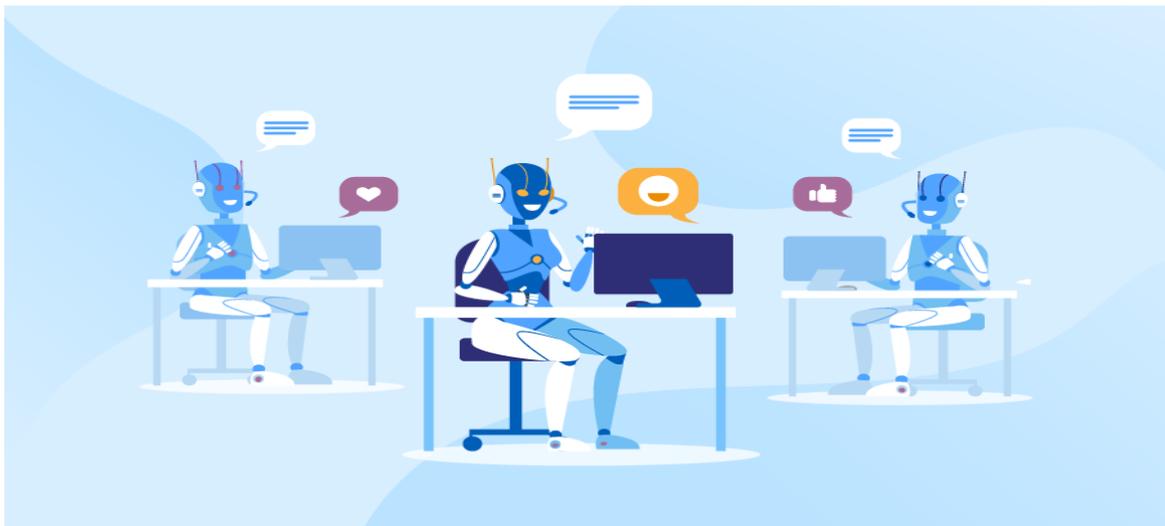


What is AI as a service?

AI as a service (AlaaS) is a service offered by third-party vendors that allows businesses to incorporate AI-powered tools and capabilities into their systems. AlaaS is a low-risk and cost-effective model because businesses can deploy AI without investing in resources to build and implement it from scratch.



Suppose you're a developer working on a mobile application that requires image recognition capabilities. Instead of building your own image recognition model from scratch, you can leverage online AI services (like Amazon Rekognition).

You can easily integrate powerful image and video analysis capabilities into your application. You simply have to upload your images or videos to the cloud, and AI algorithms analyze them to detect objects, faces, text, scenes, and more.

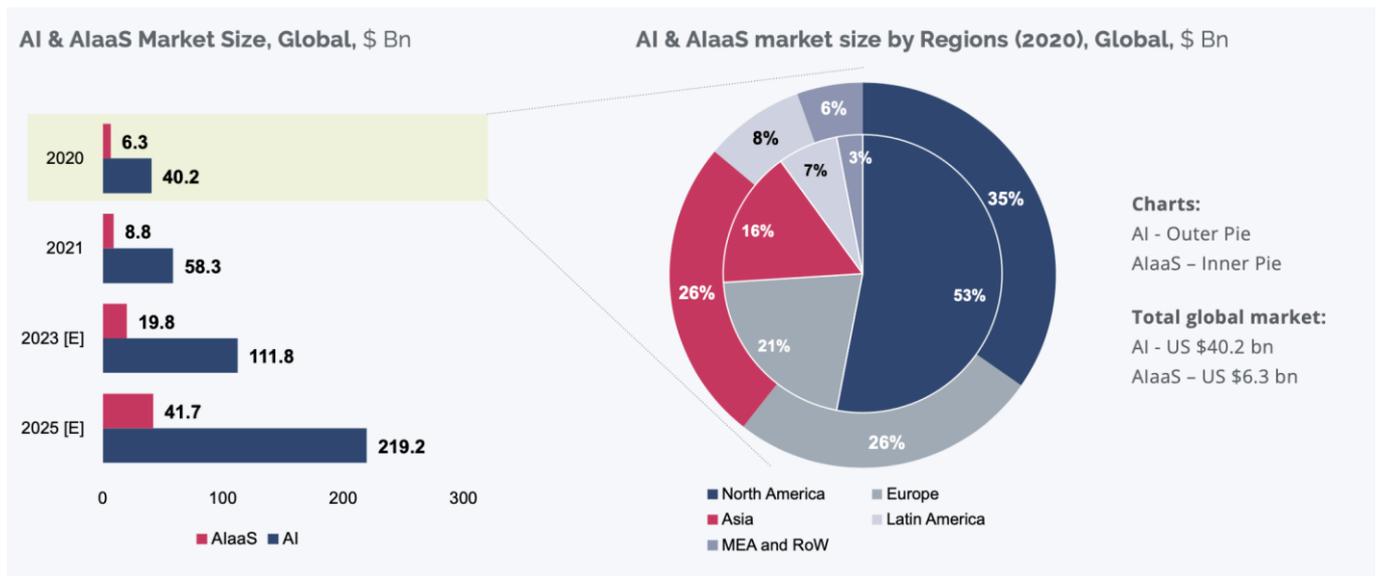
By using AI as a service, you eliminate the need to invest time and resources in training your own models and setting up infrastructure for deployment. You can simply access the AI capabilities you need through an API, paying only for the computing resources and services you use.

