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# Sales Forecasting

For an Australian retail chain using machine learning

## Banjo's Faced a Decision Problem



Banjo's is one of Australia's leading Bakery Café chains, with 44 stores across Tasmania, Victoria, New South Wales, Queensland, and South Australia.

Founded in Tasmania in 1984, Banjo's quickly became a part of the everyday Australian landscape, offering its customers freshly baked bread, cakes, and handmade treats. Today, more than 6.3 million customers visit a Banjo's store each year. But, alongside the rapid growth of its stores and customer base, the lack of data-backed decision-making for sales forecasting and demand planning was becoming more and more evident.

# The Need for Demand Planning and Sales Forecasting

In the food and beverages industry, wastage is a substantial cost driver. Repeated unavailability of food items can significantly impact customer satisfaction and drive even the most loyal customers away. Banjo's began to understand that they were bleeding money in some locations, through wastage of stock and were losing customers in other locations, due to their stock running out. Reliable daily and weekly forecasts were needed to solve these issues. A rule-based forecasting model for 44 very different venues, at a daily grain, would never be manageable. Also, sales were thrown off by COVID and the ensuing lockdowns. Banjo's needed a resilient demand planning and sales forecasting solution that could continuously self-improve, to optimize their plans and effectively manage the business. This is where HiFX stepped in.

# **AWS SageMaker and Apache Airflow**

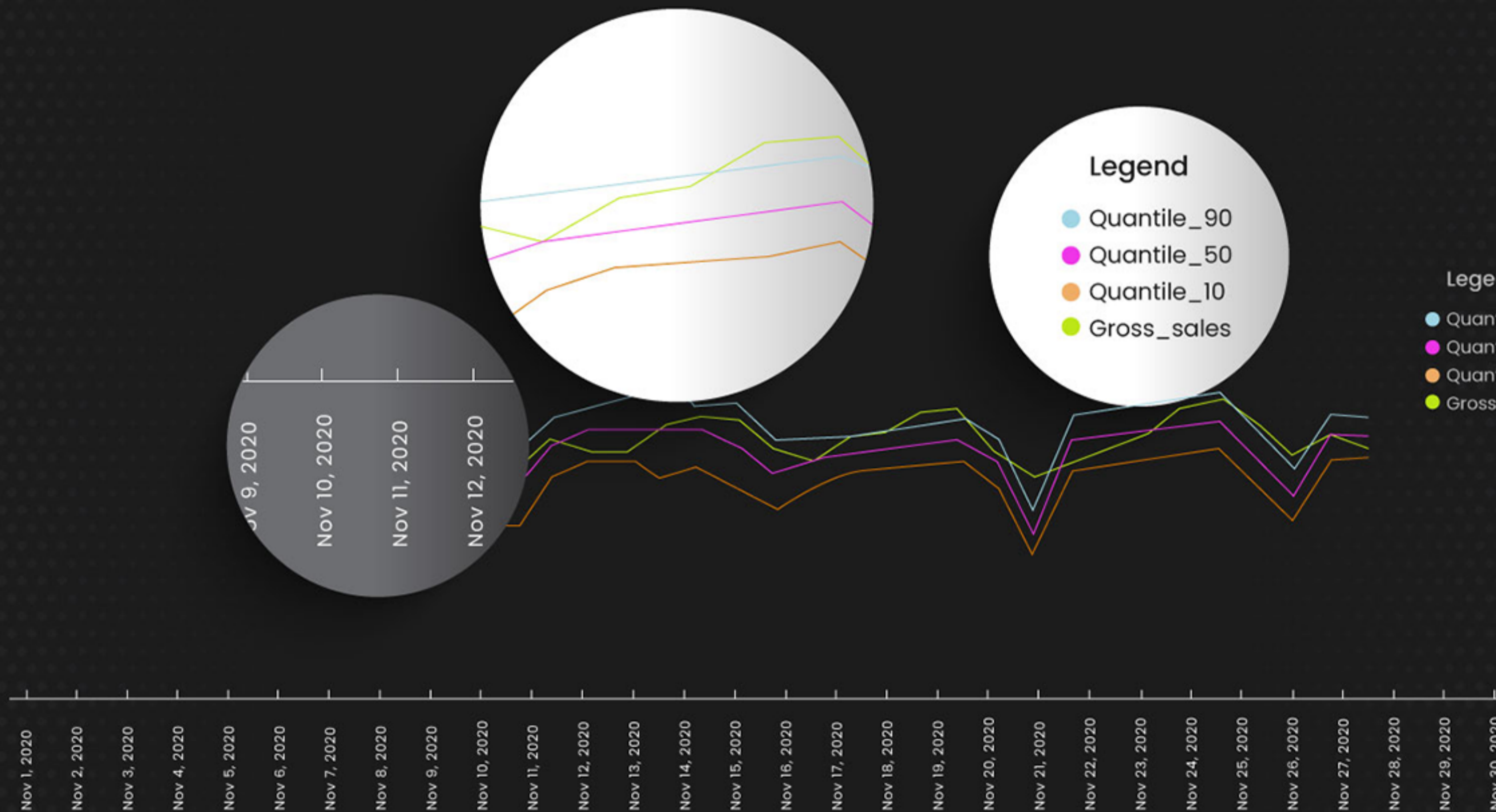
## **The Machine Learning Solution**

HiFX adopted a cloud architecture and distributed system approach. AWS SageMaker was employed for the rapid development and deployment of the ML model. It's a fully managed ML service to build, train, and deploy models at scale, resulting in significant cost savings and increased machine learning agility. Apache Airflow was used to orchestrate and schedule the data extraction, reformatting, and the train, tune, and deploy tasks on AWS SageMaker.

The training and test data sets were identified and multiple models with different hyperparameters were simultaneously run. The ML model was trained on sales data from the previous 3 years, including data points such as historical sales of each item in each store and the corresponding revenue generated, and dynamic features like seasonality patterns, the impact of COVID-19, etc. The model with the least RMS error was chosen and APIs were modeled on its output. The ML application was designed to re-evaluate its accuracy of prediction over every three-week window and tune itself.

# AWS SAGEMAKER

## Data Engineering done right



**STORE SALES PREDICTION USING AWS SAGEMAKER**  
IT'S ALMOST NEAR PERFECT.

## Reduced Stock Wastage and Better Decision Making

HiFX took ownership of the end-to-end development of the ML-based prediction tool. We were able to predict sales of each item, at each store, and the corresponding projection for revenue generated, for the coming 3 weeks. This greatly helped Banjo's in demand planning for their raw materials.

An immediate impact was seen in the 20% reduction of stock wastage within the first 2 months. Banjo's was able to realize better accountability and transparency in budgeting, using the forecasting tool. They were able to use the tool to predict business trends, based on external factors including seasonality, COVID-19, etc. Additionally, they were now also empowered to plan and deploy different campaigns to increase their sales.