# Time Series Visualization and Analytics

Intro to Klipfolio

Klipfolio is an application that provides KPI (Key Performance Indicator) dashboards to users through a variety of platforms including the web and mobile app. Dashboard visualizations called "Klips" display KPI and other information defined by the user. The Klipfolio experience relies on three main concepts: Data sources, Klips, and Dashboards. Klipfolio provides a broad set of connectors that allow users to quickly connect to different services (like Google Analytics, Twitter, Quickbooks, etc.) and fetch the data that is important to them. Users can then create Klips to monitor the data. The Klips are created using formulas pointing to data sources. Finally, a collection of Klips organized around a particular topic is called a dashboard.
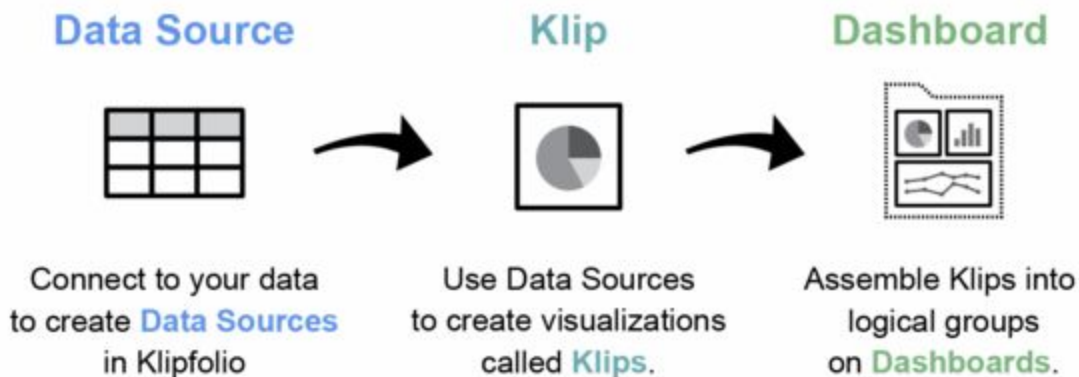
Time Series Analysis

Time series data is a set of data points ordered by time. This type of data is commonly used in businesses to capture performance metrics over time. For instance, KPIs (Key Performance Indicators) are usually measured at a particular time interval to monitor the success of an organization (e.g. hourly, daily, weekly)

Furthermore, statistical analysis is often performed on these captured time series data to understand, discover and predict a business's performance, which is vital for a business to able to adapt and survive in today's rapidly changing marketplace. A few commonly used analyses are: correlation, trend, prediction, and outlier analysis.

For a dashboard business that serves small and medium business clients, it's our objective to provide customers with easy to use tools to create dashboards that will help them understand

and monitor their time series data. Ultimately we want to help customers be competitive in their market and succeed with their business.

Scope of the Project

The goal of this project is to build an interactive visualization system using time series data with analytical capabilities, such as prediction or correlation analysis. The following diagram shows a simplified design of such a system.

As a team, you will collaborate on building the following:
1) a module to ingest data from external sources to a time series database,
2) an engine to create statistical models using the time series data and perform analysis,
3) an API endpoint to serve the result to different clients (the web, mobile, etc.) in a consumable format, and
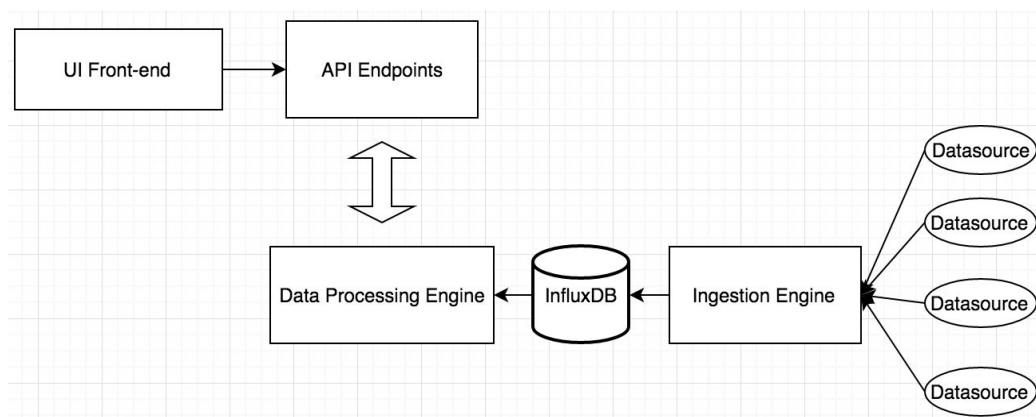4) a UI to build dazzling interactive visualizations.

