Extole practice project
Team 09. Technical University of Moldova.

Platform for client CR and customer performance monitoring.

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1 Project Description

Our task was to create a platform that would facilitate work with different multiple clients that Extole has, putting them all onto a platform that allows monitoring and would be a good base for embedding more features into it in the future. We were given a *.csv* file containing data about multiple clients regarding their attributions and the total number of customers, given for a daily basis.

2 Our solution

We decided on building the project in accordance with the guidelines given by our University. These involved having a database, a back-end part of our project and a usable user interface. We decided to use SQLite3, Python, Node.JS and React to complete the technological stack for the project. We chose for their ease of use and fast development time. Also, taking to account that we were all just students that did not have any experience in working on a big project together and in a team, it would lower the learning time and allow us to start working on it faster.

3 Realization

This section will tell about the realization of the project and the logic behind it.

3.1 Data Processing and Analysis

We used Python, specifically a Jupyter Notebook to process the given *.csv* file and perform some statistical analysis on it. However, the main metric that we were aiming for was the contribution rate for the client on a given time period. The contribution rate will be further addressed as CR where

$$CR = \frac{AttributedCustomers}{TotalCustomers}$$

on a given period of time. We have then stored this in a large *.json* file in order to unpack it easily later in a database and work with the data in a structured format for future purposes.

3.2 Database

Our database choice has fallen upon SQLite3, being a easy to use database, free and having integration with lots of programming languages. We used Python to extract the data from the *.json* file into a database containing 3 tables: clients, periods and records.

id	client_id

Table 1: ***clients*** table structure

id	period_id	attribution	total_customers	contribution_rate	client_period_id

Table 2: ***periods*** table structure

id	source	source_type	customers	contribution_rate	period_records_id

Table 3: ***records*** table structure

This structure avoids repeating the same data multiple times in the same table, a clear structure and ease of accessing data using INNER JOINs.

3.3 Back-end

For building the API, we have chosen Node.JS and the Express libraries, because they allow fast development process and creation of reliable APIs that validate the data and return it in a understandable for the Front-End part way, which is also written in JavaScript and use the same JSON format.

3.4 Front-end

The Front-end part was done using React, and initially created a mock-up for the project Figma. It fetches the data from the API and was done following an appealing stylistic and with ease of use and cleanliness as objectives.

4 Data Analysis

4.1 Main metrics

Our main metric was the CR, so we focused more on working around it. While it allows a clear understanding of what was the Extole's contribution to a company is, it is not revealing more information outside of that. We calculated each client's CR per day and per source per day and tried experimenting then with it.

4.2 Experiments

4.2.1 Interpolation

Our experiment involved applying different statistical techniques on the CR and trying to come up with a conclusion and interpretation for the results. Our interest was on how different sources affect the increase or decrease of the CR. For this purpose, we interpolated the data for each source by all days by the mean value of CR for each day across all clients. The interpolation to a polynomial function or a spline allows differentiating it, so we obtain a certain rate of change or trend of a source. We can then interpret this into different ways.

4.2.2 Correlation Matrix

A second step for the interpolations was creating a correlation matrix, that will tell how much does the performance of a source influence another one. Also the differentiation played a role here, because it adds the possibility to tell how much does the *change* in performance of a source influence the another source or its' change.

4.3 Conclusions on Data Analysis

The achieved results were interesting and correct, but it is hard to interpret them in a way that would uncover some real benefit for a client. As a beneficial use case, the correlation matrix made across sources of a certain client can tell which of them work good together or which of them have actually a bad influence on another. This may find itself useful, but usually

the values of the correlation matrix are not very high and do not tell a strong correlation between them.

4.4   Suggestions and Further Improvement

In my opinion, the CR is not really a metric that should be applied to statistical research other than visualization for the clients as a metric of how Extole brings them customers. To get more meaningful data, it would be interesting to know what was the Customer Attribution Cost for a certain attribution and the Customer Lifetime for it. When embedding these data together with the Contribution Rate, you could tell how much customer interaction would a company receive from Extole. You could then monitor different periods of activity and prolificacy of customers. For example, you could tell if a median customer is likely to create bounds with the company based on the high number of attributions of a source – a big promotion could or could not bring loyal customers. When embedded with multiple other metrics, this could become a powerful tool to present to the clients and stakeholders.

5   Our appreciation of the practice term

We are extremely thankful to Extole. This has been a great opportunity to learn something new and improve upon ourselves. We have learned a lot and we want to specially thank our guides and mentors
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