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Jio PLATFORMS

Product Brochure

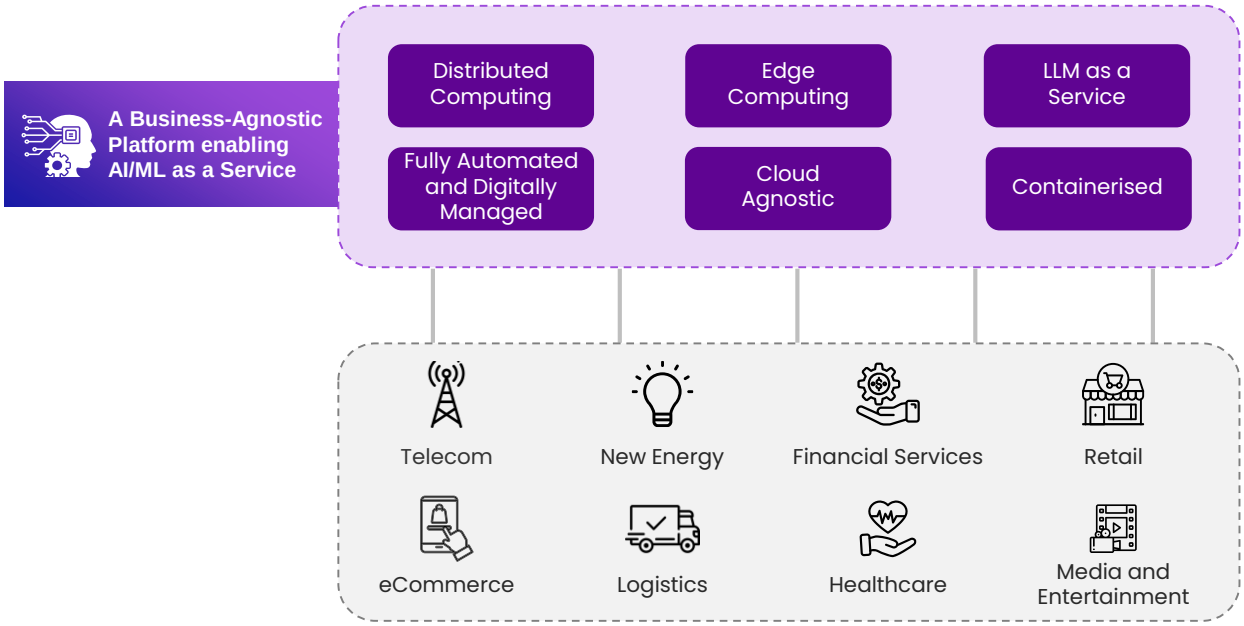
JioBrain

AI & 5G Convergence

Industry-agnostic | Plug-n-play | ML as a Service

Introduction

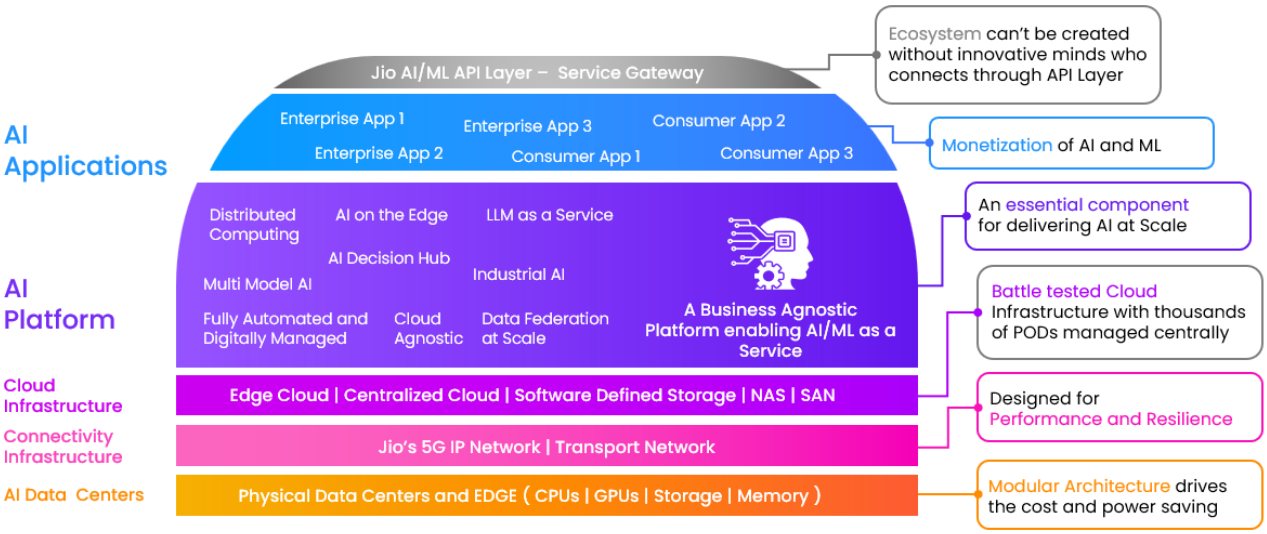
JioBrain is a versatile industry and business-agnostic 5G-distributed machine learning platform that can train and apply ML models for any business vertical.



The cutting-edge platform seamlessly integrates artificial intelligence (AI), machine learning (ML), and 5G technology. It leverages 5G's high speeds, low latency, and massive connectivity alongside advanced machine learning capabilities like data processing, analysis, and automation. Designed for enterprises and Communication Service Providers (CSPs), this powerful platform enables additive capabilities to boost various processes.

JioBrain enables CSPs to enhance not only their networks but also a wide range of 5G services and industrial applications, including image and video AI at the edge, probing at the edge, healthcare, education, gaming, and entertainment. It provides greater operational visibility, supports closed-loop automation, and opens new revenue opportunities.

The platform also ensures complete data privacy and security, maintaining the highest standards of user trust.



JioBrain leverages distributed machine learning to ensure seamless scalability and streamline the management of extensive datasets to improve model performance and precision.

Harnessing AI for the Jio True 5G Network

JioBrain has revolutionised Reliance Jio Infocomm's True 5G network, significantly enhancing network uptime, efficiency, and reliability. Its advanced AI/ML capabilities enable real-time monitoring and predictive maintenance, ensuring minimal downtime and unmatched service reliability. Operational agility is achieved through dynamic resource allocation, allowing swift adaptation to changing network conditions. Moreover, JioBrain's automation and efficient resource management have led to substantial cost reductions, enabling Jio to offer high-quality services at competitive prices. This combination of trailblazing network --=performance and operational excellence sets a new industry benchmark.

