Transforming Electric Utilities with AI and Data Science

Table of Contents

Segment:
Transforming Electric Utilities with AI and Data Science

———

In today's rapidly evolving energy landscape, electric utilities harness the power of Artificial Intelligence (AI) and Data Science to tackle pressing challenges and unlock new opportunities. From optimizing paperless billing enrollment to streamlining outage responses and revolutionizing resource allocation, innovative solutions represent the art of the possible. The industry is buzzing with advancements—machine learning models predicting customer behavior, real-time analytics minimizing energy losses, and smart platforms cutting interruption times by millions of minutes. Beyond these, solutions like predictive maintenance, demand response optimization, and renewable energy integration are also reshaping the future of utilities.

While these innovations highlight what's achievable, we've proudly collaborated with various utilities to bring them to life. Our work spans areas such as enhancing grid reliability, reducing operational costs, improving customer satisfaction, and integrating sustainable practices. We've delivered measurable impact—saving hundreds of thousands in costs, boosting productivity by up to 10%, and reducing customer interruptions with robust technologies.

We invite you to dive into these inspiring case studies with a sense of curiosity and excitement. Happy reading, as you explore how we're shaping the future of utilities—one innovative solution at a time!

LTIMindtree

Discover how a Gen AI Chat Bot drove a 3X boost in operational efficiency

for a Fortune 1000 utility leader, improving customer satisfaction by 40%.

Client

The client is a Fortune 1000 public utility powerhouse that generates, transmits, and distributes electricity to over one million customers across North America. The client needed a unified and secure platform to enable users with access to a large number of documents and ensure quick responses to internal/external customers and regulatory bodies.

Business Challenges

The client wanted to ensure that the solution tailored was specific to the needs of employees, field personnel, and customers.:

• A large number of documents with several pages, leading to difficulty in acquiring the required information.

• High TAT – Responses to internal/external customers and regulatory bodies is time-consuming.

• Ensuring data privacy and security.

Our Work

• Built a Gen AI chat platform that enabled users to access documents and ensure quick responses.

• Indexed thousands of documents using AWS Kendra services.

• Leveraged Langchain, LLM - Claude V3, and AWS Kendra services to respond to user queries.

• Provided users the ability to upload documents and search the required information quickly.

• The regulatory team is required to create many templatized documents while responding to queries to utility commissions based on a single document. This platform generates these templates within minutes.

Business Benefits

• 30% company-wide platform adoption within the first week of launch and 50% within the first two months.

• 3x improvement in operational efficiency across business functions.

• 40% increase in customer satisfaction ratings.

Discover how LTIMindtree helped a top North American Utility

save USD 700K, reduce 2 million customer interruption minutes, and boost productivity by 10% with AI-driven Field Resource Management.

Client

Our client is a vertically integrated North American Utility committed to enhancing customer experience by leveraging technology.

Business Challenges

The client encountered critical operational obstacles:

- **Real-time Visibility Gap:**
  The dispatch team lacked instant access to resource availability, hampering efficient assignment during outages.

- **Delayed Resolutions:**
  Manual resource matching extended the assignment and resolution times, slowing service restoration.

- **Poor Reliability Ranking:**
  Increased customer minutes of interruption (CMI) pushed the client into the fourth quartile for CAIDI (Customer Average Interruption Duration Index), damaging its reputation.

- **Crew Inefficiency:**
  Uncertainties in the availability of daily crew, driven by dynamic schedules, led to high downtimes, delayed work, and costly shifts to contract crews, eroding productivity and profitability.

Our Work

We delivered a transformative, data-driven platform:

- **Digitized Resource Tracking:**
  Developed a centralized system to maintain and provide easy access to real-time resource availability data.

- **Predictive Crew Matching:**
  Built a machine learning model to recommend optimal crew configurations based on historical schedules and crew compositions.

- **Smart Assignment Engine:**
  Integrated real-time crew location, event proximity, and resolution time estimates to rank and assign the best crews, minimizing customer interruptions.

- **Automated Guidance:**
  Created a platform to suggest crew configurations using past data, empowering dispatchers with actionable insights.

- **Performance Insights:**
  Designed a metrics dashboard to track CMI reduction, productivity gains, and overall performance improvements.

