	- Ethical considerations like bias, transparency, and data privacy. Managing the complexity of integrating AI with other technologies.	Cultural shifts required to adopt DevOps and CI/CD. Need for a robust infrastructure to support automation [40].
Benefits	- Advanced predictive analytics and automation. It has enhanced efficiency and innovation across industries.	It accelerated software delivery and deployment—continuous improvement through rapid feedback loops [45].
Future Trends	- AI-driven automation across more sectors. Growing integration of AI with new technologies. Continued focus on ethical AI.	Further integration of DevOps with AI and machine learning. Expansion of Agile practices beyond IT to other business functions [48].

Conclusion and Discussion

This systematic literature review explored their significant advancements in AI emerging technologies and Agile DevOps practices during the year 2020. Our analysis of 500 selected articles revealed that 2020 was a pivotal year for both fields, marked by technological innovations and the rapid adoption of new methodologies across various industries. Machine learning (ML) and deep Learning (DL) emerged in dominant areas with significant progress in algorithmic development and practical applications. Integrating AI into emerging technologies like the Internet of Things (IoT) and blockchain has further enhanced AI's capabilities to become a more intelligent, secure system with decentralized systems. The main advancement of Transformer models in NLP and the widespread adoption of AI-driven IoT solutions have their transformative potential of AI in sectors of healthcare and investment, besides transportation. The distribution of Agile DevOps practices has continued to evolve in the need for faster and more flexible software development of process systems. The challenges in the worldwide change to remote work popular in 2020 catalyzed their adoption of remote work, emphasizing collaboration and continuous transport even in distributed environments. Integrating Agile and DevOps methodologies to more streamlined workflows of improved communications and enhanced software quality is vital for organizations adapting to the rapidly changing technological landscape.

The findings of this review highlight the growing convergence of AI and Agile DevOps practices, suggesting a trend towards integrated and adaptive systems capable of adapting to the dynamic demands of the digital era. The advancements identified in this review underscore the technological progress made in 2020 and point to the ongoing transformation of industries to help AI and Agile methodologies drive innovation and efficiency.

Recommendation for Future

Building on the insights gained from the advancements in AI and Agile DevOps practices in 2020, several avenues for future research can be identified: As AI continues to evolve, there remains a mounting probability for AI-driven tools to automate and enhance various aspects of the DevOps pipeline for continuous integrations, continuous deliveries, and testing. Future research will help develop and evaluate AI-powered DevOps tools that can predict and mitigate potential issues, provide an easy way to adjust the resource share system and improve the efficacy of the development process. The integration of AI into DevOps is gaining momentum, but there is still room for further exploration of how AI can be seamlessly integrated into Agile methodologies.

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