



# Predicting Loans with Machine Learning and Streamlit

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## THE PROBLEM

# Industry Overview



Most of the loan application process is laborious. **The outcome is a simple 'Yes' or 'No' without further explanation.**



Rejection is tough – don't let it make your business tougher. **There is communication gap to be bridged.**

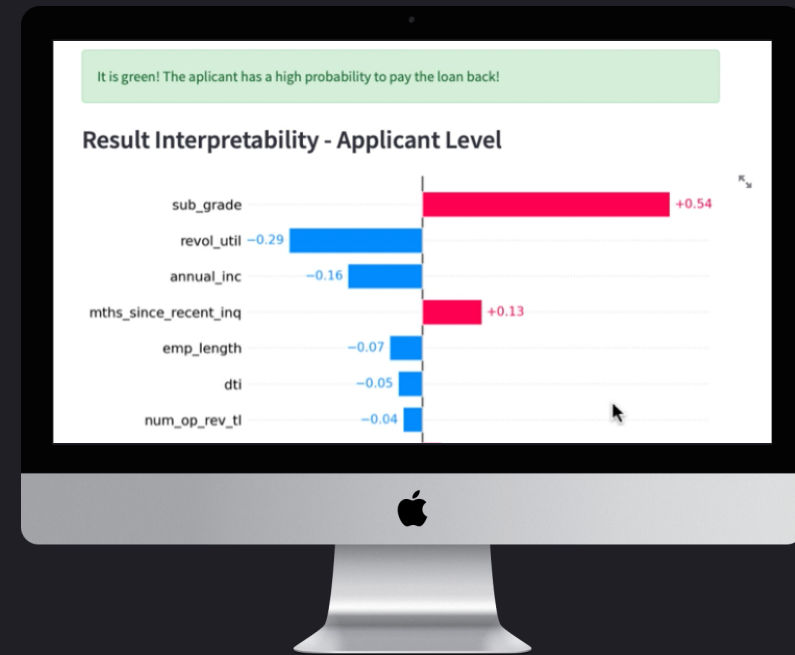
## SOLUTION

# Unlocking the Insights of Machine Learning

Despite its powerful capabilities, machine learning's charm was often hidden beneath technical jargon and the mystery of its "black box" operations.

The web application created with Streamlit used visual exploration to demonstrate the power of machine learning, showcasing the dynamic input feature and its **SHAP value** that drove the decision.

This improved the application's transparency and helped to close the communication gap.



# What are SHAP Values?

- ☆ Calculation that represents the relative influence of each input features within the algorithm.
- ☆ It can be thought of as the 'weighting' that each feature had upon the final result of creditworthiness that the model predicted.

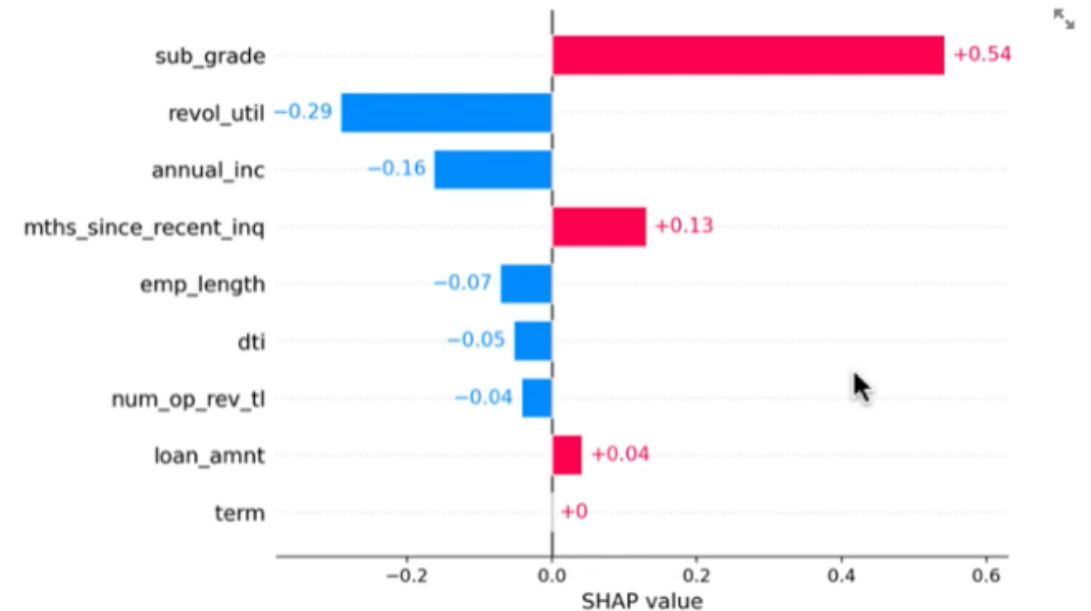
To predict default/ failure to pay back status, you need to follow the steps below:

