Am I
DOING?
IT RIGHT

Artificial Intelligence, Data Organization and Integration

'Am I doing it right?' is a common question one might ask when unsure about correctly performing a complex task, particularly when the task can significantly impact an organization's performance. The complexity escalates when a combination of intricate technologies and artificial intelligence is utilized to solve the task. From a technology perspective, there's no definitive right or wrong. Hence, the most relevant question becomes

Am I DOING?
IT EFFICIENTLY ?

Challenges in Your Business: From Data Quality to Legacy System Integration

01 Data Quality & Consistency

02 Business Process Scenarios & Complex Rules

03 Integration of Legacy Systems

04 Lack of Data Governance

05 Resource Crunch to Support Old Technologies

No matter the challenges you may or may not be facing in these critical areas, we have got you covered! With our expertise and tailored solutions, we're here to help your business navigate these complexities with ease.
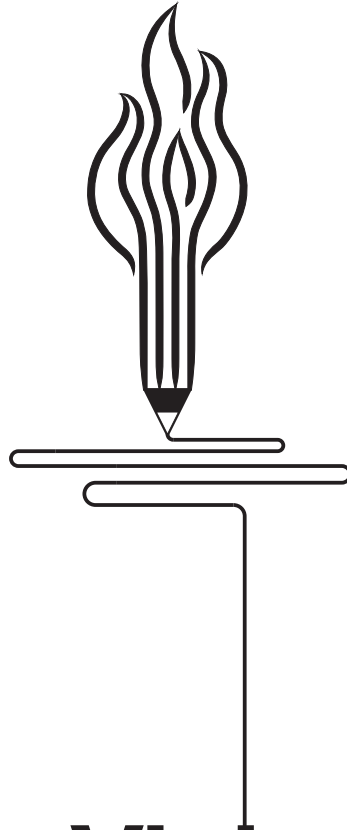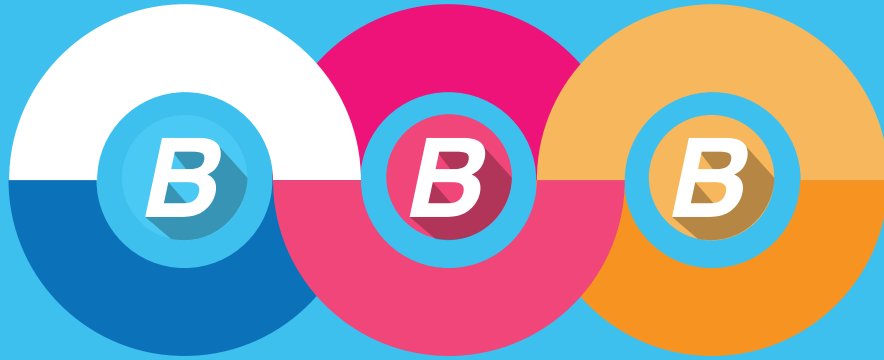
Our Vision

At ThoughtsWin Systems, we believe that data is the most powerful asset of any organization. We harness the power of data to deliver value where it matters most.

We strive to do this in the most efficient way possible, utilizing minimum resources and maximizing the output that you desire.

THOUGHTSWIN
SYSTEMS

Build Lasting Relationships

Beyond Duty Attitude

Benchmark Quality

CUSTOMER CENTRICITY

INTEGRITY

Our Value System

Building Lasting Relationships
We not only meet the immediate needs of customers or partners, but also foster a long-term connection based on trust and collaboration.

'Beyond Duty' Attitude
Our team goes above and beyond the call of duty, providing service and solutions that exceed expectations.

Benchmark Quality
The level of quality we aim to achieve is not just satisfactory, but is a standard that others in the industry should aspire to reach.

Customer Centricity
This emphasizes our focus on the customer in all aspects of the business, ensuring that the customer's needs and experiences are at the heart of decision-making.

Integrity
All business practices are conducted ethically and honestly, fostering trust with both customers and the broader community.

Our Design Approach

User Empathy Based Phased Approach. Evolution Not Revolution.

1 Empathize — Empathize with people we are designing for.

2 Define — Define insights & opportunities.

3 Ideate — Ideate until you get to the most appropriate route.

4 Prototype — Prototype with real users to validate its effectiveness.

5 Test — Followed by Lean Startup and Agile Methodology.

6 Support — Collaborate with the client to guide their journey and extract value.

7 Sustain — Support the customer in the adoption of the change.

PHASE 1:
Assessment & Planning

STEP 01 — Process & Workflow Assesment

STEP 02 — User Journey Mapping

STEP 03 — Architecture Design & Sign Off.

Detailed Project Plan

PHASE 2:
Design, Develop and Deploy

STEP 04 — UI/UX Mock Ups & Environment Set up

STEP 05 — Agile Development

STEP 06 — Rollout Planning & Testing

STEP 07 — Phased Deployment & Training

Performance Metrics, System Integrations, Data Entry, Tool Usage, Training

Serving Public & Private Clients

10+
Satisfied Clients

50+
Happy Consumers

40+
Projects

50+
Enthusiastic
Team Members

03+
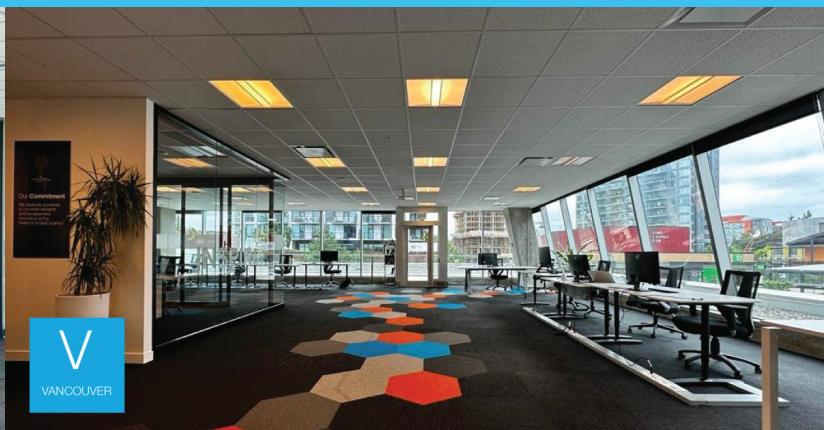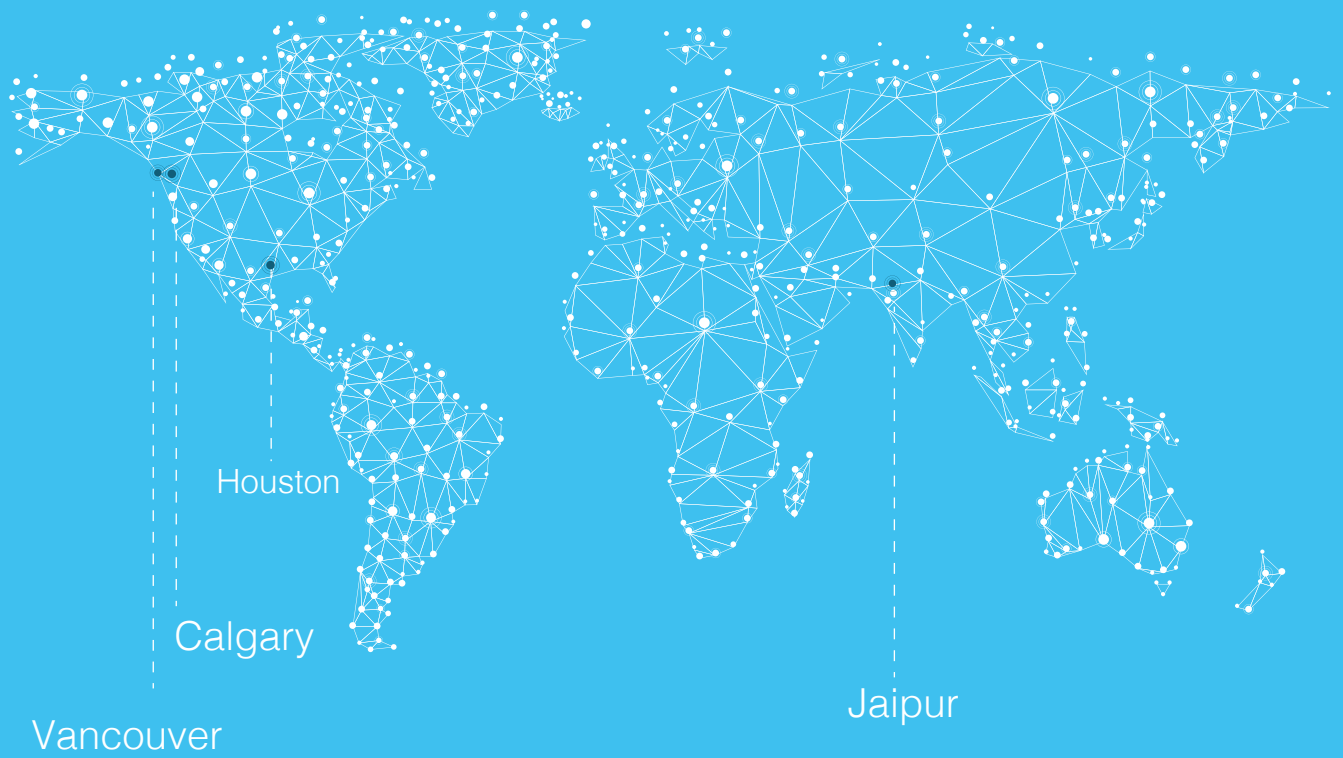Locations

