CELEBAL TECHNOLOGIES

Transformer Fault Diagnostics

Microsoft Solutions Partner

Infrastructure (Azure)
Data & AI (Azure)
Digital & App Innovation (Azure)
Security
Biz Applications

Celebal Specialization and Strength

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Microsoft
AI Partner Of The Year 2023
Global

databricks
Partner Of The Year 2022 & 2023
Asia Pacific and Japan
2 YEARS IN A ROW

databricks
Migrations Partner Of The Year 2023
Asia Pacific and Japan

Partnerships

Microsoft Solutions Partner

databricks Elite Partner

SAP Silver Partner

Red Hat Ready Business Partner

Advanced Specialization

- AI & Machine Learning
- Analytics
- Infra and Database Migration
- Kubernetes
- Cloud Security
- Low Code No Code
- Intelligent Automation

INDIA | USA | CANADA | APJ | MIDDLE EAST | AUS

2800+ Employees

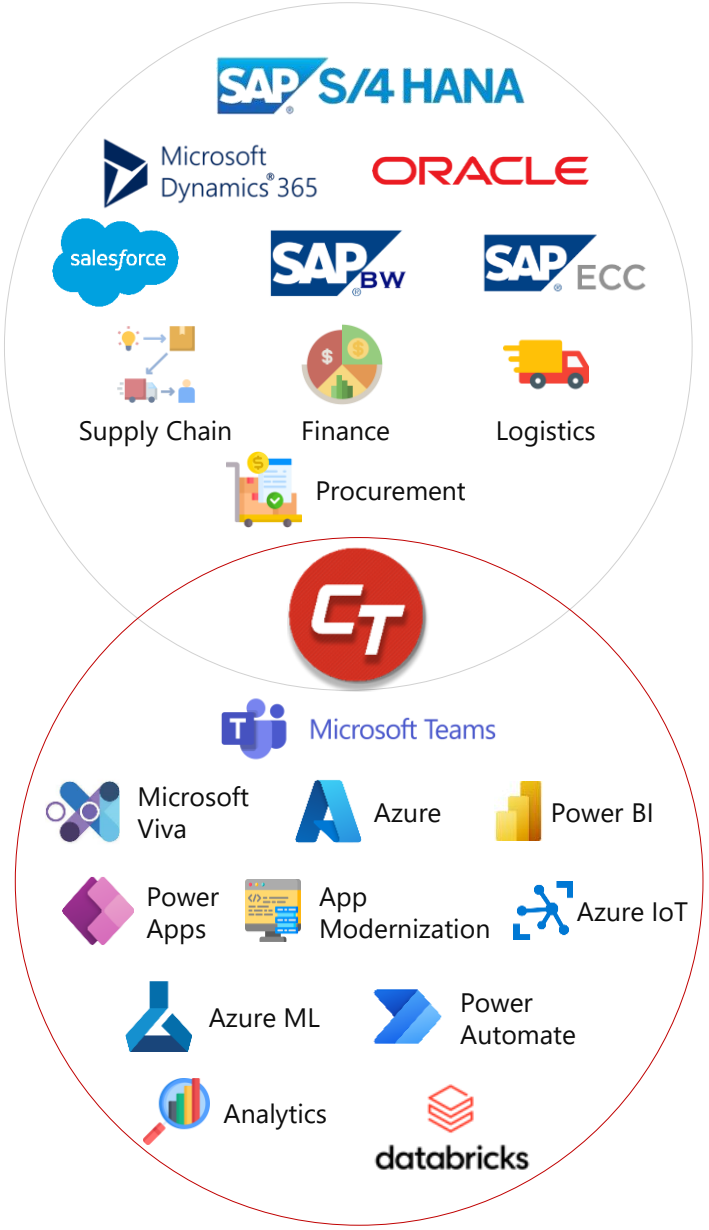
800+ AI experienced professionals

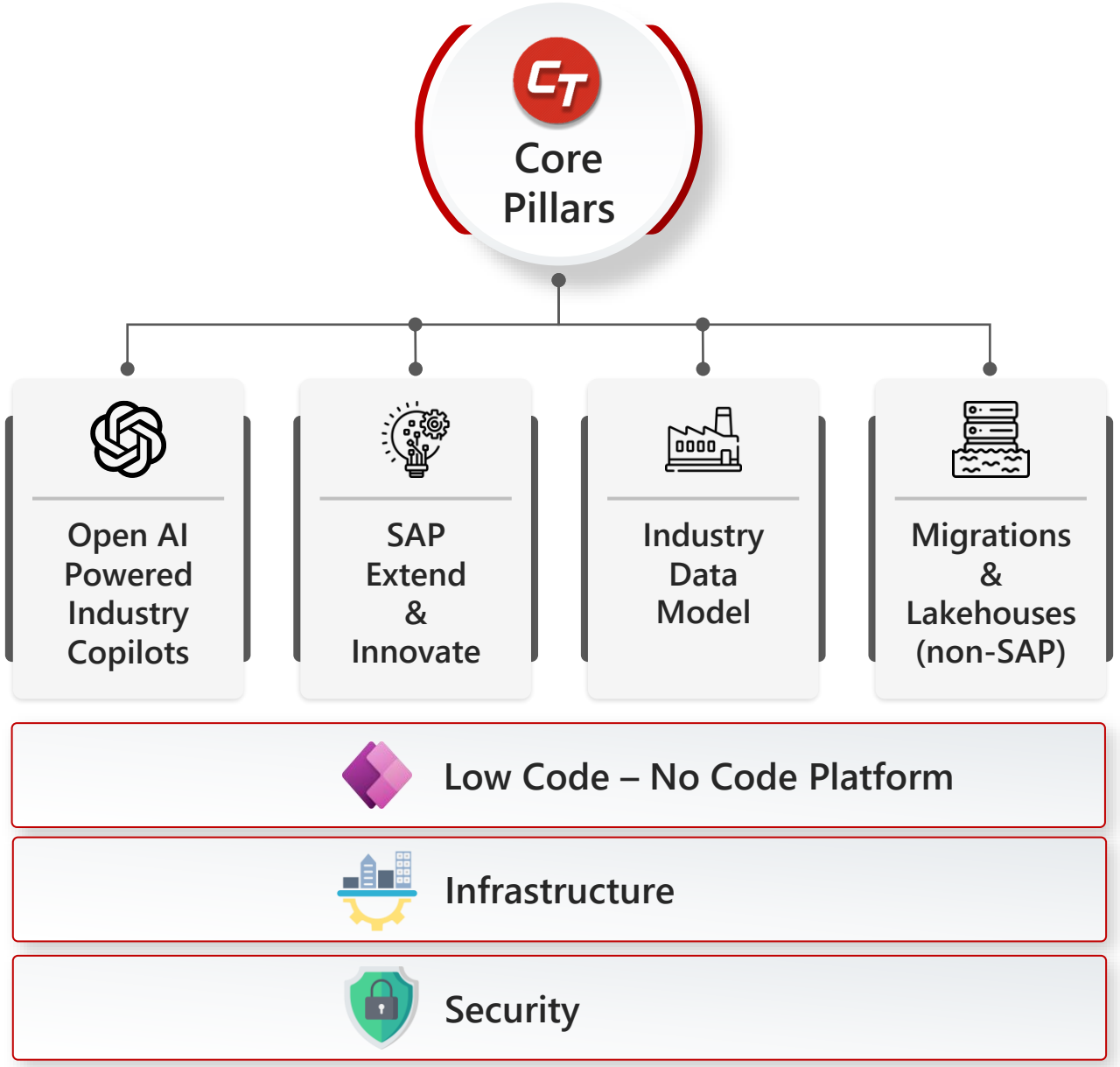
500+ AI Certifications

Industries We Serve

- Manufacturing
- Retail & CPG
- Financial Services
- Energy & Sustainability
- Healthcare & Life Sciences
- Media & Entertainment

Celebal Core Pillars





Transformer Fault Diagnostics

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1. Brief Description of the Solution:

Presenting our Transformer Fault Diagnostics solution, a major step forward in electrical infrastructure maintenance. This intelligent system precisely detects and analyzes transformer faults, reducing downtime and operational risk. Traditional methods are often manual, delayed, and inaccurate, leading to power failures, compliance issues, safety risks, and financial loss. Our solution integrates Azure Machine Learning, Azure Kubernetes Service, Azure Blob Storage, and Azure Data Lake for real-time fault identification. With Azure Custom Vision, Segment Anything Model (SAM), and OpenAI's CLIP (Contrastive Language-Image Pre-training), it ensures fast model training, pixel-level accuracy, and contextual understanding, adapting swiftly to new or damaged components using limited annotated input.

2. Business Problem It Solves:

Energy infrastructure operators face significant challenges in maintaining the integrity, safety, and operational efficiency of their assets. Traditional methods of inspection and monitoring are often labor-intensive, reactive, and prone to human error. These limitations can lead to safety incidents, service disruptions, regulatory non-compliance, and increased maintenance costs. The solution addresses these challenges by automating detection processes, providing continuous monitoring, and delivering timely alerts and insights for proactive maintenance and risk mitigation.