Business Benefits

- Cut average crew assignment time per outage by three minutes, accelerating response efficiency.

- CMI reduced by two million minutes: Significantly lowered customer interruption durations, improving CAIDI rankings.

- ~ USD 700K Contract Cost Saved: Boosted internal crew uptime, reducing reliance on expensive contract crews.

- 8-10% Productivity Gain: Enhanced crew performance, driving operational excellence and cost savings.

Discover how we helped a Fortune 500 utility leader cut risk reporting time

by 40% with AI-driven insights and automation.

Client

The client is an American Fortune 500 company and one of the largest utility companies in the United States. The company provides natural gas and electric services to millions of consumers.

Business Challenges

The client needed:

- **Risk Insight:**
  Real-time, predictive risk assessments with AI and ML.

- **Cognitive Augmentation:**
  AI tools for deeper market analysis and strategy optimization.

- **Integration and Automation:**
  A unified platform integrating data, models, and workflows to automate tasks.

- **Dynamic Adaptation:**
  System learning and adapting to market conditions and regulatory changes.

- **Conversational Intelligence:**
  Natural language interfaces for intuitive access to risk data and insights.

Our Work

- **Predictive Models:**
  Developed AI/ML models for predictive risk, VaR/ES, and anomaly detection

- **Simulations:**
  Implemented AI-driven simulations for advanced scenario analysis with Azure Knowledge Fabric

- **Options Optimization:**
  Created AI-powered strategy optimization with dynamic parameter adjustment

- Risk Monitoring, Regulatory Reporting, Testing

- **Cognitive Automation:**
  Built cognitive automation for routine tasks, including chatbot and Azure Copilot integration.

- **Unified Platform:**
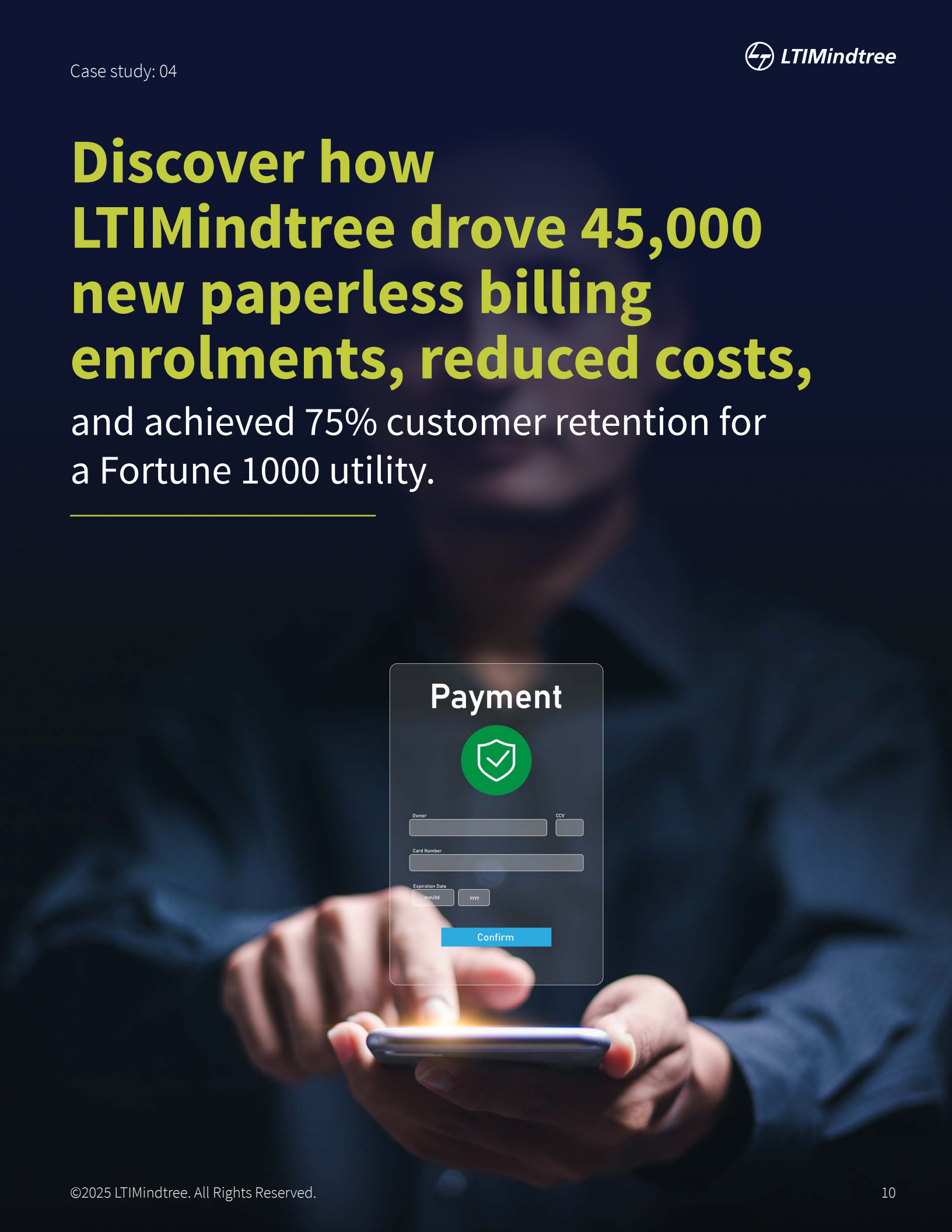 Integrated components into a unified, cloud-based platform.