05+
Years in Business

Sectors
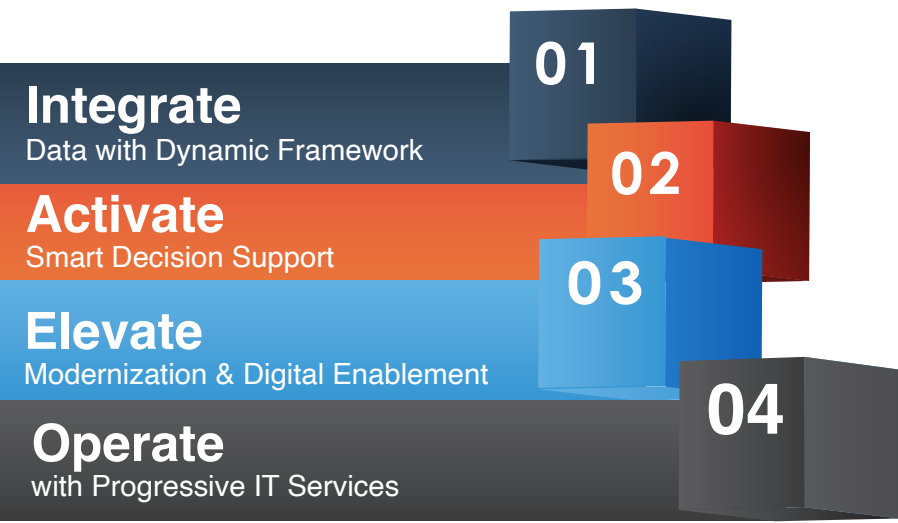
Finance
Infrastructure
Energy
Utilities
Healthcare
Retail

Global Footprint

Houston

Calgary

Vancouver

Jaipur

VANCOUVER

VANCOUVER

Our Offerings

01

Integrate
Data with Dynamic Framework

02

Activate
Smart Decision Support

03

Elevate
Modernization & Digital Enablement

04

Operate
with Progressive IT Services

Integrate Data with Dynamic Framework

Data Services

1

Data/BI Strategy
Data Quality & Governance
Data Warehousing
Data Engineering
IoT Data Integration
Enterprise Information Management

Activate Smart Decision Support

Advanced Analytics

2

Data Science/Machine Learning
Computer Vision
Data Visualization
Business Intelligence
Deep Learning
Natural Language Processing

Elevate Modernization & Digital Enablement

Digital & Enterprise Services

3

Digital Strategy through AI
Product Development Leveraging Generative AI
Data Integrators & Accelerators
Data Platform Migration to Cloud
Business Process Automation with AI, RPA, and Generative AI Techniques
Application Development

Operate with Progressive IT Services

Managed Services

4

Support Service
Maintenance
Monitoring
Project Management
Continuous Improvement
Partner Affiliation

CLOUD ENGINEERING

ENTERPRISE ARCHITECTURE

Our Partners

Microsoft Solutions Partner
DATA & AI
AZURE

databricks

canary CERTIFIED PARTNER

aws

FIVETRAN PARTNER
REGISTERED REFERRAL

Areas where these services can be employed.

The proper organization and integration of data is crucial for businesses to make informed decisions, improve operations, and maintain a competitive edge. Here are some areas where artificial intelligence, data organization and integration services can be employed:

- Business Intelligence and Analytics
- Customer Relationship Management (CRM)
- Supply Chain Management (SCM)
- Financial Management
- Human Resources (HR)
- Sales and Marketing
- Regulatory & Compliance Management
- Workforce Scheduling
- Risk Management
- Traffic Management

- Product Development
- Operational Efficiency
- Predictive Maintenance
- Fraud Detection
- E-commerce Recommendations
- Natural Language Processing (NLP) &
- Energy Management
- Reading & Digitlizing Engineering Drawings
- Personalizing Customer Experience
- Fleet Management

When do organisations need
Artificial Intelligence,
Data Organization and Integration

Organizations often need to initiate data organization and analysis in response to certain events or situations, including, but not limited to:

1. Business Growth or Expansion
2. New Regulations or Compliance Requirements
3. Mergers and Acquisitions
4. New Business Models or Strategies
5. Data Breaches or Security Incidents
6. Technological Advances
7. The need for Advanced Analytics &
8. Being competitive

Community AI Projects

We assisted our clients in AI projects aimed at making a positive difference in various communities which secured funding from SCALE AI

Scale AI is a co-investment and innovation hub with government funding matched by contributions from the private sector.

Scale AI helps companies enhance their AI-based product and service offerings, as well as assists with AI go-to-market strategies to boost revenues.

The projects we secured funding for:

1. **Supply-Chain:** We are building an AI Demand Forecasting Model that will incorporate data such as historical sales, inventory levels, seasonality, and promotions to better estimate expected demand for centre-of-store SKUs to provide insights to the supply-chain team.

2. **Labor Scheduling:** We are also productionizing and improving an optimization algorithm to automate labor scheduling that will result in significant labor savings coupled with improved productivity, customer service, and job satisfaction.

ThoughtsWin joins the partner consortium for the supply chain AI-based demand forecasting initiative at Save-On-Foods

SCALE AI announces a major financing round in artificial intelligence: $50 million to support 12 new projects

Montréal, Québec - August 22, 2022

With an additional 12 projects representing more than $50 million in investments announced today by SCALE AI, artificial intelligence (AI) is continuing on its path of rapid adoption by Canadian industry leaders.

VALUE PROPOSITION

Improving retail clients' supply chain through AI-based demand forecasting

USE CASES

01 — Build AI Demand Forecast Model

02 — Improve & field test demand forecast model

03 — AI-Enabled Auto Scheduler to optimize labor scheduling

https://www.scaleai.ca/scale-ai-announces-a-major-financing-round-in-artificial-intelligence-50-million-to-support-12-new-projects/

We are Sector-Focused

In the realm of service provision, it's easy to get caught up in the details of what we, as providers, have to offer. Yet, the true barometer of success is not just the diversity or quality of our services, but rather the extent to which they fulfill the wants and needs of our clients. Each client brings unique expectations and goals, which demand an equally unique and tailored approach. It's important to recognize that clients across various sectors have different requirements. Hence, we have created a variety of sector-specific offerings. Whether you operate in finance, healthcare, technology, or any other industry, we have solutions specifically designed to tackle your unique challenges. Even if these services don't directly meet a current need, they can provide insight into potential areas of improvement or innovation within your sector. This sector-focused approach not only underscores our commitment to understanding and serving our clients but also our dedication to helping them solve problems and grow in their respective industries.

Energy

In today's data-driven world, capitalizing on opportunities for operational excellence is paramount. Our custom solutions, infused with AI & Analytics, do more than just streamline operations. They enhance efficiency, boost reliability, drive significant cost savings, and further your sustainability goals. Moreover, our expertise in seamless content management, data migration, organization, and modernization ensures that vital information is always at your fingertips, bolstering operational efficiency and facilitating informed decision-making.

Elevate your operations with our bespoke solutions, meticulously crafted to cater to the unique demands of the Energy industry. Embrace the future now, propelling your business towards enhanced cost-effectiveness, sustainability, and reliability.