1. Enter/choose the parameters that best describe your applicant on the left side bar;
2. Press the "Predict" button and wait for the result.

Below you could find prediction result:

It is green! The aplicant has a high probability to pay the loan back!

Result Interpretability - Applicant Level



Model Interpretability - Overall

# Why Should I Care About SHAP Values?

Unveiling the Creditworthiness Prediction:



SHAP values provide an **intuitive** way to understand the impact of individual features on a model's predictions



SHAP values can be used to identify important features and **detect potential bias** in a model



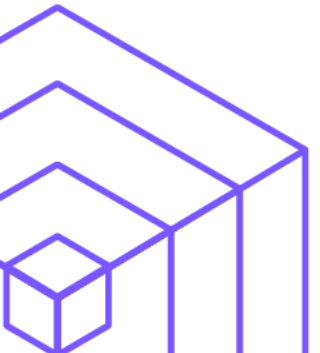
SHAP values can be used to improve model performance by **identifying redundant or irrelevant features**

Discover How Your Financial Profile Affects Your Risk with SHAP Values



MISSION

**Helping**  
**customer to learn**  
**from their data**



# Lending Club dataset is used for model training

Available from Kaggle

Total observations

**2.26m**

Total features

**150**

Annual income:

**65k**

Loan amount (median):