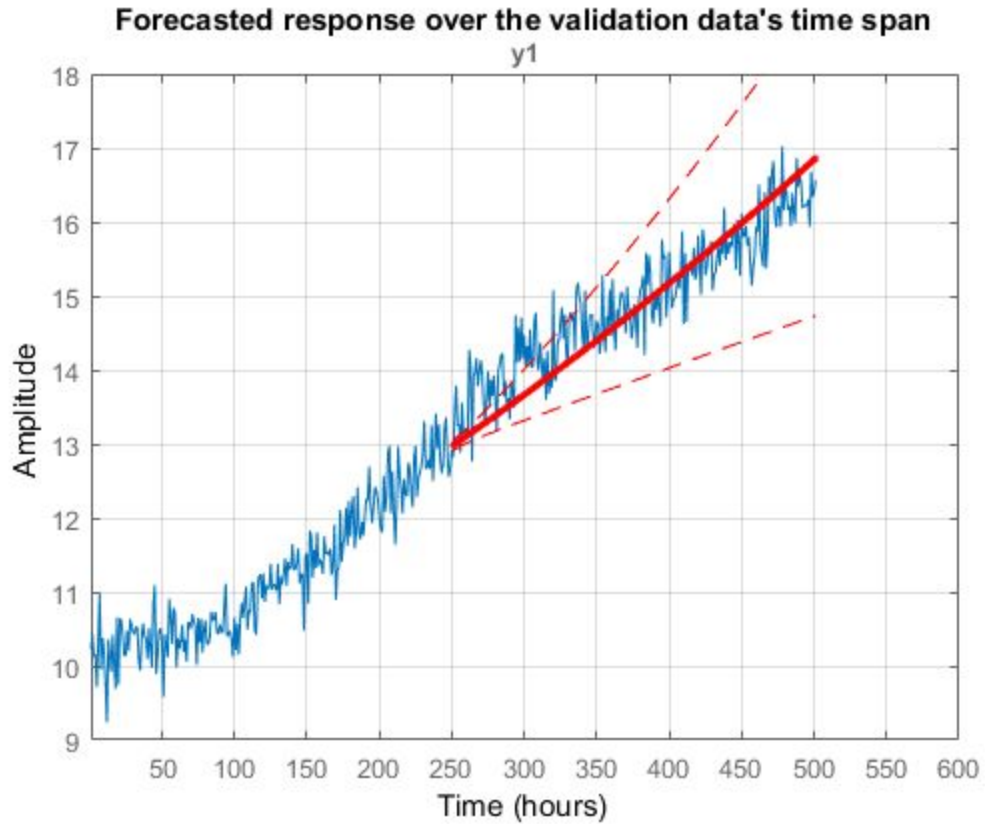*Fig 1: Example design of the system*

Fig 2: Example of a time series visualization where the existing data is divided into Input & Validation segments. The input data (0-250 hours) is used to derive a forecast for 250-500 hours, which can then be compared against the actual data
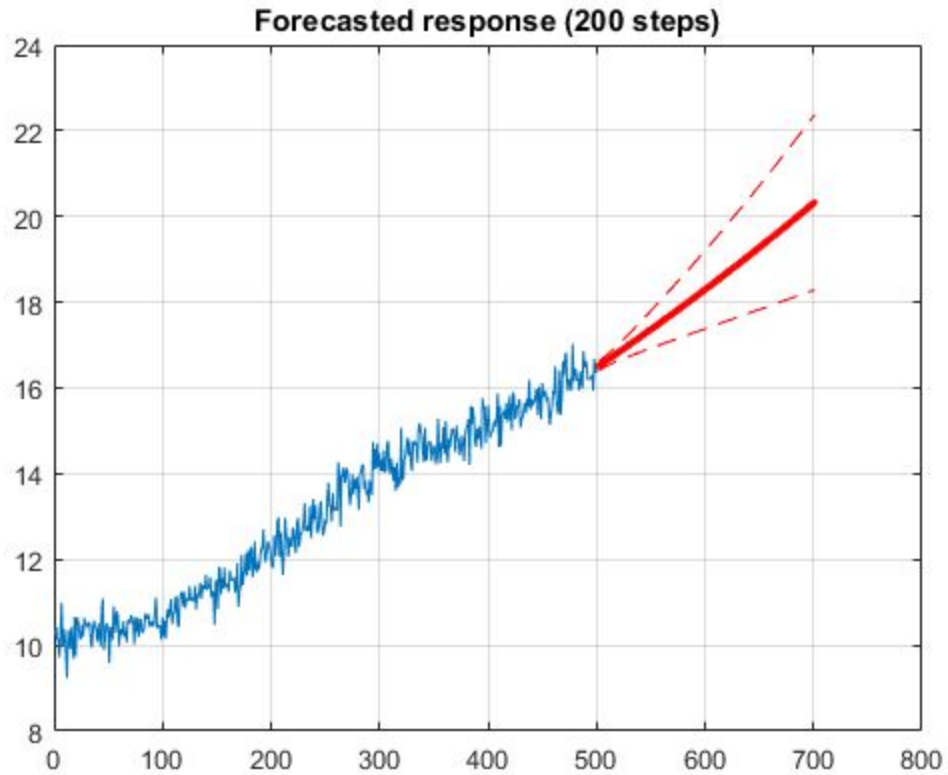
Fig 3 Example of a prediction of time series data (in red). Dashed red lines indicate confidence intervals
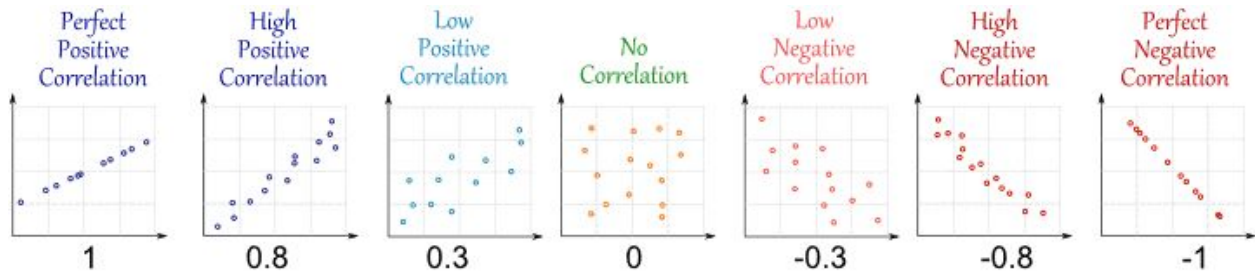

Fig 4 Example scatter charts displaying 2 variables and their correlations. Each point represents the values for 2 variables at a specific point in time.

At the end of the project, your team will be demonstrating a working prototype that will stream time series data from a data source of your choice, providing an interactive visualization in a web UI, and also provide analytics of your choice.

Project Agenda

Day 1

20 minutes	Introduction, Project Briefing
30 minutes	Team setup, networking, brain-storming, task distribution
20-30 minutes	Setup development environment
1 hour	Coding
Lunch Break	
2 hours	Coding
5 minutes	Scrum meeting

Code until the end of day 1
End of Day 1 Demo.
Bonus: End-to-end working project

Day 2

5-10 minutes	Scrum meeting
Until lunch break	Try to complete the project

Bonus: If the team was able to complete end-to-end of the project on day 1, focus on the stretch goals
Lunch break

After lunch break	Prepare for the demo
1 hour	Rehearse the demo

Have an Awesome Demo