Predictive Analytics Maintenance

Harness advanced data analytics for preemptive asset failure detection before a major breakdown. By enabling predictive maintenance and optimized operations, we pave the way for reduced costs, enhanced efficiency, and a forward-thinking industry.

Asset Management

With IIoT 4.0 rapidly evolving, ThoughtsWin offers an inventory management system that refines inventory and asset management lifecycles. A dependable system accelerates the turnaround cycle, leading to heightened profitability.

Process and Workflow Optimization

Utilize AI algorithms to pinpoint inefficiencies in regular business operations. Our platforms let clients discern, map, and fine-tune processes, with our alliances facilitating end-to-end IIoT 4.0 integrations.

Risk Management

Employ our risk management tools to work collaboratively and prioritize tasks within multi-disciplinary teams. Simplify complex workflows with our advanced analytic platform, supported by Subject Matter Experts (SME).

Data Integration

Merge data from varied sources for a holistic analysis, driving informed decision-making.

Supply Chain Management

Our AI-driven solutions optimize logistics, from demand prediction and route planning to delivery scheduling, ensuring reduced costs and boosted reliability.

Asset Performance Management

Leverage AI and IIoT 4.0 for predictive, condition-based maintenance. This innovation minimizes unplanned failures, manages maintenance costs, and prolongs asset lifecycles. The resultant insights lead to cost reductions and enhanced efficiency, signaling a future of sustainable and innovative industries.

Data Visualization

Empower business units with detailed visualizations that foster cohesive teamwork. These visual aids facilitate efficient communication, promoting prompt decision-making.

Decision Support

Navigate the IoT 4.0 era with accelerated, precise decisions. AI assists in discerning trends and patterns within vast data volumes.

Digitization

ThoughtsWin champions history preservation. Utilizing Machine Learning and Computer Vision algorithms, we recognize and categorize extant information. Our sophisticated extraction tool, Artemis, digitizes and contextualizes physical documents, integrating them into unified platforms like Digital Twins.

Management Services

Avail both technical and non-technical management services from our Subject Matter Experts, specializing in the energy sector. Our SMEs guide the transformation of existing platforms through advanced data analytics.

Turnaround Planning

Mitigate the complexities and costs of turnaround processes. By prioritizing a data-first approach, our tools aid schedulers in timely task completion and real-time reporting.

Operational Insight

Equip business units with live visualizations of production, maintenance, and ESG KPIs. Promote safety, reliability, efficiency, and energy conservation through integrated collaborations.

Enterprise Content Management Migrations

Specializing in Enterprise Content Management (ECM) migrations, ThoughtsWin expertly transitions to the new SharePoint ECM Platform. This centralizes content management, enhances collaboration, and strengthens compliance. The current focus is on refining existing content, with a preference to migrate only cleaned-up data into the ECM Platform, avoiding the transfer of raw content.

Case Study: Energy : APM

Activate: Smart Decision Support

Asset Performance Management
Pressure Control Valve (PCV) Monitoring

KEY BENEFITS

Remote monitoring of assets

Reduced downtime of assets

Dashboards for Management Operations & Site engineers

PowerBI dashboards for external regulatory.

CHALLENGES

Reduce manual surveillance of remote farm sites

Poor Network access

Can't do Remote Monitoring of RNG assets:
- *Geographically distributed assets.*

Reactive maintenance costs.

SOLUTION

Implemented Data infrastructure for preventive and condition-based maintenance.

Technologies
- OSISoft PI DA,
- Asset Framework
- Event frames,
- Notifications
- PI Vision
- PI connectors & PI interfaces
- PI Integrator for BI

Nearing $3 Million recurring annual savings

$3 Million

Case Study: Energy : APM
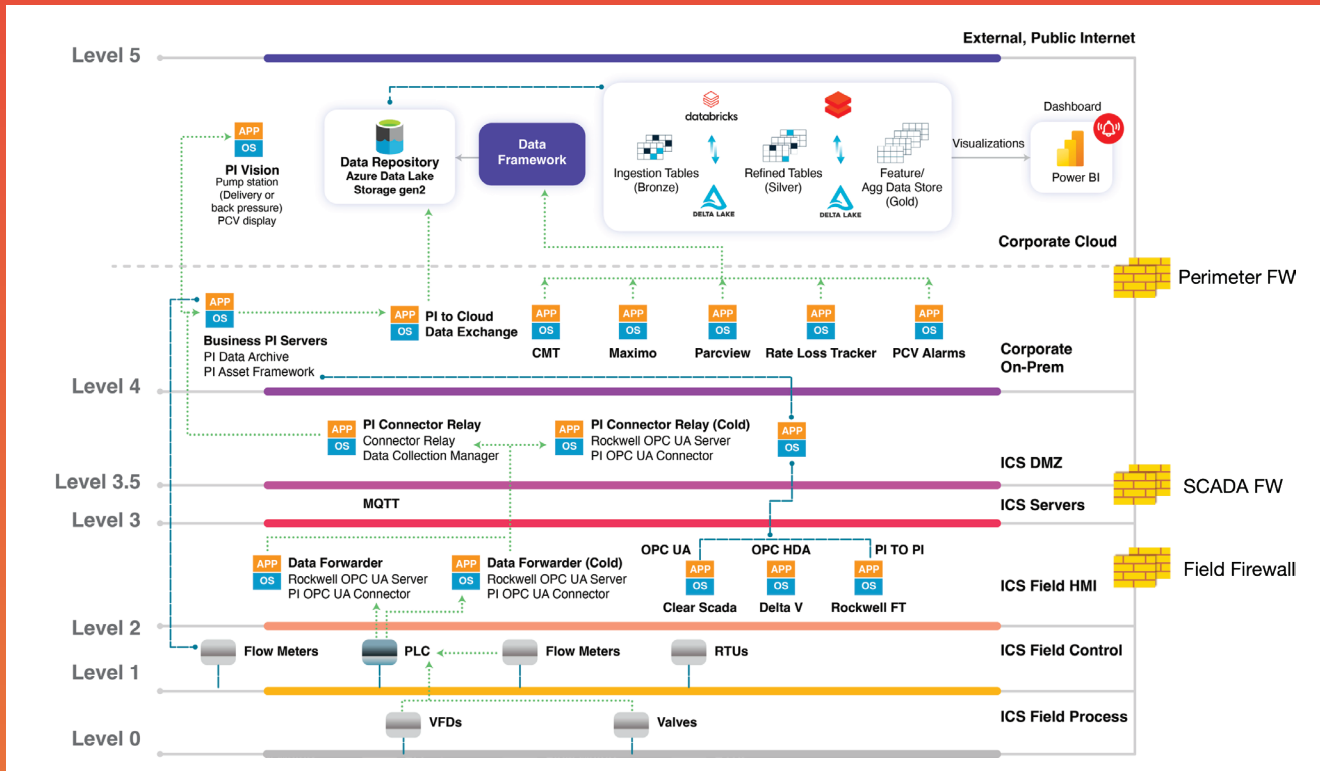
PCV - Monitoring Architecture

1. PCV Prioritization Score Tree Map
2. Revenue Impact Page and Map
3. PCV Health Score Tree map
4. PCV Health and Prioritization scores
5. Root Cause and Health Score Trends Analyses
6. Performance Thresholds Analysis
7. Actuator Diagnostics Dashboard
8. PCV/Actuator Performance and Capacity Analyses

Services Employed:

Business Process Automation with AI, RPA, and Generative AI Techniques

End of Case Study

Case Study: Energy : CBM

Activate: Smart Decision Support

Asset Health

Unit			
100			
80			
60			
40			
20			
0			

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

Time

■ Health   ● Open work orders   ● Meter Health

Health **73%**   Criticality **50%**   Risk **75%**
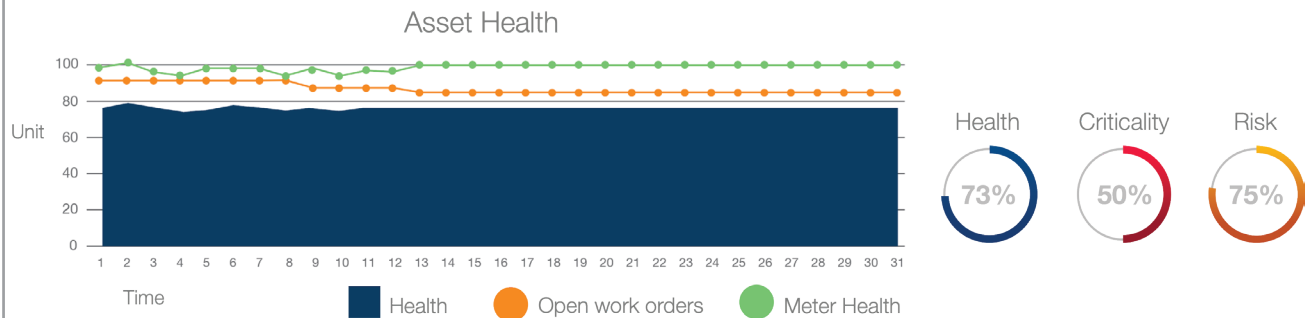
Condition Based Maintenance Pump Vibration

KEY BENEFITS

Significant reduction in unplanned downtime due to early detection of potential failures.