With the advent of cloud computing services, the application of Artificial Intelligence for various services has been democratizing for some time. Now companies of all sizes can have access to AI. Within a limited budget, AI is offering many opportunities to improve business and people's lives. It has all become possible with the emergence of a relatively new business niche: AlaaS, i.e., AI-as-a-Service, a third-party offering of AI outsourcing.

The main attraction of AI as a Service is that businesses need not invest massively to build Artificial Intelligence applications massively. Still, it can continue



focusing on its core business while taking advantage of AI technologies for varied solutions. The other advantages include reduced investment risks, reduced development time, and increased strategic flexibility. And the major disadvantage is the dependence on service providers.



Sources: Emergen Research, IMARCC group, EIN news, Allied Market Research Future

Fig 1. Market share of AlaaS

AlaaS is helping businesses leverage Artificial Intelligence for several applications at reduced risk and expense. Although being around for years with around \$2.3 billion in 2017, the market of AlaaS is expected to reach \$77 billion in 2025, with a forecasted CAGR of 56.7% in the period 2018-25. So far, the main players in the industry proving AlaaS are IBM (Developer Cloud), Google Cloud Platform, Amazon Web Services, Microsoft Azure and OpenAI.

Architectural Diagram

AI Infrastructure: AI infrastructure supports the backbone of AI and ML models, relying on two core elements: AI data and AI compute.

AI data: Functional ML models emerge when vast datasets are applied to statistical algorithms, enabling learning from existing patterns. The accuracy of predictions hinges on the volume of data. For instance, deep learning networks are trained on numerous medical reports to identify medical emergencies, cancer, or tumors.

AI compute: AI compute services encompass VMs, serverless computing, and batch processing, facilitating parallel processing and automating ML tasks. Apache Spark, for instance, offers real-time data processing capabilities and a scalable ML library. ML models, once trained, are deployed in VMs and containers for computation tasks.

AI Services: Public cloud vendors furnish readily available APIs and services, eliminating the need for custom ML models.

Cognitive computing: Cognitive computing APIs cover speech, text analytics, voice translation, and search functionalities, accessible via REST endpoints for seamless integration into applications.

Custom computing: Cloud providers are transitioning towards custom computing, empowering users to train cognitive services with their datasets. This approach reduces algorithm selection overhead and

simplifies model training.

Conversational AI: Cloud providers assist developers in integrating voice and text bots across platforms, catering to the growing acceptance of AI-driven virtual assistants among end-users.

AI Tools: In addition to APIs and infrastructure, cloud vendors offer tools catering to data scientists and developers, promoting seamless utilization of VMs, storage, and databases.

Wizards: Beginner data scientists benefit from wizards that streamline ML model training, providing a multi-tenant development environment.

Integrated development environment (IDE): Cloud vendors invest in IDEs and browser-based notebooks to facilitate easy ML model testing and management for experienced users.

Data preparation tools: To ensure optimal ML model efficiency, public cloud vendors provide data preparation tools for extract, transform, load (ETL) jobs, feeding data into the ML pipeline for training and evaluation.

Frameworks: Cloud providers furnish VM templates with pre-installed frameworks like TensorFlow and Apache MXNet, simplifying the setup and configuration of data science environments. GPU-supported VMs facilitate training complex neural networks and ML models.