Business Benefits

- **Optimized Returns:** AI-driven insights improved trading decisions and risk management.
- **Reduced Risk:** Predictive analytics and scenario analysis minimized potential losses.
- **Increased Efficiency:** Automation and conversational AI freed up expert time.
- **Enhanced Compliance:** AI-powered tools streamlined regulatory reporting.

Discover how LTIMindtree drove 45,000 new paperless billing enrolments, reduced costs,

and achieved 75% customer retention for a Fortune 1000 utility.

Client

Our client, a Fortune 1000 public utility powerhouse, generates, transmits, and distributes electricity to over one million customers across North America. Committed to operational excellence, the client sought an innovative strategy to curb rising costs while enhancing customer engagement. Their goal: To boost enrollment and retention in their paperless billing program to drive efficiency and sustainability.

Business Challenges

The client faced mounting pressures that demanded a transformative solution:

- **Escalating Costs:**
  Surging postage and material expenses for paper billing strained operational budgets.

- **Untapped Potential:**
  With less than 50% of customers enrolled in paperless billing, there was significant room to reduce paper-based delivery and offset cost increases.

- **Targeting Precision:**
  The company needed a reliable way to identify customers who would likely adopt auto-enrollment in the paperless program.

- **Long-term Retention:**
  Ensuring newly enrolled customers remained committed to the program for at least 12 months was critical to maximizing ROI.

Our Work

- **Propensity Modeling:**
  Built a sophisticated machine learning model with over 100 predictive features to pinpoint customers primed for paperless adoption.

- **Continuous Optimization:**
  Automated monthly model runs, integrating real-time campaign results into a dynamic feedback loop to sharpen accuracy over time.

- **Robust Training Data:**
  Trained the model using a cohort of ~25,000 customers who had been auto-enrolled and stayed engaged for over three years, ensuring predictive reliability.

- **Actionable Insights:**
  Delivered curated customer lists for targeted email campaigns at strategic intervals, refining the model with each cycle's outcome.

Business Benefits

- **45,000 New Enrollments:** Reduces paper usage
- **7% Email Engagement:** Drives strong customer response through targeted outreach.
- **<1% Bounce-back:** Ensures precision with minimal campaign fallout.
- **>75% Stickiness:** Locks-in long-term savings with high retention.

Conclusion

The adoption of new energy sources presents a unique opportunity to establish a secure, reliable, and sustainable energy ecosystem. Coupled with the accelerated pace of disruptive technology, LTIMindtree's diverse offerings, built with our engineering DNA, can unlock quick wins and strategic transformation opportunities.

These case studies help spark innovation by building a digital foundation to deploy data, AI, and sustainability projects to propel your digital energy transition journey.

Ready to revolutionize your utility value chain with innovation and AI led transformation?
Reach out to us at **eugene.comms@ltimindtree.com**

Let's get to the future, faster together.

12