CHALLENGES

Unplanned Downtime due to unexpected equipment failures, leading to production losses.

High Maintenance Costs: Increased costs associated with reactive maintenance and emergency repairs.

Lack of real-time visibility into equipment health, making it difficult to identify issues before they escalate.

Lower maintenance costs through proactive identification and resolution of issues before they lead to major breakdowns.

SOLUTION

Real-time Monitoring: Deployment of a real-time monitoring system to provide instant alerts on abnormal conditions.

Data Analytics: Use of advanced data analytics to analyze sensor data and predict potential issues.

Enhanced visibility into equipment health, enabling better decision-making and more efficient maintenance planning.

Case Study: Energy : APM

Activate: Smart Decision Support

Table

	station_id	prediction	fileName	max	min	mean	sd	rms	skewn
1	MixingStep-Line1	BALL_FAULT_PREDICTED	vibration_reports_inference.csv	0.35986	-0.4189	0.017840462	0.12274639	0.124006465	-0.118
2	MixingStep-Line1	BALL_FAULT_PREDICTED	vibration_reports_inference.csv	0.46772	-0.36111	0.022254799	0.13248798	0.13431221	0.1746
3	MixingStep-Line1	BALL_FAULT_PREDICTED	vibration_reports_inference.csv	0.46855	-0.43809	0.020470295	0.14965051	0.15100786	0.0403
4	MixingStep-Line1	BALL_FAULT_PREDICTED	vibration_reports_inference.csv	0.58475	-0.54303	0.02095973	0.15706746	0.15842175	-0.023
5	MixingStep-Line1	BALL_FAULT_PREDICTED	vibration_reports_inference.csv	0.44685	-0.57891	0.022167344	0.1381888	0.13992216	-0.081
6	MixingStep-Line1	BALL_FAULT_PREDICTED	vibration_reports_inference.csv	0.43726	-0.44435	0.021119274	0.13876337	0.14032781	-0.131

1,000 rows | Truncated data

Asset Predictive Management

KEY BENEFITS

More efficient maintenance scheduling based on actual equipment condition, reducing unnecessary maintenance activities.

Higher equipment uptime due to timely interventions based on predictive insights.

Data-driven Decisions: Improved decision-making through integrated data analytics and actionable insights.

CHALLENGES

Maintenance activities based on fixed schedules, leading to unnecessary maintenance or missed issues.

High rate of equipment failures impacting production and operational efficiency.

Data Silos: Disparate data sources and lack of integration between IT and OT systems.

SOLUTION

Implementation of predictive analytics models to forecast equipment failures based on historical and real-time data.

Integration of IT and OT data to provide a comprehensive view of asset health and performance.

Development of an automated alert system to notify maintenance teams of predicted failures and recommended actions.

Case Study: Energy : ADLM

Integrate
Data with Dynamic Framework

Activate
Smart Decision Support

Operational records

7.5M
Number of docs

Content type
- Governing Docs
- Controlled Maintenance Records
- Uncontrolled maintenance Records
- Team workspaces

~7
Size (TB)

15,000
Load Rate (docs/hr)
(concurrent execution using multi-threading)

4,500
Enterprise users

Engineering Records

2.5M
Number of docs

Content type
- Controlled Engineering Records
- Vendor Records
- Project Records

~3
Size (TB)

12,000
Load Rate (docs/hr)
(concurrent execution using multi-threading)

4,500
Enterprise users

Asset Development Lifecycle Program

CHALLENGES

- Complex Content Landscape
- Large Volume of Data
- Phased Implementation
- Metadata Complexity
- Change Management
- High User Demand

SOLUTION

We implemented a comprehensive and phased approach.

- Detailed Planning and Workshops
- Source Analysis and Data Profiling
- Metadata Enrichment and Mapping
- Infrastructure and Permission Model
- ETL Model Development
- Phased Migration Execution
- System Integration and Go-Live Support
- Warranty and User Support

KEY BENEFITS

- Efficient and Accurate Data Migration
- Enhanced Data Quality

- Seamless User Transition
- Operational Continuity

- Improved Information Management
- Business Process Support
- Long-term Value

Case Study: Energy

Asset Management Program

The Asset Management Program (AMP) is an implementation of updated systems that will change the way our Clients manages their asset and engineering information.

Enterprise Implementation seeks to complete the AMP program and ensure a standardized approach across all Client's facilities in how we manage Asset Data and enhance our Digitalization journey by ensuring a single source of truth with trusted reliable data to manage all assets.

Expertise Mapping

ENTERPRISE
- Corporate Technical Standards(CTS)
- Building TAG Registry with business
- Understand Asset Hierarchy (SAP)
- Process Engineering | Oil & gas
- Enterprise Content Management

Experts with right blend of business and technical understanding to drive the business value

TECHNICAL
- Certified Solution Architect and Data engineers
- PI Asset Framework understanding
- Data visualization expertise
- Data Architecture and Integration
- AI/ML

Key Accelerator:

DREX is an innovative AI-driven data extraction tool designed specifically for engineering drawings. It simplifies the process of extracting valuable data from complex, unstructured engineering documents, significantly reducing manual effort and improving accuracy.

1. Utility was developed to interpret digital images on a pixel-by-pixel basis to accurately identify and classify objects like human brain
2. Utility is written in Python, leverages OpenCV and Tesseract for computer vision
3. Utility has the capability of Object detection, text/handwriting recognition etc.
   - Scan and parse source documents per given rules
   - Save relevant metadata to underlying database

DREX
DEFINE | READ | EXTRACT

www.datadrex.com

Retail

Artificial Intelligence (AI), Data Organization, and Integration are at the forefront of transforming the modern retail landscape, offering innovative solutions that go beyond the conventional paradigms of customer service, inventory management, and sales strategy. The application of these technologies in the retail industry can act as a fulcrum for organizational success, addressing diverse challenges, and catalyzing growth.

In a constantly evolving market, filled with shifting consumer expectations and increasingly complex operational demands, AI and data-centric approaches offer a pathway to agility, efficiency, and customer-centricity. By leveraging predictive analytics, machine learning, sophisticated algorithms, and integrated data structures, retail chains can transcend traditional boundaries and deliver a personalized, responsive, and streamlined experience. The convergence of these technologies represents not just an incremental change but a fundamental transformation of retail, driving data-driven decisions, optimizing operations, and enhancing the overall customer experience.

Personalized Marketing and Customer Experience

We use the power of AI to analyze customer preferences and shopping behaviors to craft personalized marketing strategies, tailored product recommendations, and irresistible offers. Unlock the full potential of customer engagement and loyalty, making your retail business stand out in a competitive market.

Reading and Digitization of Documents

We specialize in AI-driven document digitization for the Retail Sector. We transform purchase orders, invoices, receipts, inventory records, contracts, really any key documents, into digital formats, simplifying your document management, streamlining administrative tasks, enabling detailed analysis and processing to enhance operational efficiency.

Supply Chain Optimization

Our AI algorithms predict demand, optimize inventory, and automate reordering processes, reducing costs. Streamline inventory management, minimize overstock, and ensure timely replenishment with vendor collaboration. Partner with us for a more efficient retail supply chain, driving success in the dynamic retail landscape.

Omnichannel Integration

Omnichannel Integration is a vital strategy for seamless customer experiences. By unifying data across online, in-store, and mobile channels, we enable retailers to deliver a seamless shopping experience. Your customers can effortlessly transition between channels, enjoying consistency and convenience throughout their retail journey.