Transformative Impact of JioBrain on Jio 5G Network

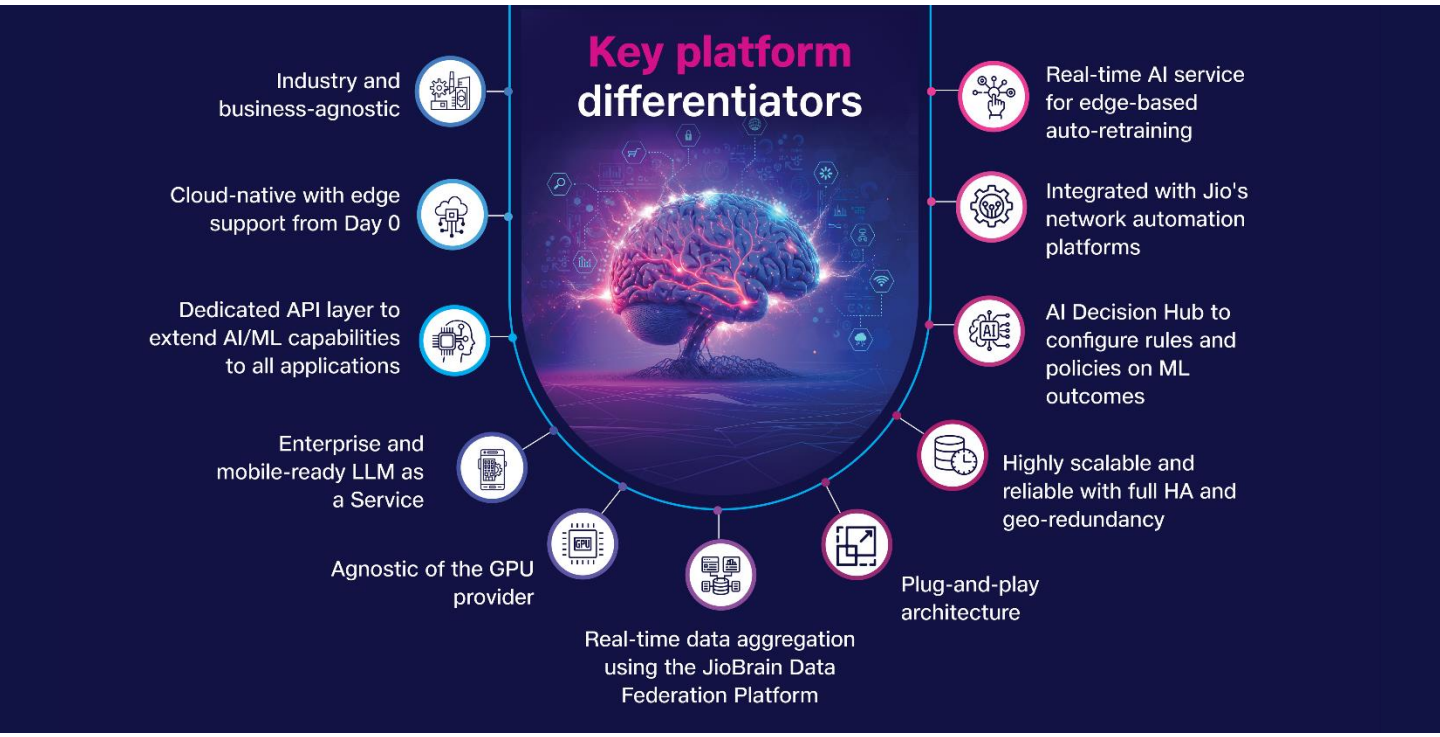
- Trailblazing network uptime
- Unparalleled efficiency
- Unmatched reliability
- Operational agility
- Reduced costs

Highlights

JioBrain is more than just a technological advancement; it is a game-changer in the realm of AI and 5G connectivity, offering enterprises and CSPs a unique and competitive edge.

The versatile and industry-agnostic solution is designed to operate efficiently in both cloud and edge environments. This flexibility ensures robust support for real-time data aggregation, automated decision-making, and continuous model retraining. Such features are crucial for maintaining operational excellence in today's fast-paced digital landscape.

One of the standout features of JioBrain is its dedicated API layer, which extends AI/ML functionalities to a wide array of applications. This ensures seamless integration and interaction with existing systems, allowing businesses to enhance their operations without overhauling their current infrastructure. The platform's plug-and-play architecture further simplifies deployment, making it accessible to organizations of all sizes.

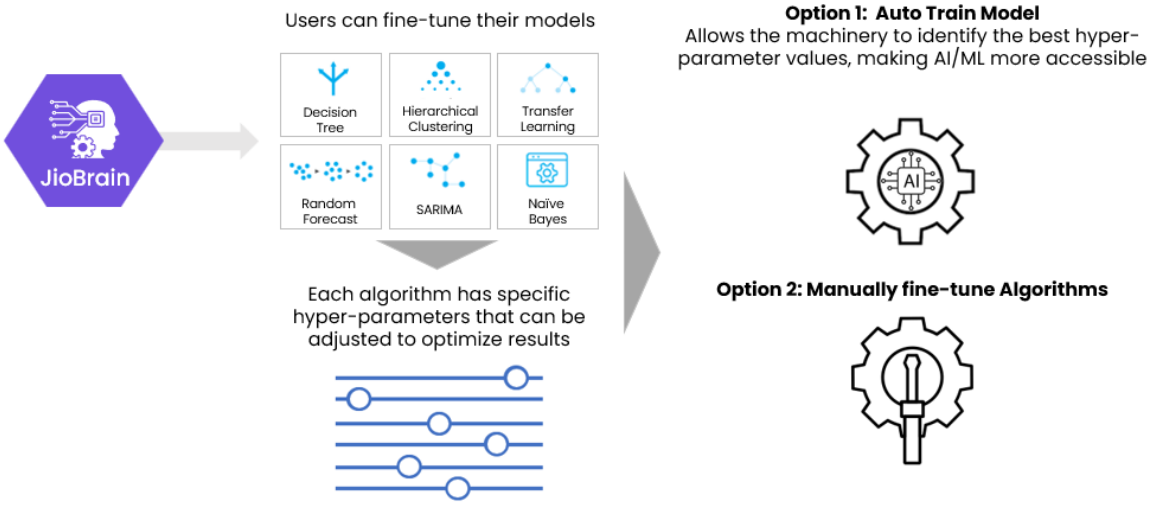


What also sets JioBrain apart is its comprehensive suite of features, including enterprise and mobile-ready LLM as a service, an AI Decision Hub for configuring rules and policies, and real-time AI services for edge-based auto-retraining. By leveraging these capabilities, enterprises and CSPs can transform their operations, optimize network performance, enhance customer experiences, and drive business growth. Integrated with Jio's network automation platforms, JioBrain not only enhances operational efficiency but also accelerates time-to-value, making it an indispensable tool in the modern digital landscape.

Key Features

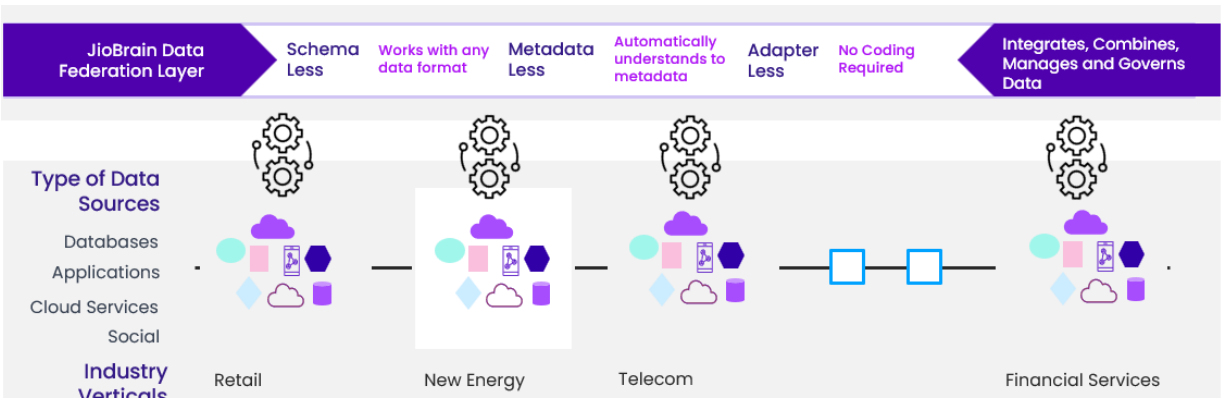
JioBrain Foundational Model Training and Fine-Tuning as a Service

JioBrain can train domain-specific models in its vector database without dependence on any third-party LLM. It also supports fine-tuning of existing models. Multiple models for diverse use cases can be concurrently fine-tuned.