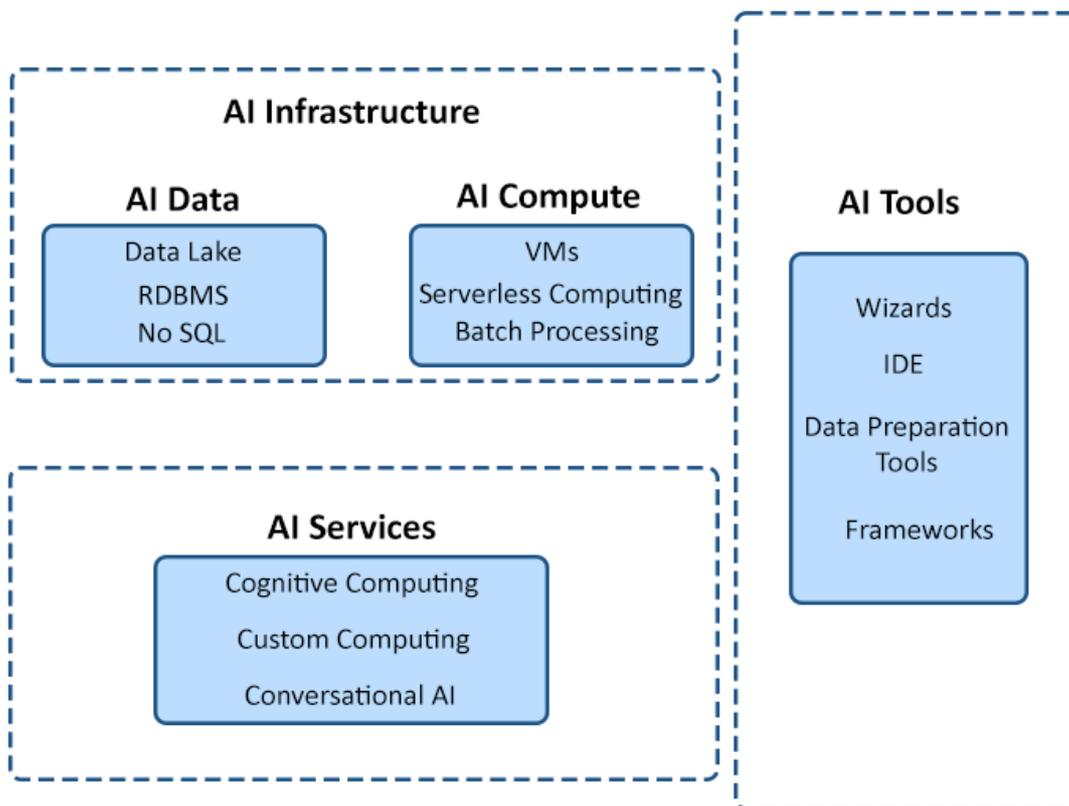


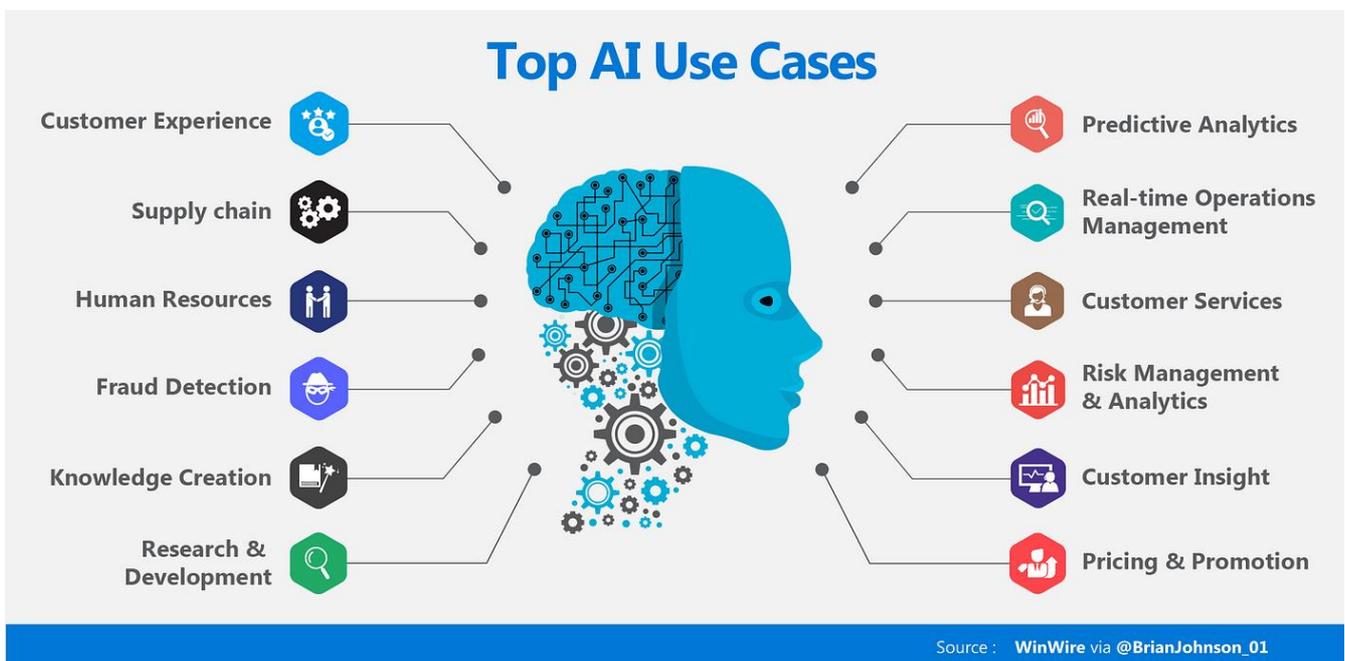
Fig 2. Key Architectural Components of AlaaS