**\$13k**

Avg interest rate

**13%**

Selected features

**17**

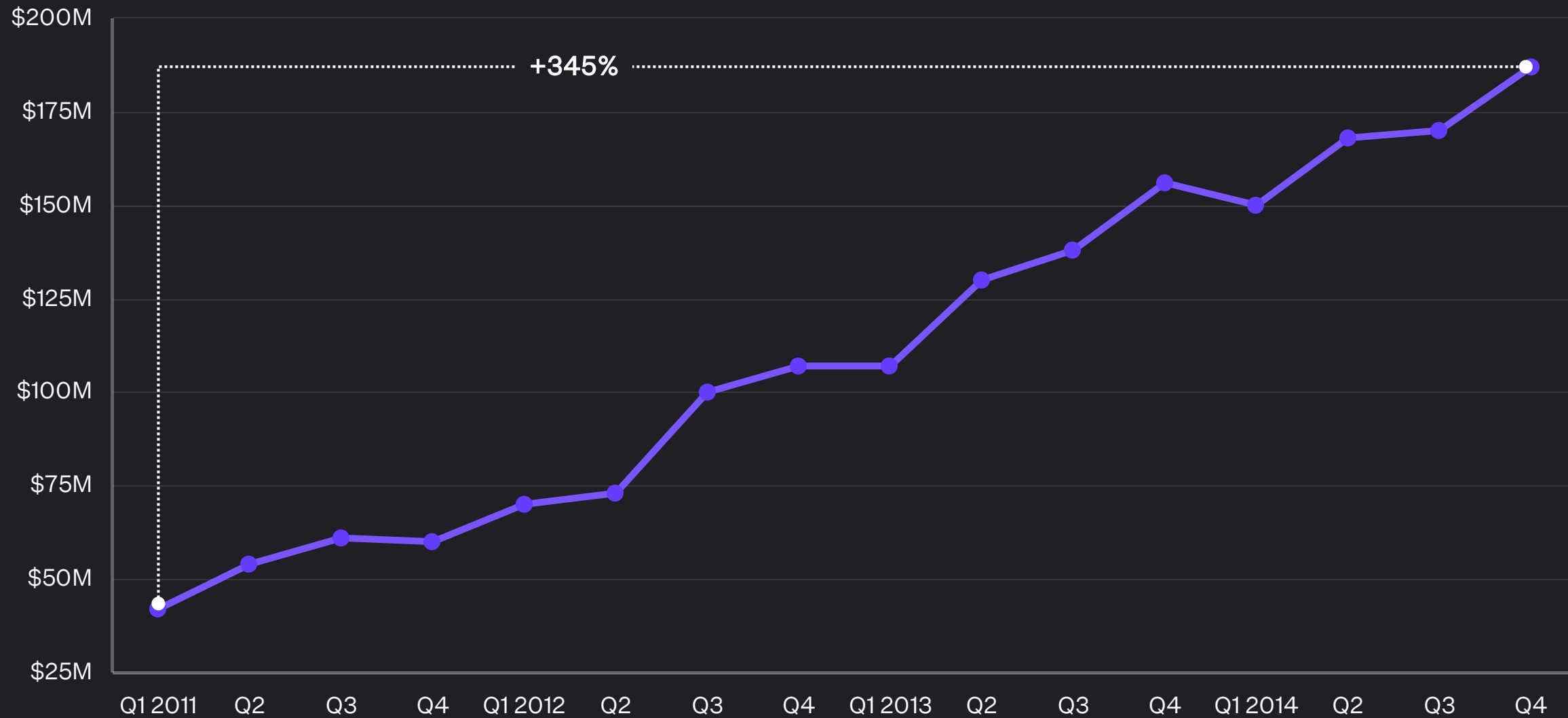
## COMPETITIVE ADVANTAGE

**In 2010, we built the most sophisticated analytics data base engine to answer questions that existing technology could not answer. It's the reason we are winning.**