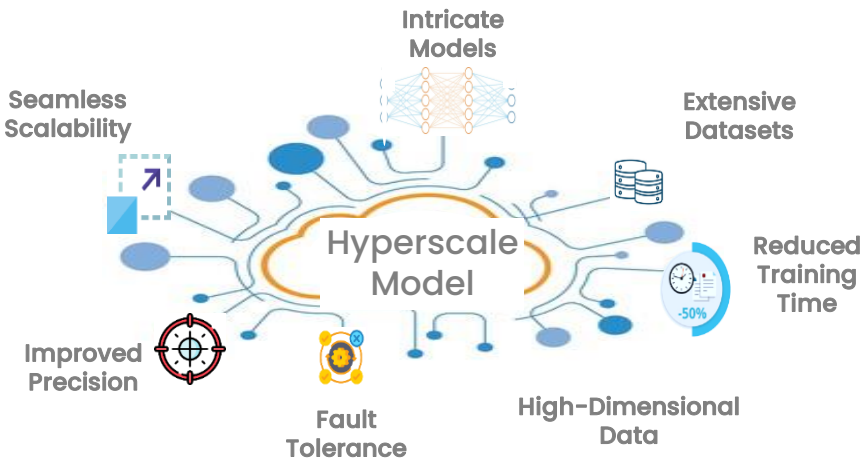
Real-Time Data Aggregation using the JioBrain Data Federation Layer

The data federation layer supports all known data formats, data cleaning, formatting, conversion, splitting, labeling, and aggregation. It connects with JioBrain using streaming connectors, file system, as well as API-based options.



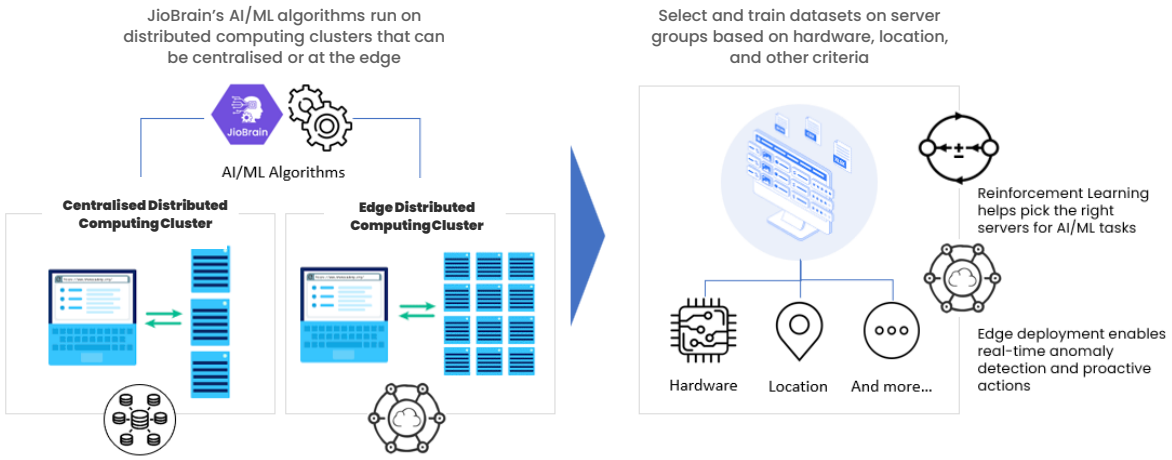
Distributed Machine Learning

Distributed ML is an advanced feature that helps achieve hyperscale performance. It leverages the capabilities of distributed computing to optimise different aspects of ML processes. By parallelising computations across multiple nodes or servers, this feature enables seamless scalability, significantly reduces training times, and efficiently handles extensive datasets. It empowers users to tackle intricate models and high-dimensional data, leading to improved model performance and precision. Additionally, the integration of fault tolerance ensures stable operations, even in the event of node failures. As a transformative tool, distributed machine learning expedites model development and deployment, making it an indispensable component of modern machine learning platforms.



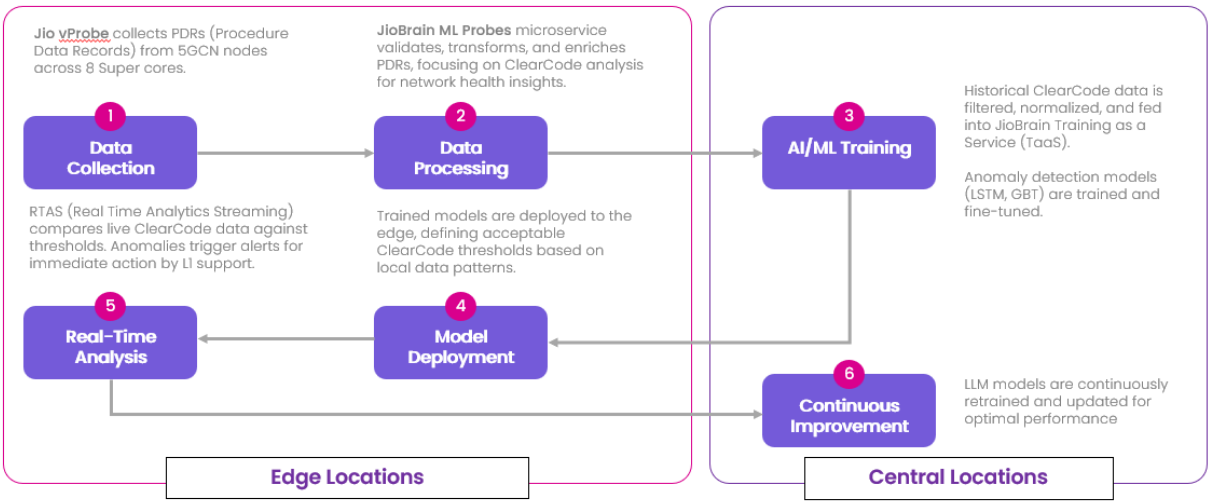
Distributed Machine Learning with ML on the Edge

JioBrain AI/ML algorithms run on distributed computing clusters, which can be centralised or at the edge. Users can select and train datasets on server groups based on hardware, location, and other criteria. Reinforcement learning helps pick the right servers for AI/ML tasks, and edge deployment enables real-time anomaly detection and proactive actions. This approach reduces bandwidth usage compared to traditional central data processing, benefiting tasks like real-time anomaly detection in network data.



