# Business Analytics Portfolio

## Black Friday Analytics

### Background:

A major retail company wanted to optimize inventory and marketing strategies by analyzing consumer behavior during Black Friday sales. The sales data, however, was massive and unstructured, with no prior segmentation or real-time monitoring tools.

### Problem Statement:

Key decision-makers lacked visibility into real-time purchasing trends and inventory gaps. Inventory stock-outs were causing missed sales opportunities, and marketing efforts were not data-driven.

### My Role:

As a Business Analyst, I led the data analysis and dashboard development initiative to help the business extract key insights from 500,000+ transactions.

### Phase 1: Requirement Understanding

* Worked with sales and inventory managers to identify key KPIs and business questions.
* Mapped current data flows and pain points in reporting and analysis.

### Phase 2: Data Analysis & Dashboard Design

* Used Python (Pandas) for cleaning and preprocessing transaction data.
* Performed customer segmentation and product-wise sales trend analysis.
* Built Power BI dashboards for real-time visualization of trends.

### Phase 3: Performance Optimization

* Optimized SQL queries for speed and scalability.
* Created indexed views to enhance report refresh time by 30%.

### Outcome:

* Reduced inventory stock-outs by 15% using data-driven restocking insights.
* Enabled stakeholders to monitor real-time sales and adjust marketing strategy on the go.
* Significant improvement in decision turnaround time and cross-department collaboration.

## Sonic Hub Studios Analytics

### Background:

Sonic Hub Studios, a digital media and entertainment firm, needed better visibility into revenue trends and customer engagement across different content types and regions. The management was relying on fragmented reports from multiple tools.

### Problem Statement:

They lacked a centralized analytics solution. Metrics were delayed, inconsistent, and not actionable. There was also no churn prediction in place for high-value subscribers.

### My Role:

As a Business Analyst, I was responsible for designing and implementing an integrated analytics platform to support business decisions in real time.

### Phase 1: Discovery & Stakeholder Engagement

* Engaged with finance and content strategy teams to understand key metrics and challenges.
* Defined use cases and outlined the scope of analytics insights needed.

### Phase 2: Data Architecture & Modeling

* Merged SQL and MongoDB datasets using Python scripts for structured + unstructured data integration.
* Created data models for revenue KPIs, user engagement, and content performance.

### Phase 3: Dashboard & Predictive Layer

* Developed Power BI dashboards with drill-throughs for content consumption and revenue flows.
* Built a logistic regression churn model to flag at-risk subscribers.

### Outcome:

* Improved data accessibility for leadership through a single source of truth.
* Enabled 20% increase in retention strategies via predictive churn insights.
* Reduced reporting delays by 40% and improved team alignment on growth KPIs

## Larch AI-Powered Metal Testing

### Background:

A metal fabrication company was experiencing delays and cost overruns due to manual quality control checks on large volumes of metal sheets. They needed a way to automate defect detection with high accuracy.

### Problem Statement:

Manual inspections were inconsistent, slow, and expensive. False negatives were compromising product quality and customer satisfaction.

### My Role:

As a Business Analyst, I worked closely with the AI/ML team to define requirements, interpret model outcomes, and present insights in business-friendly dashboards.

### Phase 1: Use Case Analysis

* Interviewed plant engineers and QA teams to gather problem insights and inspection workflows.
* Helped identify metadata tagging and image types needed for model training.

### Phase 2: Model Development Support

* Supported data preparation for training a CNN model in TensorFlow.
* Validated image classification outputs and ensured mapping with defect types in manufacturing terms.

### Phase 3: Deployment & Monitoring

* Helped design a dashboard for real-time defect monitoring and audit trail.
* Integrated outputs with MySQL backend and quality report systems.

### Outcome:

* Achieved 98% model accuracy in detecting surface defects.
* Reduced manual inspection cost by 40% and inspection time by over 50%.
* Improved customer satisfaction and reduced post-delivery returns due to defects.