



CASE STUDY

Lutron RadioRA ML Edge Compute

Executive summary

In-office work has grown more inconsistent due to remote work. This project generates a predictive set of data to determine when lights should or should not be active. This allows for customer provided data sets for cross-validation of actual Lutron control inputs. This project serves as an ML extension to a decade of lighting control systems that have been built.

The challenge

► Inconsistent in-office work

This has led to an increase of electricity during times when the lights are not needed.

► Constantly Changing Seating Arrangements

Our teammates frequently change their seating locations every 3-6 months. There is a need for a model that can be updated regularly to allow for updated seating arrangements.

► Cloud Solution to Increase Up-Time

This project focuses on a cloud-based solution in order to increase up-time and allow for quicker development of improvements.

Why choose AWS for your machine learning (ML) needs?

With high-performance compute options powered by machine learning, Amazon Web Services (AWS) enables organizations to undergo broad digital transformations with modern, cloud-native solutions. Offering a broad set of ML services and supporting cloud infrastructure, AWS enables organizations to tailor their ML solution to meet the unique needs of their business.



About Lutron

In almost 50 years of innovation, Lutron has invented hundreds of lighting control devices and systems, and expanded their product offering from 2 products to 15,000. The company has advanced the technology of lighting control while maintaining top market position by focusing on exceptional quality and design. Lutron continues to lead the market in high-quality lighting controls for fluorescent, halogen incandescent, magnetic low-voltage, electronic low-voltage and LED light sources.

*“Start with small, simple experiments in applying AI to existing processes before embarking on longer AI journeys”
- InfoWorld, 2021*



Why Source Allies?

Founded in 2002, Source Allies is a premier, team-based, technical consultancy in Des Moines, Iowa. We provide high-performing coaches and teams who work alongside our partners to cultivate a shared ownership environment. We are dedicated to our partner's long-term success and focus on continuous value delivery while remaining flexible to our partners' dynamic business needs. Our mission is to combine the skills of data science/data analytics/statistics with software development skills and best practices (TDD, data engineering, MLOps, cloud architecture) in order to incorporate the right skills into product teams so that we can answer tomorrow's questions without redesign.

The solution

Lutron IoT events are sent to AWS IoT Core to be processed. Each night an AWS Glue job runs a batch process to combine the events from the day into Parquet files in S3. AWS SageMaker then uses this S3 bucket to grab the data for analysis and model hosting. We also implemented an Athena set-up for running ad-hoc queries and analysis outside of the SageMaker workflow. From here, predictions are output into S3 and then relayed back to the lights each hour necessary to implement the prediction of turning the lights off.

“By 2030 AI will increase the output of knowledge workers by 140%” - ARK Investments



Results

The results of our work has been an automated solution for capturing Lutron light events and acting on predictions for future light events. By implementing this solution energy costs have been able to be reduced by 20%. We've also been able to make our development team's time 10x more efficient by implementing an automated pipeline for deployment through AWS cloud services. Additionally, documentation has been created to allow other teammates to onboard onto the project quickly.

Benefits

Since your solution has been implemented, we've been able to reduce energy costs and consumption by 20%. This has been a huge benefit, not only to our partner, but also to the world with such a focus on continuing efforts to reduce energy consumption. We are doing our part. With an increase in our team's efficiency, they have been able to deliver more features and at a faster pace, allowing for cost savings, time savings, and increase in team morale. By having the solution be AWS Cloud based, we can say with confidence that our up-time will be increased with better reliability and a reduction in time to action on severe production events.

"Look at ML as a way to improve existing business processes... ask, 'If we could improve this decision by x%, what effect would it have on our bottom line?'" - OpenAI's Sam Altman, 2022

Next steps

Our current model allows for manual re-training in order to incorporate new data. Next steps for us would be to automate this process and allow the model the means to train itself every month, creating a new model and deploying it to production without any downtime. In addition to this, we are always looking to increase our model's accuracy. For this reason, additional models such as XGBoost will be evaluated and implemented if deemed more appropriate.

Benefits

➤ 20% Reduction in Energy Costs

Turning off lights when no one is predicted to be in the room has resulted in a 20% reduction in energy costs.

➤ 10x Increase in Development Speed and Team Efficiency

By using AWS SageMaker products and a cloud solution, we've helped the team become more efficient, delivering features quicker and with greater reliability.

➤ Seating Arrangement Changes are Being Considered

This solution has allowed us to keep our teammates in mind while continuing to be efficient with our energy usage. As teammates locations and lighting habits change, so does our algorithm and predictions.

About Source Allies

We partner with privately owned small businesses to fortune 100 organizations. We have received the Migration & Modernization Competency and applied for the Machine Learning Competency in 2022. Our teammates are certified in: Data Analyst Specialist, Professional Solutions Architect, Professional DevOps, SysOps Administrator, Machine Learning Specialty.



• Migration Services Competency