Customer Service Automation

We use AI chatbots and virtual assistants to efficiently handle routine activities such as product inquiries, order status checks, returns, and refunds. This frees up your human staff to focus on personalized customer interactions, deepening relationships and enhancing retail experiences, streamlining your retail customer service for better efficiency.

Store Operations and workforce Management

Our AI-driven tools optimize staff schedules for peak shopping times, offer real-time performance insights, streamline inventory management, and even help realize sustainability outcomes. Create a more efficient workforce, optimize store operations, improve customer service, and enhance the overall retail experience for your customers.

## Real-time Analytics and Insights

We leverage AI and operational data to gain immediate access to sales trends, customer behavior analysis, and market dynamics. Real-time insights empower retailers to make proactive, data-driven decisions, such as optimizing pricing strategies, stocking popular products, and enhancing the overall customer experience.

Case Study: Retail

Integrate
Data with Dynamic Framework

Activate
Smart Decision Support
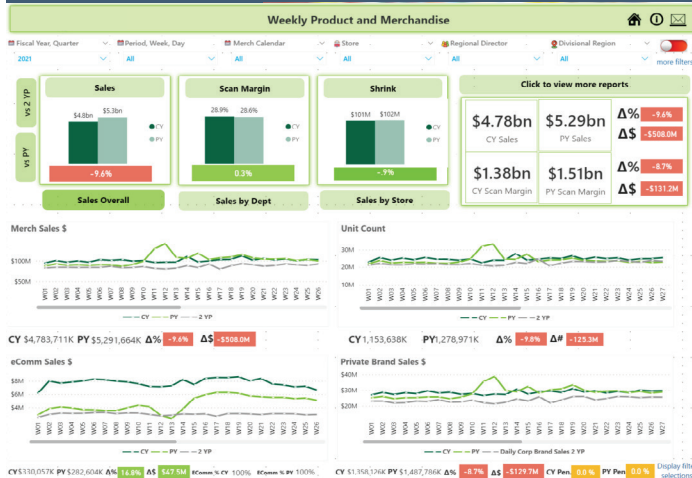
Customer 360° view that explains buying behavior and churn across segments

CHALLENGES

Maintaining data quality and consistency, particularly with the large volume and variety of data generated from multiple sources.

Data silos and redundancies that affected data accuracy and completeness.

The lack of a centralized data governance framework also affected retail data management.

Integration of legacy systems and new technologies was a challenge.

Resource crunch to support the old technologies.

KEY BENEFITS

General health of the customer base was identified.

Store & Market Performance was determined.

Determined customer Profile for Store & Region and Return on Customer Investment.

Target Market was identified.

Identified customer churn and Customer Movement between segments: Recency, Frequency & Monetary.

Services Employed: Data Engineering & Visualization

Case Study: Retail

Integrate
Data with Dynamic Framework

Activate
Smart Decision Support

Utilize Computer Vision to personalize customer service experience

KEY BENEFITS

Improved customer experience.

Established single source of reporting.

Personalized offers at point of sale.

CHALLENGES

Generating personalized offers due to data residing in multiple systems.

No unified source of truth.

Limited visibility into national trends and issues.

Services Employed: IoT Data Integration & Computer Vision

Case Study: Retail

Integrate
Data with Dynamic Framework

Activate
Smart Decision Support

tm_name	2024-05-19	2024-05-20	2024-05-21	2024-05-22	2024-05-23	2024-05-24	2024-05-25	total
David George	14:30-23:00*	14:30-23:00*	14:30-23:00*	14:30-23:00*			STAR-FT	32.0
A-12/10/1979 - RO	GR-CL	GR-CL	GR-CL	NAT-CL				40.0
BLK/FZ/GR/HE/MGT/NAT/PR	00:00-24:00	00:00-24:00	00:00-24:00	00:00-24:00	00:00-24:00	00:00-24:00	00:00-24:00	F
Janine Antonacci		STAT-FT	05:00-13:30^	09:30-16:00, 16:00-18:00*	12:30-21:00*	09:30-13:30, 13:30-18:00*		32.0
A-08/27/1987 - RO			FZ-CL	DY-CL, FZ-CL	FZ-CL	DY-CL, FZ-CL		40.0
BLK/DY/FL/FZ/GM/GR/NAT/PC/PR	00:00-24:00	00:00-24:00	00:00-24:00	00:00-24:00	00:00-24:00	00:00-24:00	00:00-24:00	F
Luise Hegyi		STAT-FT	07:00-15:30^	07:00-15:30^	07:00-15:30^	RTO*		24.0
A-05/22/1985 - RO			DY-CL	DY-CL	DY-CL			40.0
DY/FZ/GR/NAT	N/A	00:00-24:00	00:00-24:00	00:00-24:00	00:00-24:00	00:00-24:00	00:00-24:00	F

Utilize ML and Quantum Computing to produce optimized retail store employees schedules

KEY BENEFITS

Operational effectiveness and cost efficiency

Standardized practices across all the stores

Improved employee experience

CHALLENGES

Scattered scheduling practices across different stores.

Schedule generation is a time intensive exercise.

Specialized human knowledge required to generate usable schedules.

Infrastructure

Artificial Intelligence (AI), Data Organization, and Integration are rapidly becoming foundational elements in the realm of infrastructure management. In an era marked by technological innovation and growing complexity of urban and industrial landscapes, the task of managing and maintaining infrastructure—be it roads, bridges, utility networks, or buildings—has taken on new dimensions. Today's infrastructure is no longer a static entity but a dynamic, interconnected system that requires continuous monitoring, intelligent analysis, and proactive intervention. AI, with its capacity for predictive analytics, automated decision-making, and real-time responsiveness, offers a new frontier in infrastructure management. When coupled with robust data organization and seamless integration, AI transcends the traditional limitations of infrastructure management, enabling greater efficiency, reliability, sustainability, and resilience. It allows managers to anticipate challenges, optimize resources, enhance safety, and ultimately, to realize a vision of infrastructure that is in tune with the evolving needs of society and the environment.

Predictive Maintenance

AI algorithms can predict wear and tear, detect anomalies, and schedule maintenance activities before problems escalate, thereby reducing downtime and costs.

Environmental Monitoring

AI can analyze environmental data to ensure compliance with regulations and minimize the environmental impact of infrastructure.

Energy Efficiency

By monitoring and analyzing energy consumption patterns, AI can help in optimizing energy usage and forecasting, leading to more sustainable and cost-effective operations.

Integration of Systems

By integrating data from various infrastructure elements like transportation, utilities, and public services, AI can enable more coordinated and efficient e-governance.

Asset Management

Using AI and Data Integration, managers can get a unified view of all assets, monitor their condition, and make informed decisions on repair, replacement, or enhancement.

Security and Safety

AI can monitor and analyze video feeds from security cameras, providing enhanced security and safety measures across various infrastructure elements.
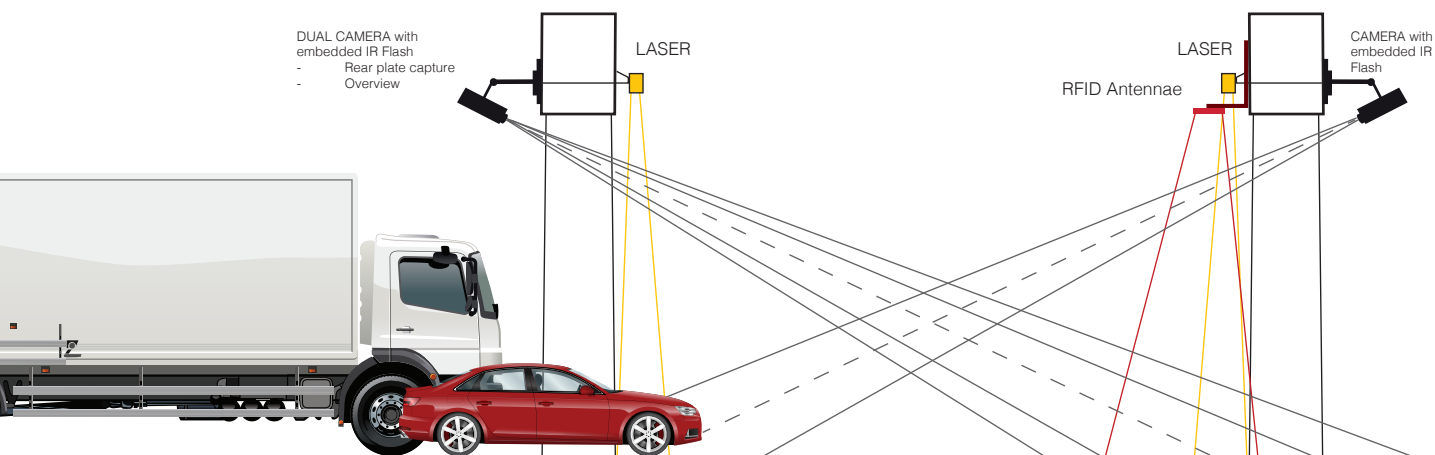
Use Case