Benefits and Challenges

If you're exploring the option of using AI as a service, it's important to evaluate both its advantages and disadvantages. This assessment can help you determine whether it would be a beneficial strategic move or potentially pose additional liabilities.

Benefits	Challenges
Cost Efficiency: Lower initial investment costs for businesses as they don't need to build and maintain AI infrastructure from scratch.	Data Privacy and Security: Concerns about the privacy and security of sensitive data being handled by third-party AI service providers.
Ease of setup: AlaaS simplifies setup with no complicated installation required. You can quickly access needed AI features without the need for a dedicated IT team or complex infrastructure.	Blurry visibility: You pay only for services provided by the provider, but lack access to the underlying processes. While you're aware of inputs and outputs, you lack insight into the specific AI algorithms being used.
Fee transparency: In an AlaaS solution, you are only liable to pay for the features that you actively use. You are not expected to pay for the AI functions your organization doesn't need from the overall AlaaS package.	Third-party dependency: Since you rely on a third party to provide correct information, any error in their software can cause operational issues or delays. This can be problematic with real-time use cases.
Scalability: Allows businesses to easily scale AI capabilities according to their needs without significant upfront investments.	Dependency on Providers: Businesses may become dependent on AI service providers, which could lead to vendor lock-in and limited flexibility.
Access to Advanced AI Technologies: Provides access to state-of-the-art AI technologies and expertise without requiring in-house development.	Integration Challenges: Integration of AI services with existing systems and workflows can be complex and time-consuming.

Use Case



The use of AI as a service in the context of COVID-19 has played a crucial role in various aspects of pandemic management. AI technologies have been employed to address challenges, enhance healthcare systems, and provide support in different areas. Here are some key use cases of AI as a service with respect to COVID-19:

Diagnostic Support:

- AI algorithms have been developed to assist in the diagnosis of COVID-19 through the analysis of medical imaging, such as chest X-rays and CT scans.
- Chatbots and virtual assistants powered by AI have been used to provide preliminary screening and information to individuals concerned about potential COVID-19 symptoms.

Epidemiological Modeling:

- AI-driven models have been employed to predict the spread of the virus, helping policymakers make informed decisions about resource allocation, lockdown measures, and public health interventions.

Drug Discovery and Vaccine Development:

- AI has been utilized in the drug discovery process, helping researchers identify potential compounds and speed up the development of treatments and vaccines for COVID-19.
- AI algorithms can analyze large datasets to identify existing drugs that may be repurposed for COVID-19 treatment.

Contact Tracing:

- AI-based solutions have been used for contact tracing, helping public health authorities identify and notify individuals who may have been exposed to the virus.
- Automated contact tracing systems can analyze large datasets and provide more efficient and accurate results compared to manual methods.

Remote Monitoring and Telemedicine:

- AI technologies enable remote patient monitoring, allowing healthcare professionals to track patients' vital signs and symptoms without physical contact.
- Telemedicine platforms, often incorporating AI, have become essential for virtual consultations and providing medical advice while minimizing the risk of virus transmission.

