How do you innovate to drive business outcomes?

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Agenda

Innovation fundamentals

Starting the innovation journey

Customer stories

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# Innovation fundamentals

- Formula for innovation

f(x) = business objective + action

- Keys to success

Tailor to fit

Experiments are a must

Journey, not a destination

Start of the innovation journey

Automation
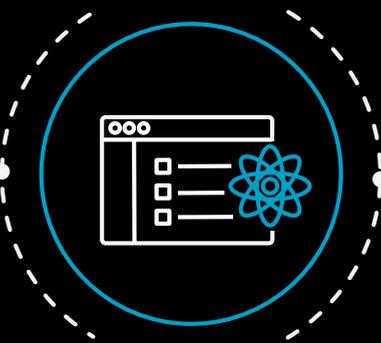
Enrichment

Differentiate

Automation

CATHAY PACIFIC

Automation

Challenges

- Unauthorized users in a customer-facing application
- Detection and extra validation checks to rule out unauthorized users
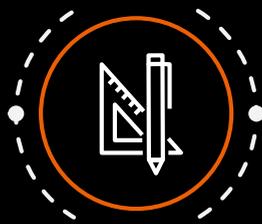
Solutions

- XGBoost classifier model to classify users as unauthorized or legitimate
- Novel Natural Language Processing (NLP) techniques using pretrained word embeddings to feature user names, increasing model speed and accuracy

Outcomes

- Models were deployed into production by using Amazon SageMaker endpoints
- Models have a tunable threshold for the business to decide on tradeoffs between catching unauthorized users vs. impacting legitimate customers
- Model detected more than 75% of unauthorized users while impacting less than 1% of legitimate customers

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TOYOTA
RESEARCH INSTITUTE

Automation

Challenges

Solutions

Outcomes

- ML models for self-driving trucks require large amounts of accurately labeled data
- Toyota Research Institute needed an approach of identifying, assessing, and quantifying the occurrence of labeling errors for large quantities of images

- Amazon SageMaker training jobs with custom containers for image preparation
- Amazon SageMaker Ground Truth pipelines
- Amazon SageMaker notebook-based reporting

- Accelerated project progress by allowing Toyota Research Institute to focus on research value vs. technical implementation
- Identified edge cases and error rates by class, allowing identification and focus on highest-value areas
- Improved insights into labeling quality and additional label details

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Enrichment

Chesterfield County Public Schools

Challenges
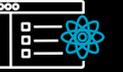
Solutions

Outcomes

Identify chronically absent students (more than 10% of school days missed) in a timely fashion so the institution can effectively intervene
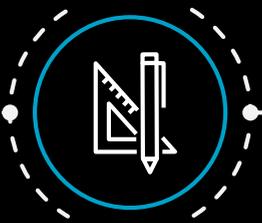
- R-based exploratory data analysis and reporting to provide visualizations of student trends
- Amazon SageMaker XGBoost classification model to identify high-risk students

- As a result of identifying a set of student IDs that have a high risk of being chronically absent, the school system was able to proactively intervene
- Enabled Chesterfield County Public Schools to reuse and iterate on predictive model for future academic terms

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21ST CENTURY FOX

Challenges

Solutions

Outcomes

Need for a more accelerated TV viewer forecast per telecast program per demographic
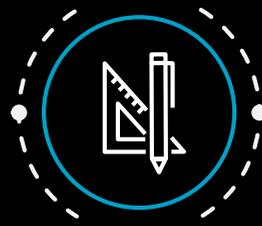
Amazon SageMaker
- Word embeddings
- XGBoost
- Hyperparameter optimization

- 1 year ahead upfront sales forecasts vs. 2 weeks ahead
- 86% increase in viewer forecast accuracy
- Identification of undersold opportunities (39x accuracy)

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Differentiate

AstraZeneca
What science can do

Differentiate

Challenges

Solutions

Outcomes

Assess overall kidney injury,
by locating and scoring all glomeruli
to a predefined injury class

- Single Shot Multibox Detection
- Image classification

- Reduction in time to reach scientific insight
- Reduction in manual assessment by increasing accuracy and reduction in human bias and errors
- Reduction in operations cost and add scale to pathologists

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Differentiate

MERCURIA

Challenges

Solutions

Outcomes

Access to intelligent data is critical to making sound business and trading decisions

- DeepAR and Prophet
- Fully automated ML pipeline with Amazon RDS data extraction and Amazon SageMaker

- Improved abilities to access accuracy and distribution of data
- Reusable framework to experiment and productionize other models

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