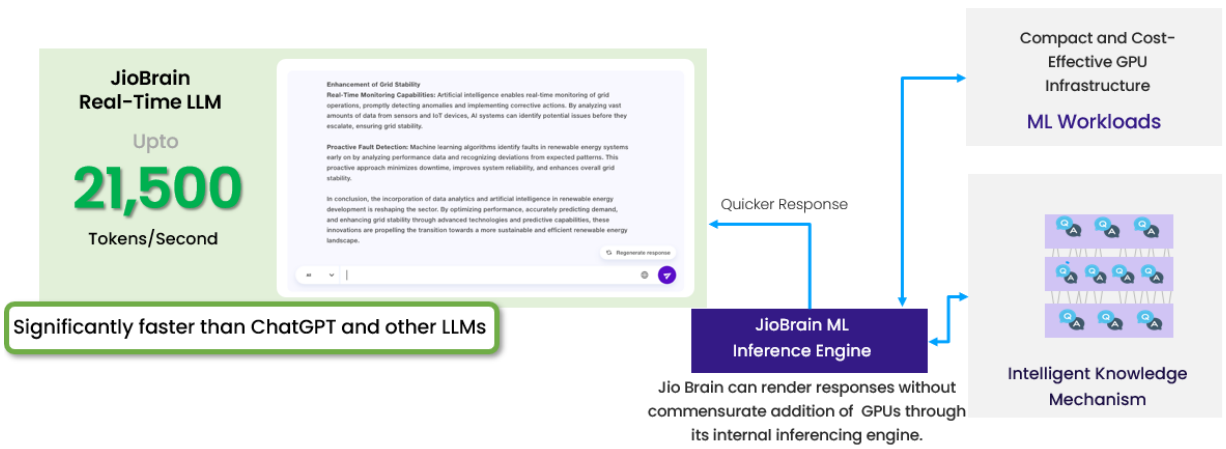
JioBrain Real-Time AI Service (RTAS)

While inferencing takes place at the edge, JioBrain provides a disaggregated service that can be deployed at hundreds of sites to connect with its trained models in real-time. This is an essential capability for 5G Advanced and 6G, and is equally beneficial for Jio's RIC platform.



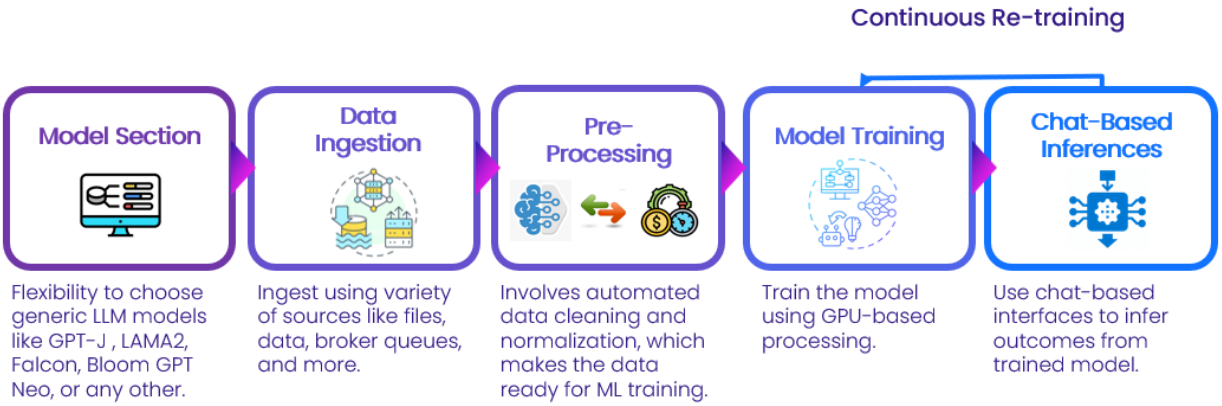
JioBrain Real-Time LLM

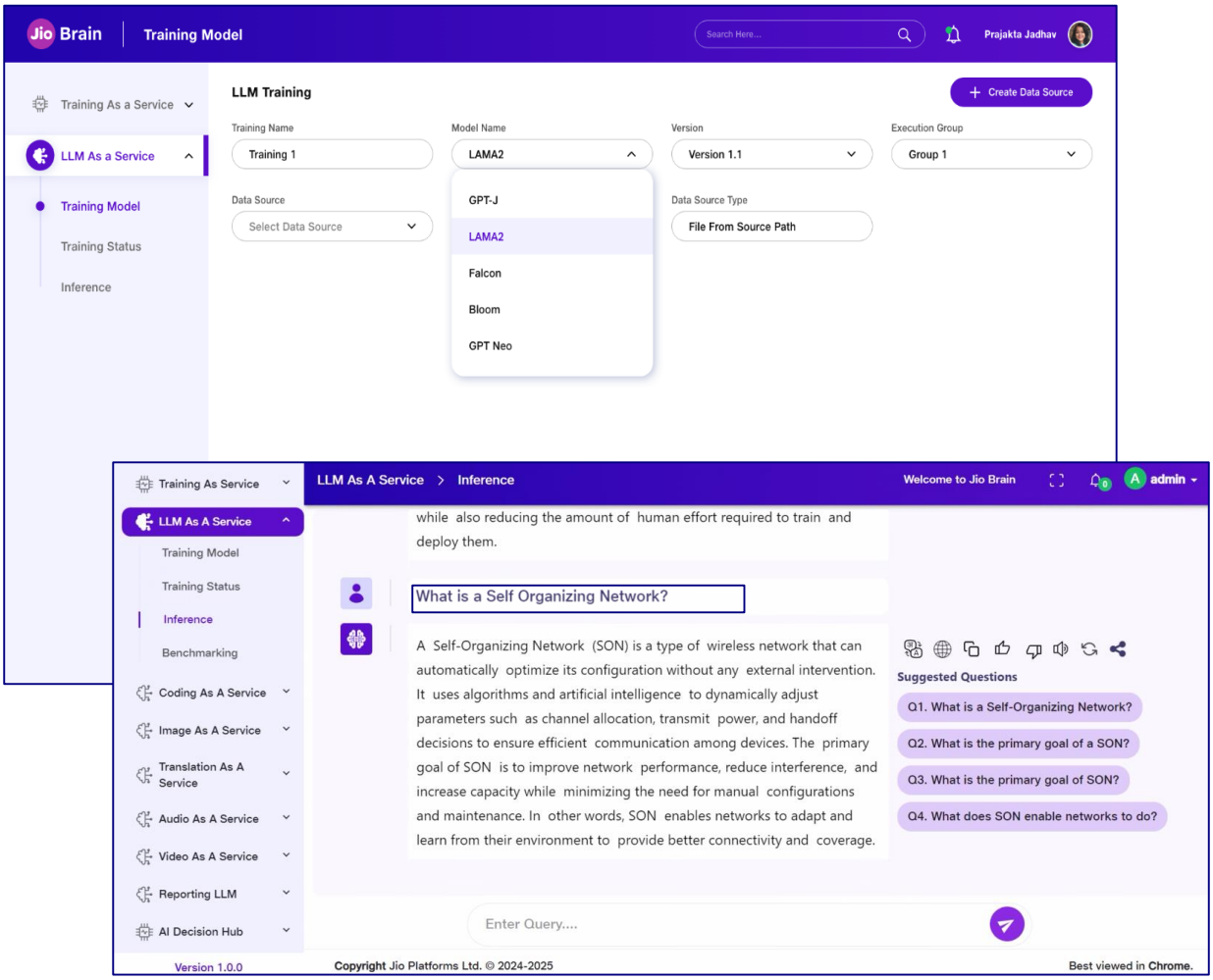
The JioBrain Real-Time LLM provides the fastest throughputs for natively trained LLM models through JioBrain's vector database. The platform works in conjunction with its vector DB, which enables massive speed-up of LLM responsiveness of up to 21,500 tokens/second, without a commensurate increase in GPU investments for inferencing workloads. The latency of generating LLM responses from the JioBrain vector DB drops to less than 1 millisecond.



LLM as a Service

JioBrain gives users the flexibility to choose from a range of LLM models. Users can import their own data and use it to train these models. Once the training process is completed, JioBrain offers a chat-based interface to extract insights from the trained models. These models are automatically trained based on new data and prompts provided by users.