Integrate
Data with Dynamic Framework

Activate
Smart Decision Support

CHALLENGES

1. An open road tolling system without barriers presents unique challenges in accurately capturing the identity of passing vehicles at high speeds.
2. The system must be capable of processing large volumes of real-time data to ensure that toll transactions are captured and validated accurately.
3. The lack of physical barriers in the tolling system increases the risk of toll evasion and fraud, necessitating robust security measures and redundancy protocols.
4. Implementing an open road tolling system requires significant investment in equipment, software, and personnel, which can be a financial challenge.
5. Technical glitches in the system such as malfunctioning equipment or network connectivity issues could result in delays or errors in toll transactions.
6. Ensuring the security of the personal and financial data collected through the tolling system, as it is vulnerable to cyber-attacks and other security breaches.
7. The high cost of implementing and maintaining the automated system, including the equipment, software, and personnel required to operate it.

DUAL CAMERA with embedded IR Flash
- Rear plate capture
- Overview

LASER

LASER

CAMERA with embedded IR Flash

RFID Antennae

HARDWARE SOLUTION
THIRD PARTY

1. The hardware solution for the tolling system included a highway gantry spanning the highway across the toll bridge.
2. The gantry was equipped with a range of cameras, emitters, lasers, and loops to identify passing vehicles.
3. The system used either a small RFID decal inside the car or optical character recognition (OCR) of the vehicle's license plate to identify each passing vehicle.
4. The use of RFID technology and OCR allowed for rapid and accurate vehicle identification, even at high speeds.
5. The implementation of this hardware solution enabled the tolling system to operate seamlessly, without impeding traffic flow, and without the need for physical barriers or toll booths.

SOFTWARE SOLUTION
ThoughtsWin Systems Capability

1. Toll transactions were initially captured at the roadside equipment, such as cameras, emitters, lasers, and loops on the highway gantry.
2. The captured toll transaction data was then replicated to servers at primary and secondary service centers.
3. The replicated toll transaction data was then processed and validated at the service centers.
4. The toll customer relationship management system was used to access and validate the processed toll transaction data.
5. This system allowed for the efficient processing and validation of toll transaction data, enabling accurate billing and improved customer service.

(*ThoughtsWin Systems* is not claiming solution IP with this case study, wherein, only show casing our subject matter expertise and implementation experience with this case at the **Program Management Level**)

BENEFITS

1. Improved traffic flow and reduced congestion, as vehicles, can pass through the tolling system without stopping or slowing down
2. Improved customer service through faster, more convenient tolling and the ability to access transaction information through the customer relationship management system.
3. Reduced environmental impact as the system eliminates the need for tollbooths and reduces vehicle emissions associated with idling or slowing down at toll plazas.

Utilities

Artificial Intelligence (AI), Data Organization, and Integration are transforming the modern landscape of utility companies, reshaping the ways they generate, distribute, manage, and innovate within the energy sector. The utility industry, characterized by its extensive networks, vast data streams, intricate regulations, and fluctuating demands, stands at a pivotal point where technology is not merely an enabler but a critical factor in achieving operational excellence and sustainability. AI, with its machine learning, predictive analytics, and automation capabilities, heralds a new era of efficiency, resilience, and customer-centricity. It moves beyond conventional methodologies, opening up possibilities for personalized service, real-time response, dynamic pricing, and predictive maintenance. Complementing this, Data Organization and Integration ensure that the diverse, often siloed data within utility operations is unified, structured, and ready for insightful analysis. This convergence of AI, Data Organization, and Integration fosters a holistic approach to utility management, blurring the lines between traditional compartments of operation, customer service, compliance, and innovation. It signals a shift towards a more interconnected, intelligent, and insightful utility paradigm.

Predictive Maintenance

Through AI, utility companies can predict failures and undertake preventive measures, thereby minimizing downtime and reducing maintenance costs.

Demand Forecasting

AI can analyze consumption patterns to accurately forecast demand, enabling better capacity planning and energy distribution.

Energy Efficiency and Optimization

AI algorithms can optimize energy generation and distribution, ensuring energy is used most efficiently.

Smart Grid Management

With AI, utility companies can manage smart grids dynamically, adjusting to changes in demand and supply, and integrating renewable energy sources.

Customer Service Automation

AI-driven chatbots and virtual assistants can provide quick customer service, handling routine inquiries and even assisting with technical issues.

Fraud Detection and Security

AI can help detect fraudulent activities and security breaches, enhancing the integrity and reliability of utility services.

Personalized Customer Engagement

AI enables personalized communication with customers, offering tailored solutions, dynamic pricing, and engagement strategies that resonate with individual needs and preferences.

Compliance and Reporting

Automated data organization and reporting tools ensure compliance with regulatory requirements and facilitate transparent reporting.

Real-time Analytics and Insights

Through data integration and AI-driven analytics, utility companies can gain real-time insights into operations, markets, and customer behavior.

Use Case

Our Client is a significant consumer of electricity for its operations and is required to submit precise energy usage forecasts to its suppliers on a daily basis. It is crucial that these projections accurately reflect the anticipated consumption as penalties may apply if there's substantial variance between the forecast and actual consumption. Our Client was looking to invest into advance machine learning models as the monitoring solutions to do more accurate forecasting, reduce any manual intervention and most importantly avoid an increase in operational costs incurred due to penalties or higher purchasing costs. Furthermore, The introduction of advanced forecasting tools will allow our client to mitigate any future increase in excess operating cost as the electric locomotive's footprint increases gradually. Our Client is promoting more electric equipments adoption and thus advanced technology investments are very much aligned with overall objectives and goals.

CURRENT **SOLUTION:**
Weighted Average Method

The current solution leverages a statistical approach using the weighted average method to determine the energy consumption forecast. The limitations around the accurate forecast method is resulting in substantial main absolute deviation and thus leading to higher operating cost aka penalties from energy supplier sources.

Key observations:

1. **Subjectivity:** The weights assigned to each data point can sometimes be subjective.
2. **Increased deviation:** They can be less stable over time and more sensitive to changes in individual data points.
3. **Needs Manual Intervention:** If there is a lot of variance, the new demand is manually adjusted based on energy consumption of the latest slots.
4. **Dynamic factors are not considered:** In the current weighted average solution there is no dynamic variables considered that would influence the energy consumption in near real-time manner.

Challenge

The current energy forecasting solution deployed at our client's place is based on a statistical method that leverages historical energy consumption static data and requires too frequent manual intervention to adjust & override the system-generated forecasts in order to minimize the absolute deviation and minimize operations costs that are incurred through penalties or higher purchase costs. The higher deviation in the forecast on a daily basis is limiting our client to provide more accurate energy demand to its suppliers. It is expected the demand for energy due to the increased adoption of electric equipments in future will further aggravate this problem and hence looking into advanced machine learning-based methods are needed for more accurate forecasting.