3. Value Add for Customer:

- AI-Powered Detection: Trained on vast image datasets for accurate damage identification.
- Insightful Reporting: Visual dashboards and actionable insights for confident, data-backed decisions.
- High-Precision Monitoring: AI-powered computer vision ensures pixel-level fault detection and diagnostics.
- Forecast-Driven Analytics: Predictive models identify emerging issues by analyzing real-time and historical data.
- Real-Time Alerts: Instant notifications keep operators and maintenance teams informed and responsive.
- Scalable Architecture: Azure-based design ensures enterprise-grade reliability and seamless grid-wide integration.

Few shot Image Segmentation (SAM + CLIP)

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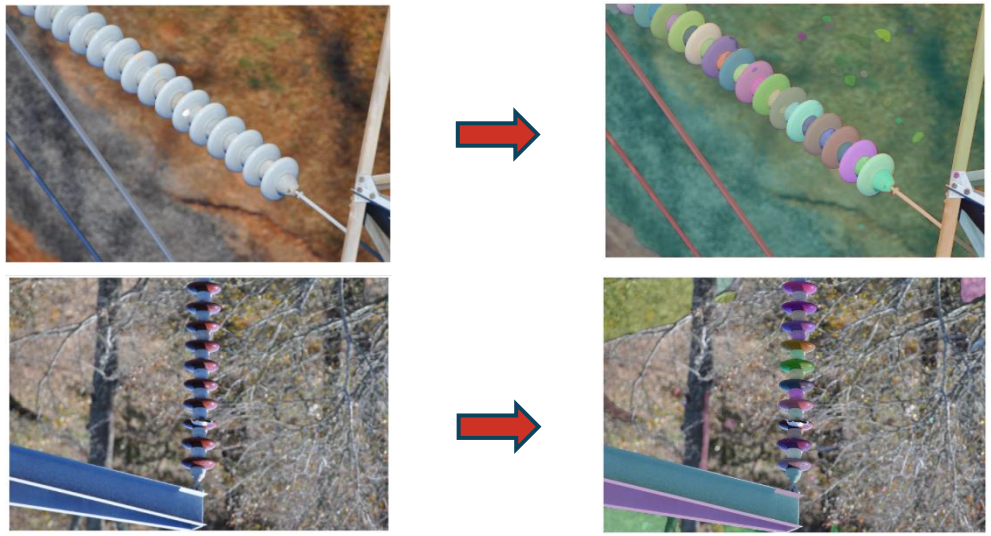
Overview

This approach uses zero-shot learning with FAIR's SAM model for image segmentation with minimal labeled data. CLIP model is used to filter segmented regions based on natural language prompts, enabling rapid development of image segmentation applications with little to no training data.

Object proposals generated by SAM (Zero Shot)



Approach

Get all object proposals generated by SAM

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Crop the object regions by bounding boxes

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Get cropped images' features and a query feature from CLIP

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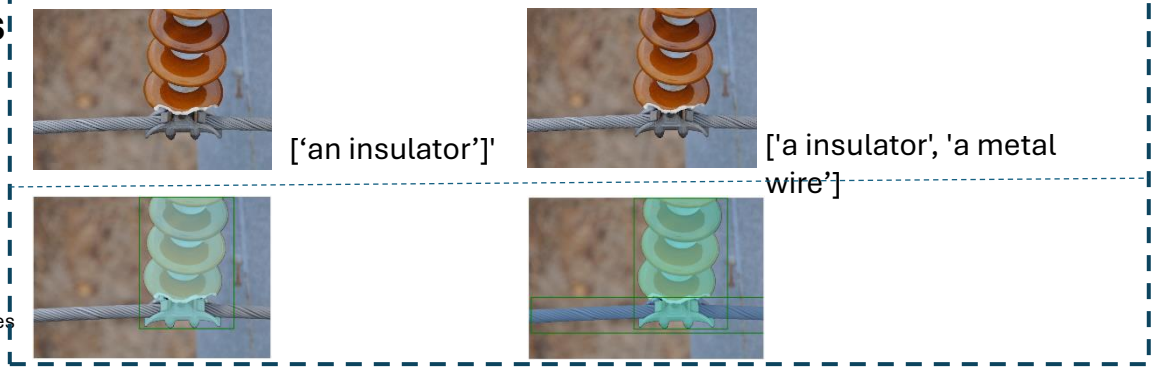
Infer mask regions based on similarity between image features and the query feature

Results



Conclusion

Hence by cropping object regions and extracting visual features with CLIP, we can efficiently perform instance segmentation selectively using natural language prompts by matching images and textual contexts. This approach has a significant impact on applications such as image retrieval and segmentation of various region of interests, where accurate and efficient collection of data is critical for user experience and productivity.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Thank You