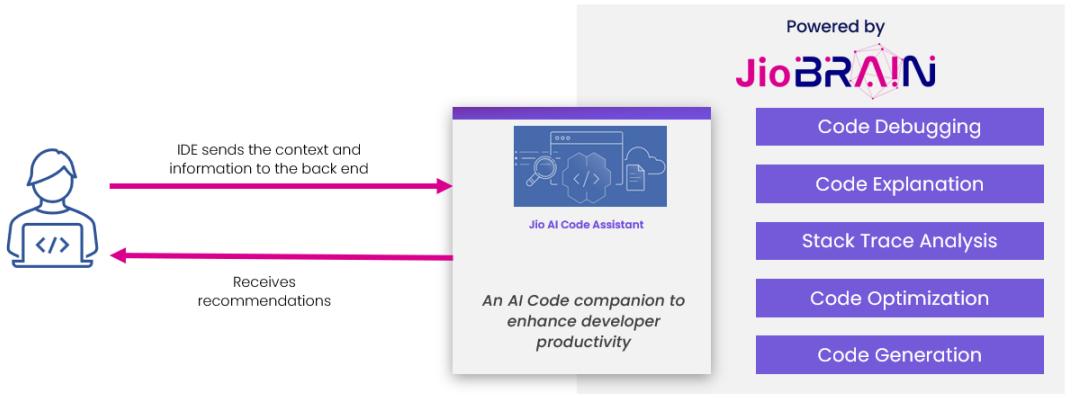




Coding as a Service

JioBrain enables Jio AI Code Assistant. Functioning as an IDE plugin, it streamlines user engagement by facilitating efficient code explanation, generation, debugging, optimization, and stack trace analysis. Developers can explore new ideas and receive intelligent suggestions for new, upgraded, or refactored code.

Users can access its features directly from the toolbar section in their workspace, enabling them to adeptly manage various coding-related tasks.



Generates code to help improve productivity

Debugs code to help optimize code quality and efficiency

Speeds up code review processes to enhance time efficiency

Explains code to help accelerate learning

Scans the code base for licensing vulnerabilities

Generates test cases to help increase test coverage

Optimizes Code to improve its efficiency and performance

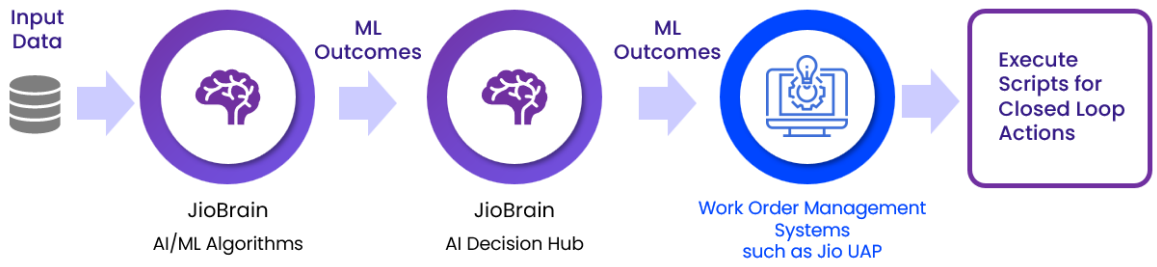
Provides insights into the occurrence of run-time errors and exceptions

Streamlines user engagement functioning as an IDE plugin

Performs Static Code Analysis to identify bugs, security vulnerabilities, and deviations from coding standards

JioBrain's AI Decision Hub

Jio Brain can link ML algorithm outcomes to policies and rules in real-time and stitch them to a workflow with SLAs (based on the Jio UAP and Jio AI Decision Hub). The AI Decision Hub is an intuitive UI module that provides the ability for systems to configure rules and policies on ML outcomes. Once JioBrain executes AI/ML algorithms on the supplied dataset, the ML outcomes can be fed to the AI Decision Hub. These rules and policies are defined based on possible ML outcomes and linked to workflows/ticketing systems for closed-loop actions.



Trigger Automated Workflows | **Apply Real Time Logic** | **Derive AI Based Insights** | **Massively Scalable**

Ability to Connect Third-Party LLMs

JioBrain's supports the ability to connect to any third-party LLMs and integrate its vector database with any LLM model. Moreover, JioBrain can connect to any data source on public internet and use its metadata to train new models.

- **Standardized APIs**

  Leverage well-defined Application Programming Interfaces (APIs) for seamless communication and data exchange between your AI engine and external LLMs.

- **Plug-and-Play Functionality**

  Easily connect and disconnect from different LLMs based on specific use cases or requirements, without extensive reconfiguration.

- **Customisable Pipelines**

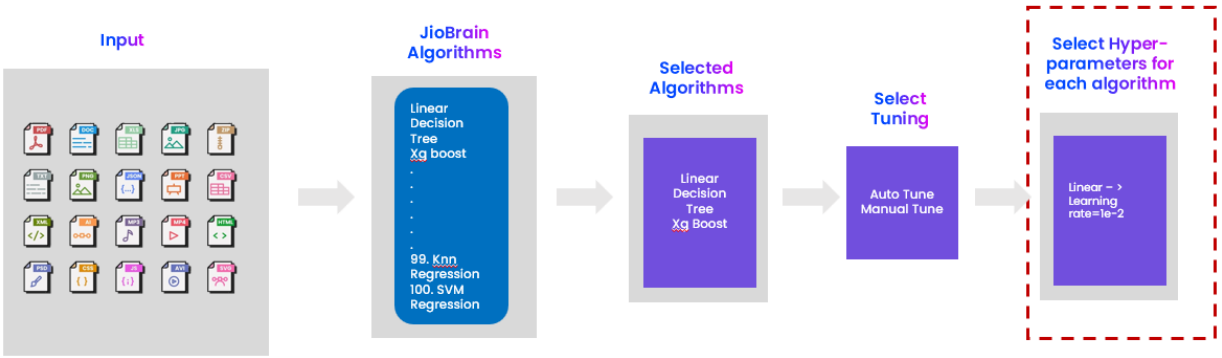
  Design tailored workflows that leverage the strengths of different LLMS in a sequential or parallel manner, optimizing performance and accuracy.

- **Hybrid AI Systems**

  Combine the strengths of JioBrain with the unique capabilities of external LLMs, creating a powerful hybrid system that excels in specific domains or tasks.

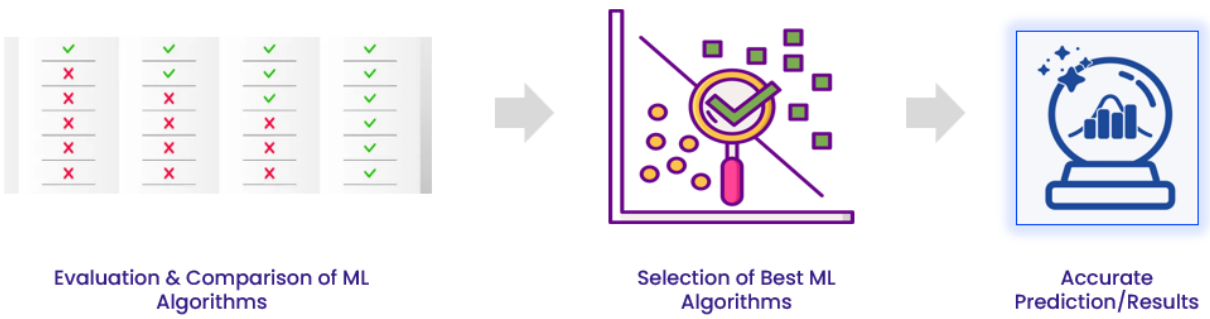
Auto Hyperparameter Tuning

Algorithm hyperparameters are adjustable settings or configurations that influence the behaviour and performance of a machine learning or optimization algorithm. Tuning of these parameters is done to get best performing hyperparameters. The algorithm and its tuning type (auto-tuning/manual tune) is then selected. Based on the expertise on the algorithms and usage, users can demand auto-tuning for select algorithms.