Large Deviation in
Actual vs Forecasted Power Consumption
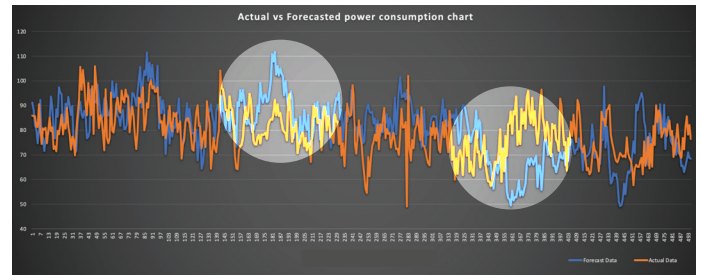
Data Duration: 5 Days

Deviation Range: -65% to 70%

Data Duration: 5 Days

CURRENT STATE

DESIRED STATE
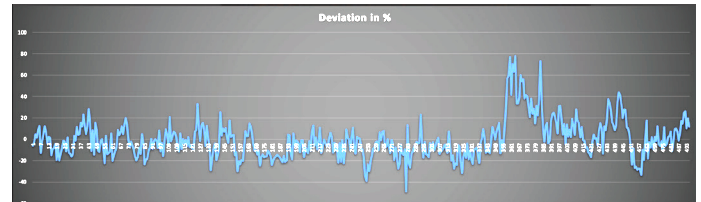
Key Attributing Factors

Energy demand not determined by measured use → Large deviation in the calculation of precise demand → Paying for more energy than used → Higher Penalties

Paying higher for the additional usage → Higher Operation Cost

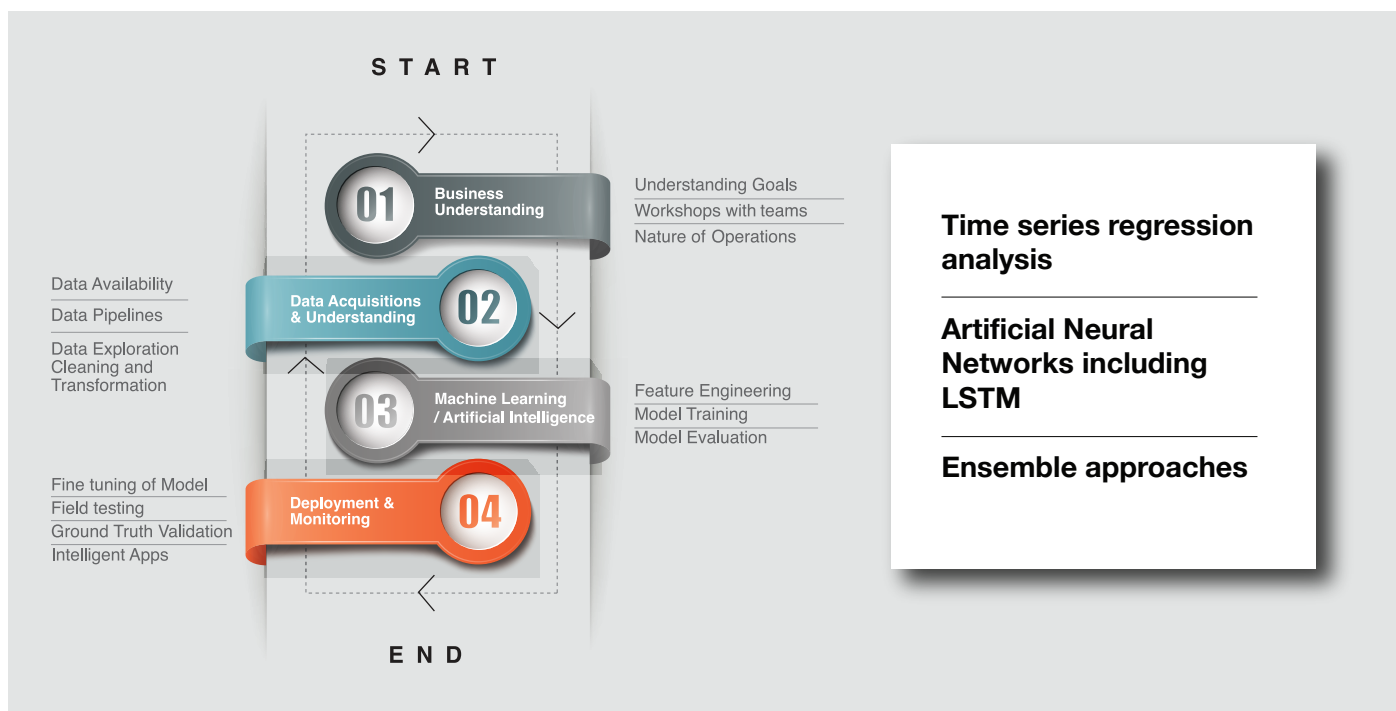Dynamic factors Influencing energy demand are not considered

THE **SOLUTION:**
Intelligent Power Demand Forecast

ThoughtsWin Systems recommends developing machine learning-based solutions that would factor in all the historic consumption data to train AI/ML models and incorporate key dynamic factors that have direct impacts towards energy consumption. The new solution will have the ability to update forecasts based on previous blocks' data/metrics (Machine Learning will be triggered for each contiguous block and forecasts can be regenerated).

Some key dynamic factors for model development consideration in addition to historical energy consumption data:
- Dynamic nature of equipment operations/schedules
- Composition of equipments
- Location and elevation of equiments
- Local weather
- Variation in power consumption of electric equipments

S T A R T

01 Business Understanding

Understanding Goals
Workshops with teams
Nature of Operations

Data Availability
Data Pipelines
Data Exploration Cleaning and Transformation

02 Data Acquisitions & Understanding

03 Machine Learning / Artificial Intelligence

Feature Engineering
Model Training
Model Evaluation

Fine tuning of Model
Field testing
Ground Truth Validation
Intelligent Apps

04 Deployment & Monitoring

E N D

Time series regression analysis

Artificial Neural Networks including LSTM

Ensemble approaches

VALUE **PROPOSITION**

1. Higher Accuracy using AI/ML based Forecasting
2. Better Demand Forecasting
3. Lower Cost of Operations
4. Cost Avoidance – No Penalties
5. Increased Employee Satisfaction (Due to less manual intervention)
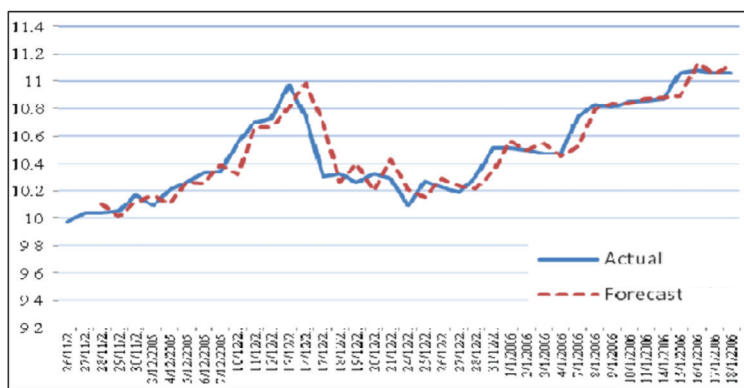
Healthcare

AI, Data Organization, and Integration are revolutionizing healthcare, reshaping medical practice, patient care, and research. This shift signifies a new era in healthcare, aligning with precision, personalization, and efficiency. With the ability to analyze vast data sources, ensure accessibility, and provide a holistic view, these technologies pave the way for transformative advancements in healthcare delivery.

Transform your healthcare ecosystem with our comprehensive solutions tailored to optimize every facet of medical practice. From our robust Hospital Information System (HIS) ensuring seamless patient data management, visit tracking, and operational efficiency, to our Radiology Information System (RIS) facilitating efficient imaging study handling and workflow optimization, and our advanced AI-powered enterprise imaging platform with a sophisticated DICOM Router ensuring secure image management, retrieval, and transmission with compliance to FHIR/HL7 and HIPAA standards. Complementing these systems, our DICOM viewer empowers clinicians with intuitive tools for image analysis, AI result visualization, and seamless integration with PACS. Moreover, our AI-driven medical imaging solutions enable precise diagnosis, personalized treatment plans, and enhanced patient engagement, while optimizing resource allocation and expanding healthcare access through telemedicine. Additionally, our capabilities extend to accelerating clinical research, supporting public health initiatives, and ensuring surveillance readiness for timely outbreak detection and pandemic response.

HIS (Hospital Information System)

Comprehensive management of hospital operations and patient data. Manage Patient Data: Centralized storage and management of patient information using FHIR/HL7 standards. Electronic Health Records (EHR) Management:Streamline the handling of EHRs, ensuring all relevant patient information is readily accessible for healthcare providers. Track Patient Visits,Store Medical History and Generate Operational Reports Handle Billing process and Payment management, ensuring HIPAA compliance.

RIS (Radiology Information System)

Optimize radiology department workflow and data management. Manage Requisitions,Schedule Radiology Exams,Track Imaging Orders and Monitor Patient Workflow Seamlessly integrate with PACS for comprehensive imaging management, using DICOM standards. Our interface with PACS is FHIR/HL7 compliant for streamlined data exchange and interoperability.