Supply Chain Management:

- AI helps optimize and manage the supply chain for medical equipment, pharmaceuticals, and other essential supplies.
- Predictive analytics and machine learning algorithms assist in forecasting demand, preventing shortages, and ensuring the efficient distribution of resources.

Public Communication and Information:

- AI-powered chatbots and virtual assistants have been used to disseminate accurate information, answer queries, and provide guidance to the public regarding COVID-19 prevention, symptoms, and vaccination.

Monitoring and Compliance:

- AI technologies, such as computer vision and machine learning, have been used to monitor public spaces for compliance with social distancing measures and mask-wearing protocols.
- Automated systems can analyze video feeds to identify and alert authorities about potential overcrowding or non-compliance.

By leveraging AI as a service, organizations and governments can enhance their response to the COVID-19 pandemic, improve decision-making processes, and contribute to more effective and efficient healthcare delivery.

A PLETHORA OF SOLUTION AND SERVICE PROVIDERS

GLOBAL AND DOMESTIC MAKE UP THE SUPPLY SIDE OF THE AIAAS MARKET IN INDIA

Illustrative



Fig 3. Companies providing AlaaS

Future

The future of AI as a Service (AIaaS) holds several exciting possibilities and trends, driven by ongoing technological advancements, increased adoption, and the evolving needs of businesses and society. Here are some key aspects that may shape the future of AIaaS:

Specialized AI Solutions:

As the field of AI matures, we can expect the emergence of more specialized and industry-specific AIaaS solutions. These offerings will cater to the unique needs of sectors such as healthcare, finance, manufacturing, and others.

Advanced Use Cases:

AIaaS will be increasingly used for advanced applications, including complex natural language processing (NLP), computer vision, and reinforcement learning. This will enable more sophisticated automation and decision-making processes.

Edge Computing Integration:

Integration of AIaaS with edge computing technologies will become more prevalent. This will allow AI models to run directly on edge devices, reducing latency and enhancing real-time processing capabilities.

Advancements in AI Technologies:

Continuous advancements in AI technologies, such as improved machine learning algorithms, more efficient training methods, and novel approaches like quantum computing, will contribute to the evolution of AIaaS capabilities.

Hybrid Cloud and Multi-Cloud Deployments:

Organizations will likely adopt hybrid cloud and multi-cloud strategies, leveraging AIaaS solutions across different cloud providers to enhance flexibility, scalability, and redundancy.

AI-Driven Personalization:

AIaaS will play a pivotal role in delivering personalized experiences to users. This includes personalized recommendations, content, and services in areas such as e-commerce, content streaming, and digital marketing.

Overall, the future of AIaaS is dynamic and promising, with an increasing focus on customization, ethical considerations, and the integration of AI into diverse aspects of our daily lives and business operations. As technology evolves, it will be crucial to address challenges and ensure that AIaaS developments align with ethical, legal, and societal standards.

Conclusion

In conclusion, the paradigm of "AI as a Service" marks a transformative shift in the technological landscape, heralding an era where artificial intelligence is not merely a specialized tool but a readily accessible and scalable resource. This model empowers businesses and individuals to harness the potential of advanced machine learning algorithms without the burden of extensive infrastructure or expertise. As AI as a Service continues to evolve, its democratizing influence on innovation and problem-solving becomes increasingly apparent, fostering a more inclusive and dynamic ecosystem. However, ethical considerations and responsible deployment must accompany this progress to ensure the responsible and beneficial integration of artificial intelligence into diverse facets of our society. In embracing AI as a Service, we embark on a journey towards a future where the benefits of intelligent systems are not confined to a privileged few but are woven into the fabric of a digitally empowered and ethically grounded global community.

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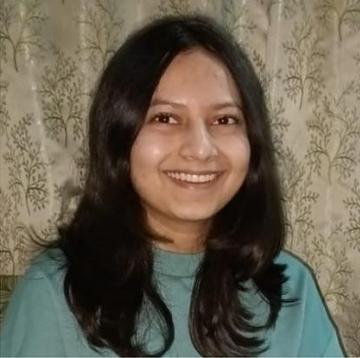
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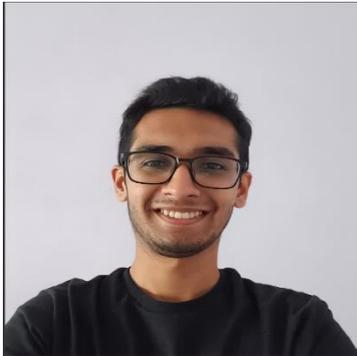
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