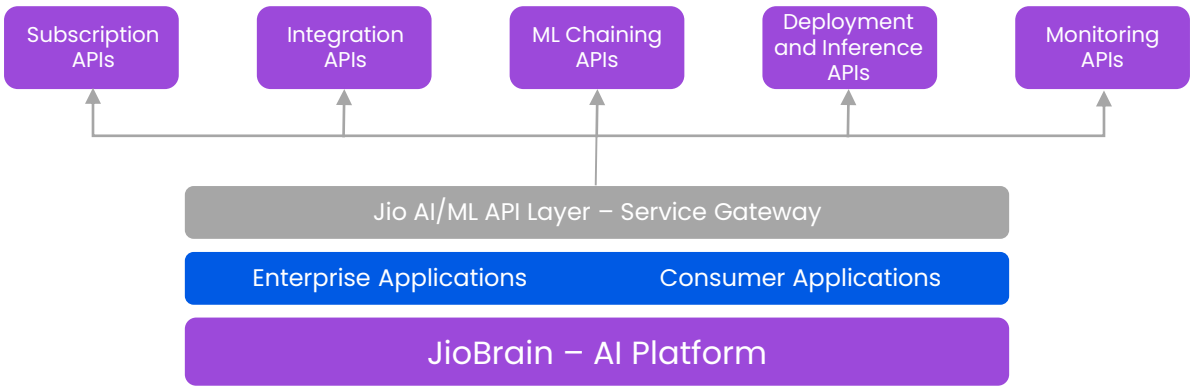
Best Fit Model for Given Input Set and Auto Retraining of Models

This feature allows users to select the most suitable machine-learning model for a particular dataset or input set. It involves evaluating and comparing multiple machine learning algorithms to find the one that best fits the data and produces accurate predictions or results.



JioBrain API Service Gateway

JioBrain API Service Gateway exposes the AI and ML capabilities using RESTful as well as real-time streaming data-plane APIs for application development. JioVault, for example, has image AI on its roadmap using JioBrain APIs.



JioBrain Metering of API for Monetisation

For API use by different applications, JioBrain is integrated with Jio BSS, where multiple subscriptions can be run based on API rate limits or LLM token usage like Open AI, or Image/Video/Speech object usage for multi-modal AI. The Jio Subscription Engine, which is part of its BSS stack, is pre-integrated with payment gateways for monetisation. This Subscription Engine can also run AI application subscriptions to implement a periodic model of revenues instead of API metering.

Metering

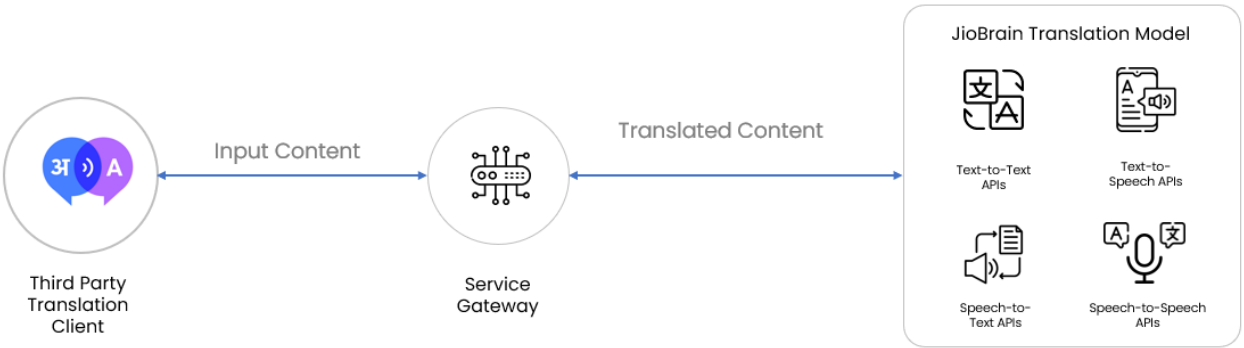
- **Data Volume**
  The amount of data processed or generated by the API.
- **API Calls**
  The number of requests made to the API.
- **Compute Time**
  The processing time consumed by JioBrain.
- **Custom Metrics**
  Additional metrics specific to your AI engine's capabilities (such as words summarized and images generated).

Monetisation

- **Pay-as-you-go**
  Users are charged based on their actual usage of the API (such as per API call, per data unit, per minute of compute time).
- **Subscription**
  Users pay a recurring fee for a certain level of access or usage (such as monthly or annual plans).
- **Tiered Pricing**
  Different pricing levels are offered based on usage volume, features, or access to premium capabilities.

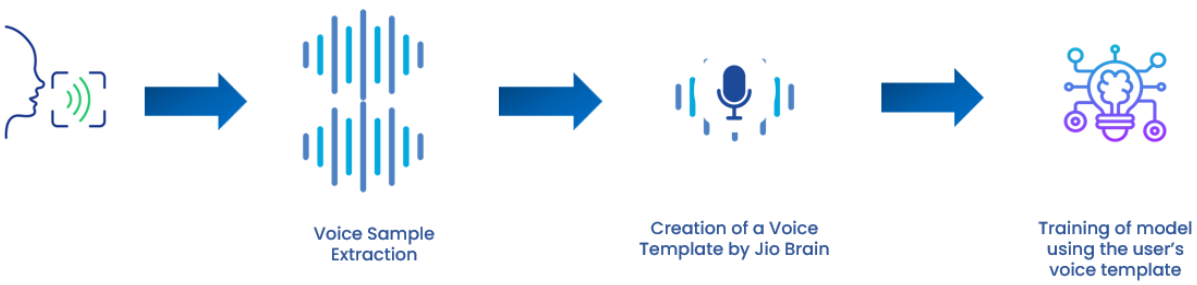
Multilingual Capabilities

JioBrain provides multilingual support for LLM responses in Indian and foreign languages. The platform supports hyperscaling for tokens/second for all languages.



JioBrain Speech AI

This feature supports voice biometrics applications (under development) as well as for T2S, S2T, S2S, and T2T translations in multiple languages. Using voice biometrics facilitates AI-enabled authentication services for consumer and enterprise applications. It involves speech and tone training for every individual, and real-time speech inferencing, which is supported by the JioBrain platform model. Google Translate APIs are not required for this purpose, and the solution is 100% on-prem.



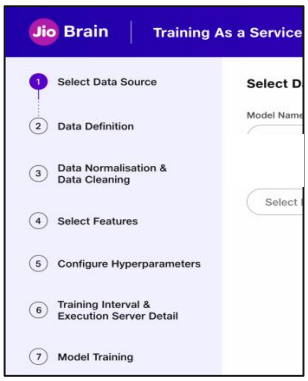
JioBrain Industrial AI Algorithms

JioBrain supports 100+ out-of-the-box algorithms spanning clustering, regression, and forecasting. This wide range of ready-to-use models provides users with diverse options to choose from, based on their specific needs and data requirements.

Refer to the Annexure for a full list of algorithms.