DICOM Viewer

Our advanced DICOM viewer offers robust features for image analysis and AI integration Seamlessly interface with PACS for efficient workflow.
Provides interactive tools for measurements, annotations, and more.
AI Results Visualization, Display segmentation and arkup of AI results directly in the viewer Seamlessly interface with PACS for efficient workflow.

DICOM Router

Advanced image management and diagnostic support. Store and Retrieve medical Images, Share DICOM Image and Provide tools for highquality image viewing and analysis. Ensure Secure Image Transmission leveraging edge computing,TLS encryption, and site-to-site VPN to protect image data during transmission.

Ensure FHIR/HL7 and HIPAA compliance for secure data handling and interoperability Our DICOM router seamlessly generates MWL lists from diverse sources like HIS, RIS, and databases, optimizing study assignment. It also supports both traditional DICOM protocol and the newer DICOM web standard, ensuring versatile connectivity in medical imaging.

AI-Driven Medical Imaging Solutions

Enhance diagnostic accuracy and speed with AI-driven medical imaging. AI Radiology Study Assignment, Leverage AI to assign radiology studies efficiently. AI Radiology Report Generation, Use advanced AI to generate comprehensive radiology reports. Disease Prediction, Employ AI to analyze medical images and predict diseases early.

Clinical Research and Trials

AI can streamline the process of clinical trials, from patient recruitment to data analysis, speeding up research, and innovation.

Personalized Treatment and Patient Engagement

Deliver customized healthcare solutions and improve patient involvement. Analyze genetic, clinical, and lifestyle data for treatment plans. Recommend therapies based on patient profiles. Use AI-powered tools to monitor patient health and adjust treatments. Provide patients with personalized health insights and Send reminders for medications and appointments. Offer customized health education materials

Public Health Surveillance

AI can monitor and analyze public health data to detect outbreaks and support pandemic response.

Optimized Resource Allocation and Telemedicine

Streamline hospital operations and expand healthcare access through telemedicine.
• Optimize staff schedules.
• Manage hospital bed allocation efficiently.
• Optimize medical equipment use.
• Provide consultations via telemedicine platforms.
• Monitor chronic conditions remotely.
• Support patients with AI-driven virtual health assistants.

Case Study: Healthcare

Activate: Smart Decision Support

Enhance Radiology Screening Processes leveraging **deep learning technology**

CHALLENGES

Interpretation of medical terms used by specialists in the reports and making them machine readable to interpret and predict future scans.

Training and accuracy of Machine Learning models to match human accuracy to read Radiology and CT Scans of the human body.

Using Machine Learning to interpret medical imaging findings to help reduce physicians/radiologists interpretation times and improve accuracy.

Integration and data movement of scans/ images from medical equipment into the product environment for processing and modeling. (i.e Getting the OEM/Medical imaging hardware systems to integrate with the cloud based Digital product).

KEY BENEFITS

Significantly improves interpretation times of scans. i.e Improves Patient Healthcare.

One product to manage and maintain patient scans (intake, billing, scanning & reporting).

Accuracy and predictions closer to a medical SME.

Accelerates and supports decision making of medical scans.

Services Employed: Data Engineering and Data Quality, Data Visualization, Data Science/Machine learning

Finance

In the highly intricate and competitive world of finance, the integration of Artificial Intelligence (AI), Data Organization, and Integration stands as a beacon of innovation and efficiency. Financial organizations, whether they operate in banking, investment, insurance, or any other facet of the financial ecosystem, are confronted with an ever-expanding array of challenges and opportunities.

These include an increasingly globalized market, fluctuating economic conditions, multifaceted regulatory landscapes, customer demands for personalized services, and the ever-present need to maintain trust, security, and integrity. It enables financial organizations to parse through vast quantities of data, extract meaningful insights, make real-time decisions, and create tailored offerings.This synergy of technology heralds a new era in financial services, marked by personalization, optimization, resilience, and growth. Here's an exploration of what AI, Data Organization, and Integration can specifically achieve within financial organizations:

Risk Management

AI can analyze market trends and various risk factors to assist in investment decisions and risk mitigation.

Fraud Detection and Prevention

AI algorithms can detect unusual patterns and flag potentially fraudulent activities, enhancing security.

Customer Service Automation

AI-powered chatbots and virtual assistants can provide 24/7 customer support, answering queries and handling basic transactions.

Personalized Marketing and Sales

AI can help in creating personalized marketing strategies and product recommendations based on individual customer behaviors and preferences.

Regulatory Compliance and Reporting

Automated systems can ensure that all transactions and operations comply with relevant laws and regulations, and facilitate streamlined reporting.

Case Study: Finance

Elevate
Modernization & Digital Enablement

Enable Data Analytics and Reporting–Using Azure Services

KEY BENEFITS

Automated Data Manipulation reduced turnaround time by 80%.

80%

Automated Data Ingestion reducing turnaround time and improving quality of Data.

End-to-End Process was secured using Azure AD and Excel reports were replaced by faster Power BI Dashboards.

CHALLENGES

Data Manipulation through Excel Macros for Advanced Financial Analytics.

Manual Data Aggregation from multiple sources.

Excel Reports and Dashboards are stored in shared drives with access to everyone within the Organization.

Services Employed: Business Process Automation

Case Study: Finance

Elevate
Modernization & Digital Enablement

Automation: Data extraction, Reading, Reporting and Data Entry for Account Payables

KEY BENEFITS

75% of the process automated & measured for value.

75%

Daily dashboard to check progress and success rates.

Saved 1 FTE effort/year & improved data quality and Accounts Payables process.

CHALLENGES

Manual and multi-touch points process.

Resource intensive.

Time consuming & $ value impacts.

Services Employed: Business Process Automation

Appendix 1

Data/BI Strategy
Aligning data management and analytics to business goals; utilizing Business Intelligence to drive informed decision-making.

Data Quality & Governance
Ensuring accuracy and reliability in data; establishing policies for consistent data handling and compliance.

Data Warehousing
Storing extensive collections of structured data in a centralized repository, utilizing advanced querying and analysis tools for efficient data retrieval and examination.

Data Engineering
Designing and constructing data architectures; transforming and preparing data for analytical or operational uses.

IoT Data Integration
Collecting and analyzing data from Internet of Things devices; enabling real-time insights and automation.

Enterprise Information Management
Managing an organization's data and content across its lifecycle; ensuring accessibility, consistency, and security.

Data Science/Machine Learning
Utilizing algorithms to analyze data and make predictions or decisions; employing machine learning to uncover insights.

Computer Vision
Enabling computers to interpret and make decisions based on visual information; used in image recognition, processing, and automation.

Data Visualization
Representing data in graphical form; using visual elements to help people understand trends, outliers, and patterns.

Business Intelligence
Leveraging software and services to transform data into actionable insights; informing business strategy and decision-making.

Deep Learning
Utilizing neural networks to mimic human brain function; applied in areas like speech recognition and image analysis.

Natural Language Processing
Enabling computers to understand, interpret, and generate human language; powering chatbots, translation, and sentiment analysis.

Digital Strategy through AI
Implementing artificial intelligence to enhance digital capabilities; driving innovation, efficiency, and customer experience.

Product Development Leveraging Generative AI
Using AI to create new product designs and solutions; enabling rapid innovation and customization.

Data Integrators & Accelerators
Streamlining data ingestion, transformation, and integration; enhancing data flow and accessibility.

Data Platform Migration to Cloud
Transitioning data platforms to cloud environments; enhancing scalability, flexibility, and cost-effectiveness.

Business Process Automation with AI, RPA, and Generative Techniques
Automating routine business processes using AI, Robotic Process Automation, and generative methods; increasing efficiency and accuracy.

Support Services
Rapid and precise technical support to ensure uninterrupted system functionality, addressing challenges with minimal downtime.

Maintenance
Strategic maintenance protocols to optimize system performance, applying regular updates and patches to preempt potential disruptions.

Monitoring
Advanced monitoring solutions offering real-time surveillance of IT infrastructure, detecting and mitigating issues before they escalate.

Project Management
Comprehensive project management to ensure on-schedule, on-budget execution, fully aligned with organizational IT objectives.

Continuous Improvement
Systematic process enhancement and optimization to sustain operational efficiency and drive technological innovation.

Partner Affiliation
Strategic alliances with top-tier industry partners to extend technical capabilities and catalyze innovation-driven growth.