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Analyzing Sine Wave Data

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Welcome, **John Smith!**
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SINE WAVE
VARIATIONS DATA

PAIR DISTRIBUTION
FUNCTION

LAST RESEARCH

THE CLIENT

Highly educated professors and PhD students conducting in-depth statistical and mathematical analysis for sine waves using in-house python algorithm.

SERVICES

- Cloud Application
- Proof-of-concept
- Application Migration
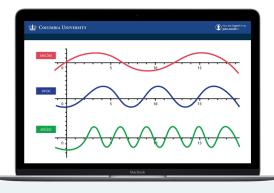- Front-end UI

TECHNOLOGIES

Summary

Scientists at Columbia University regularly find correlations between data sets while working on a new hypothesis. Their physics department studied sine waves and the variations in its distribution. For one particular function namely- Pair Distribution Function, they were using a desktop based application that helped calculate the distribution within a medium. We worked with the scientists to explore a cloud version of the same application and make it better, scalable with added analytical capabilities.

The Challenge

The old Python based application was essentially an algorithm that took in input and produced output. However, this application needed an upgrade as it was not scalable and could not store data.

The core challenge then, was to build on an existing set of code and turn the same into cloud technology. One of the enhancement requests included a real-time graph, meaning as the input values changed the results (plotted on a chart) should be updated instantly without any lag.

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The Solution

Galaxy worked on a proof-of-concept application in the first round. The requirements were simple, but the solution was not. We took the script and turned it into a cloud application meant for multiple users.

We articulated the pain points and then sorted them based on priority for the proof. We were successfully built on the python core algorithm that allowed variation within a single query to get instant results on graphs. The idea was to improve graph visuals and scale the product to enable sharing the application as well as results. The new application should be able to store data/ use-cases and analyze user data over time.

We created secure user management system that gave access to students and professors but was controlled by one admin. This system allowed users to share their experiments, and also to clone their experiments and create variation to the data sets.

Instead of the old boring data sets in PDF format, we were able to create responsive graphs using Javascript and Highchart that presented results in high-quality graphs. Moreover, these graphs are real time, which means when researcher varies the input data, the graph reflects instant results. Though on face value it's a nice feature, but it required a lot of back-end effect.

It meant creating visual data point variants for each possible combination even the negative ones. Through the proof-of-concept meet expectations, we are now looking forward to working on the MVP and scaling it into a full web application.