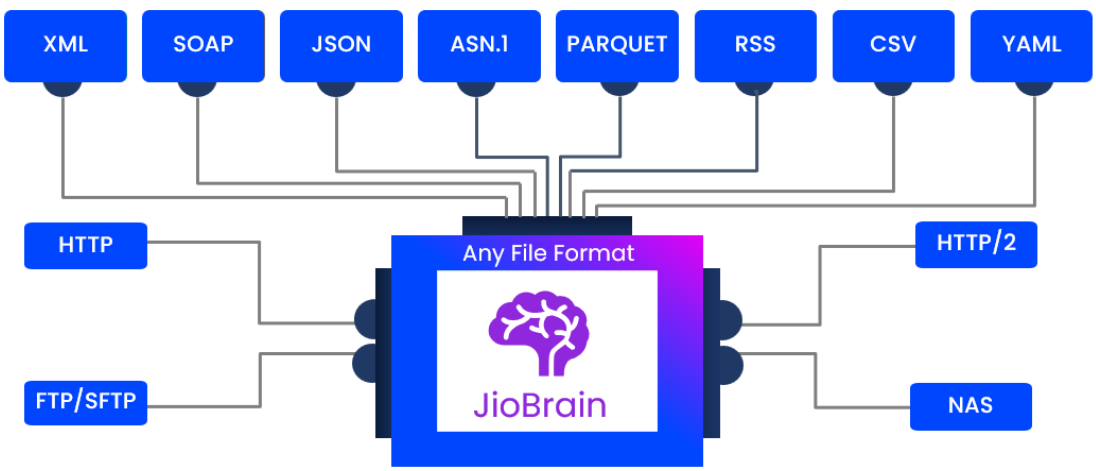
Selective ML Model Processing

JioBrain enables users to tailor their approach to the machine learning model lifecycle by prioritizing specific stages or operations based on their unique needs. This selective strategy allows users to optimize their efforts, focus on critical areas, and make efficient use of available resources to achieve the best model performance for their specific use case.



JioBrain Data Connectors for Federation

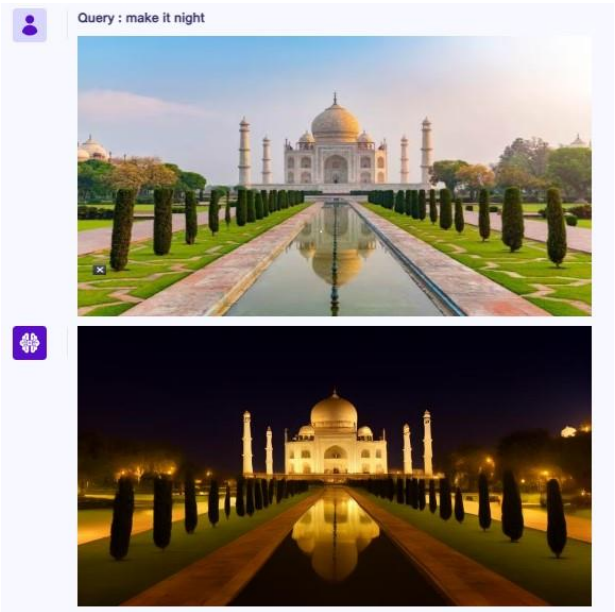
Jio Brain supports a variety of data formats to ensure no coding is required for integration. Jio Brain has an adaptive data collection layer that collects data from multiple data sources on different protocols having a variety of file formats without the need for individual adapters. JioBrain, employs a zero plugin approach by normalizing the data present in multiple formats into a unified data format (UDF) which is the same irrespective of the type of data ingested. This enables swift integration as well as the availability of data in JioBrain ecosystem for running AI/ML algorithms.

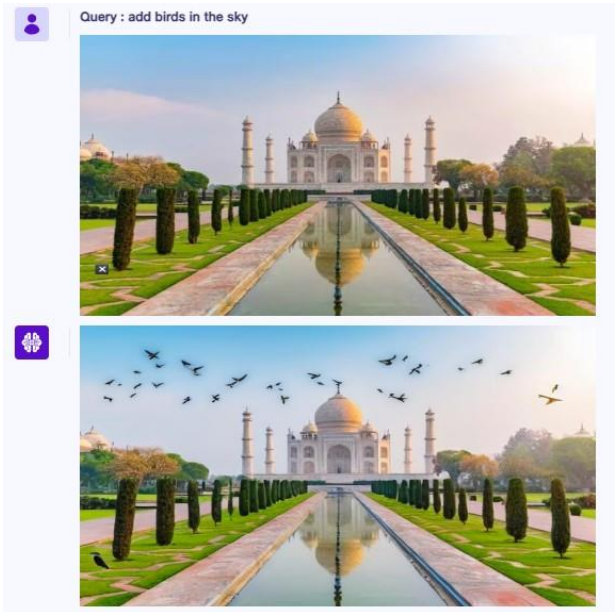


JioBrain Image AI Platform

Users can use images along with text to generate, alter, and enhance images using JioBrain algorithms.

- **User Input:** The user can provide an image along with a textual query, specifying the desired modifications or adjustments to the image. The input image and the query are submitted to a pre-trained model designed for image modification.
- **Pre-Trained Image Modification Model:** The image modification model is pre-trained on a diverse dataset, learning various visual features, styles, and transformations from a wide range of images. The model processes both the input image and the textual query using its learned knowledge of image features and modification techniques.
- **Image Modification:** Leveraging its knowledge, the model modifies the input image based on the specifications outlined in the user's query or by the provided image. This may involve adjustments to color, style, composition, or other visual elements. The result of this process is a modified image that reflects the desired changes indicated by the user's query or provided image.





JioBrain Video AI

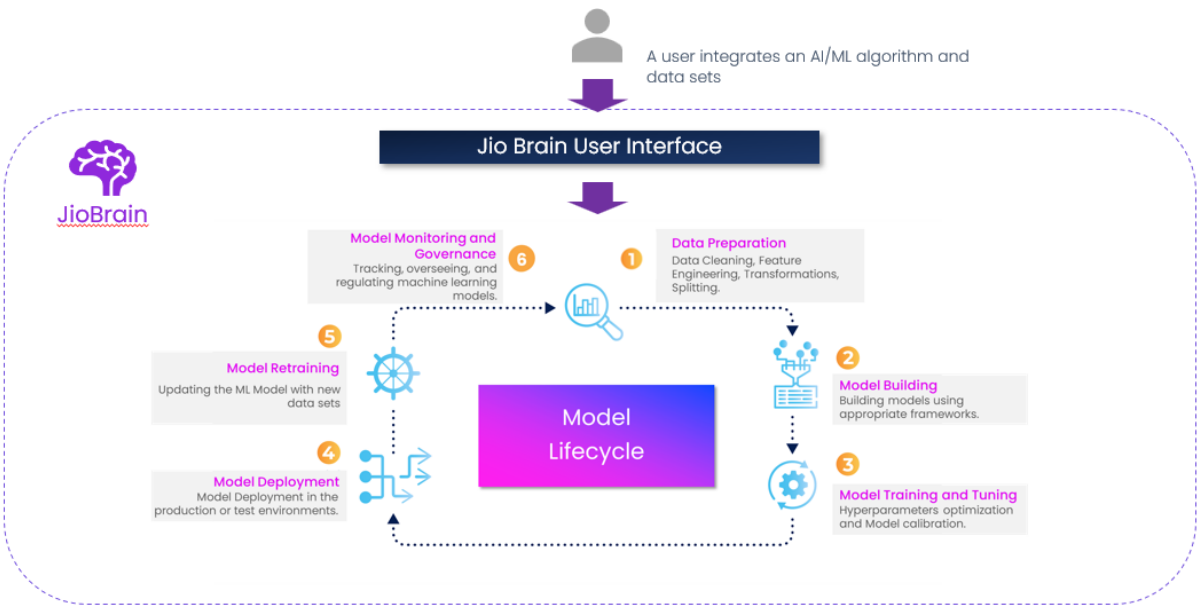
The platform offers innovative solutions for generating video content through two advanced features: image-to-video generation and text-to-video generation.

Image-to-video generation lets users create a video sequence from a set of images. The goal is to transform a collection of still images into a dynamic video, typically by arranging them in a specific order and adding transitions or effects.

Text-to-video generation is a service where textual descriptions or scripts are used to generate video content. This involves converting written text into a visual format, using advanced AI models and techniques.

Bring Your Own Model

JioBrain offers the flexibility to integrate and scale existing machine learning models or Python scripts within its advanced AI/ML ecosystem. This feature is designed to empower data scientists and developers by leveraging their pre-built models while taking advantage of JioBrain's robust infrastructure.

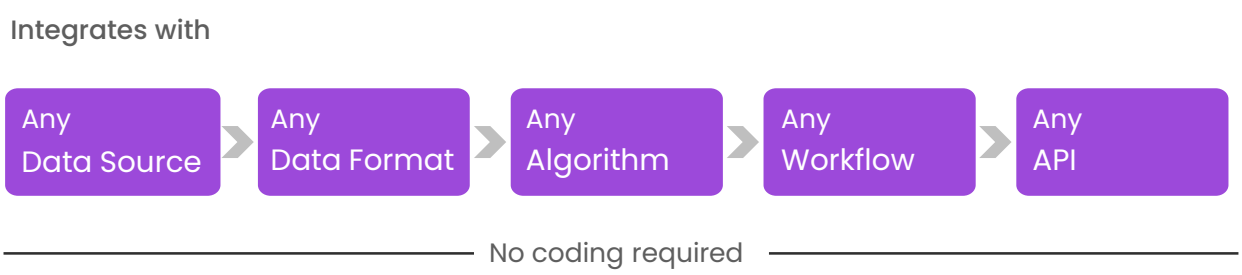


Summary

JioBrain is a cutting-edge AI/ML platform that integrates seamlessly with 5G to revolutionize network operations and business processes. Designed to be industry-agnostic, JioBrain supports multiple machine learning disciplines, including LLMs, image, video, and speech recognition, as well as industrial AI/ML capabilities. It empowers enterprises and communication service providers (CSPs) with advanced features like real-time data processing, on-the-fly feature engineering, and comprehensive machine learning pipelines.

Diverse Services Enabled by JioBrain

- **Training** as a Service
- **Feature Engineering** as a Service
- **Hyperparameter Tuning** as a Service
- **ML Chaining** as a Service
- **LLM** as a Service
- **Algorithms** as a Service
- **Coding** as a Service
- **Code Quality** as a Service
- **Workflows and SI** as a Service
- **Image Recognition** as a Service
- **Video Recognition** as a Service
- **Video Generation Gaussian Splatting** as a Service
- **Image Generation** as a Service
- **Bring Your Own Model** as a Service



The platform is cloud-native with edge support, offering API-based integrations for closed-loop automation and real-time AI services. JioBrain's unique architecture ensures high scalability, reliability, and security, making it an indispensable tool to streamline operations, optimize network performance, and drive revenue. Its proven success in the Jio True 5G network highlights its capabilities in delivering unparalleled network uptime, efficiency, and cost reductions.

Annexure

JioBrain's 100+ out-of-the-box industrial AI algorithms

1. Linear Regression
2. Logistic Regression
3. GBT
4. Isotonic
5. Random Forest
6. Decision Tree
7. TBATS
8. Sarima
9. Arima
10. Prophet
11. Holtwinters
12. Autoregression
13. NeuralProphet
14. Exponential Smoothing (ES)
15. Vector Auto-Regressive (VAR) Model
16. Vector Error Correction Model (VECM)
17. Generalised Linear Models (GLM)
18. Radial Basis Function Networks (RBFN)
19. Learning Vector Quantization (LVQ)
20. Self-Organising Map (SOM)
21. CatBoost
22. LightGBM
23. Gradient Boosting Machines (GBM)
24. Partial Least Squares Regression
25. Multivariate Adaptive Regression Splines (MARS)
26. Long Short-Term Memory Networks (LSTM)
27. Gated Recurrent Units (GRU)
28. Negative Binomial Model
29. Exponential Smoothing
30. Singular Spectrum Analysis (SSA)
31. OneclassSVM
32. XGBoost
33. Histogram-based Outlier Score
34. Local Outlier Factor (LOF)
35. Autoencoders
36. K-nearest Neighbour: k-NN
37. Support Vector Machine (SVM)
38. Connectivity-based Outlier Factor (COF)
39. Naïve Bayes Classifier Algorithm
40. Isolation Forest
41. Robust Covariance
42. Kernel PCA
43. Principal Component Analysis (PCA)
44. Gaussian Mixture Models (GMM)
45. Hidden Markov Models (HMM)
46. Long Short-Term Memory (LSTM)
47. Generative Adversarial Networks (GAN)
48. Variational Autoencoders (VAE)
49. k-Means
50. Hierarchical Clustering
51. DBSCAN
52. OPTICS Algorithm
53. Mean-Shift Clustering
54. Subspace Outlier Detection (SOD)
55. Anomaly Detection Using Binomial Test
56. Smith-Waterman Algorithm
57. Fast Dynamic Time Warping (FastDTW)
58. Singular Value Decomposition (SVD)
59. Non-negative Matrix Factorisation (NMF)
60. Independent Component Analysis (ICA)
61. Convolutive ICA
62. Kernel ICA
63. Hierarchical Temporal Memory (HTM)
64. Quantile Regression
65. Slow Feature Analysis (SFA)
66. Jensen-Shannon divergence
67. Hamming Distance
68. Manhattan Distance
69. Euclidean Distance
70. Minkowski Distance
71. Feature Selection-Based Outlier Detection (FSOD)
72. Deviation-Based Outlier Detection (DBOD)
73. Distance-Based Outlier Detection (DBOD)
74. Support Vector Machine (SVM)
75. Naive Bayes Gaussian NB
76. k-mean clustering
77. K-Nearest Neighbors (KNN)
78. Classification and Regression Trees (CART)
79. Gradient Boosted Trees LightGBM
80. Multinomial NB(naïve bayes)
81. Linear Discriminant Analysis (LDA)
82. Quadratic Discriminant Analysis (QDA)
83. Neural Networks like Multi-Layer Perceptrons (MLP)
84. AdaBoost
85. Bagging Classifier
86. Extra Trees Classifier
87. Stochastic Gradient Descent (SGD) Classifier
88. Ridge Classifier
89. Kernel Approximation Methods like Radial Basis Function (RBF)
90. Nearest Centroid Classifier
91. One-vs-Rest (OvR) and One-vs-One (OvO)
92. Passive Aggressive Classifier
93. Label Propagation
94. Naive Bayes
95. Neural Networks
96. Policy Gradient Methods
97. Polynomial Regression
98. Transfer Learning
99. Transformer Models (like BERT, GPT, T5)
100. t-Distributed Stochastic Neighbour Embedding (t-SNE)
101. Co-training

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