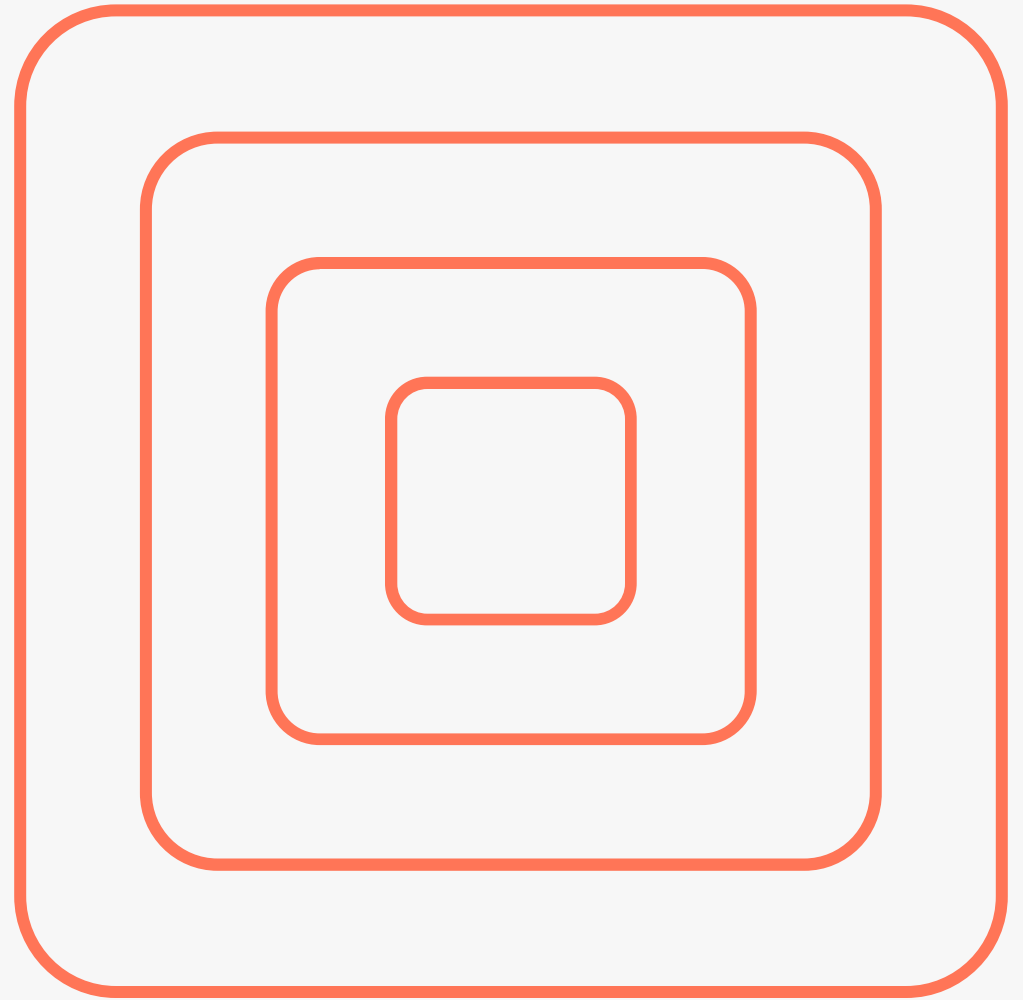


## Monthly Recurring Revenue



## MARKETING

**Our best marketing programs are freemium usage, world-class customer support, PR, and education**



# August Snapshot

General

**\$36k**

PR

**\$5k**

Advertising

**\$42k**

Total

**\$83k**

2015/2016

# Expansion Plan

Double headcount every 6-9 months



Build out **leadership team**

CFO, HR, CMO



Expand **customer facing teams**

Support, Sales Eng, etc. to accommodate new customers



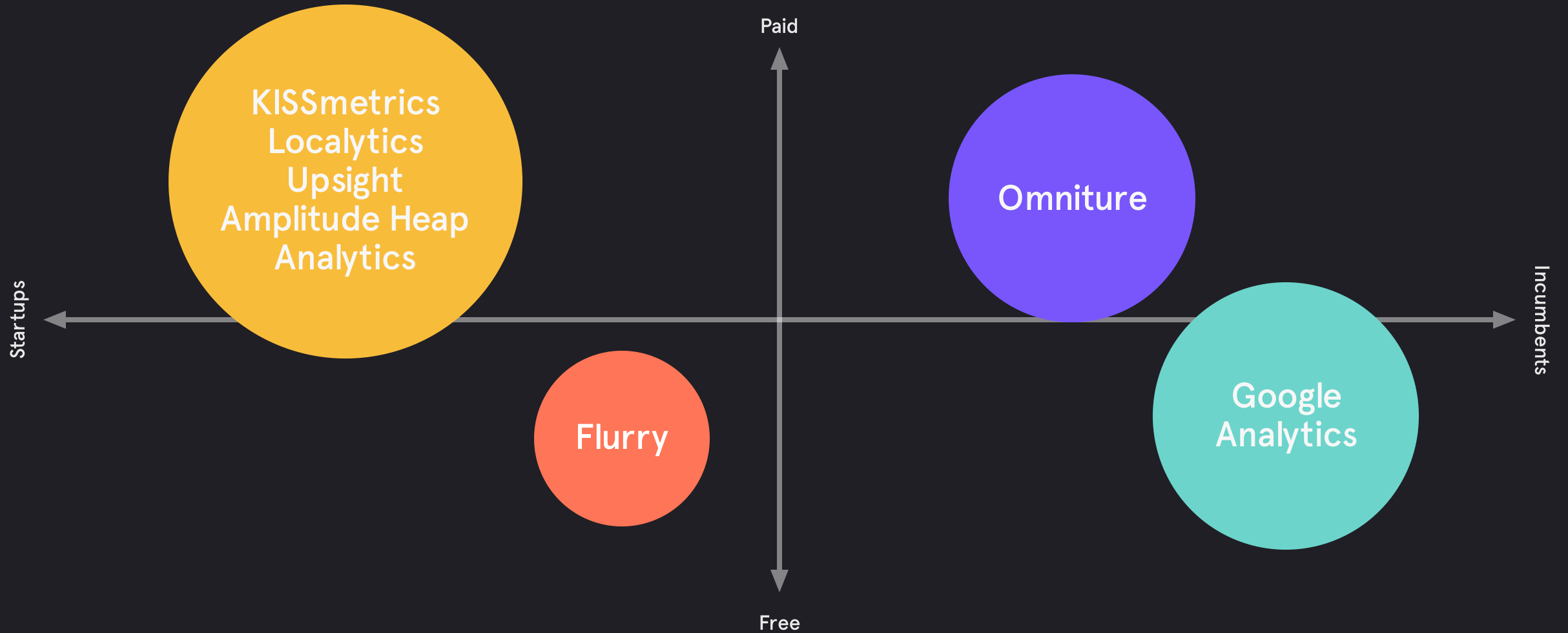
**3x Sales** headcount

Rapidly race towards distribution



Expand to **New York** in 2015 and **internationally** in 2016

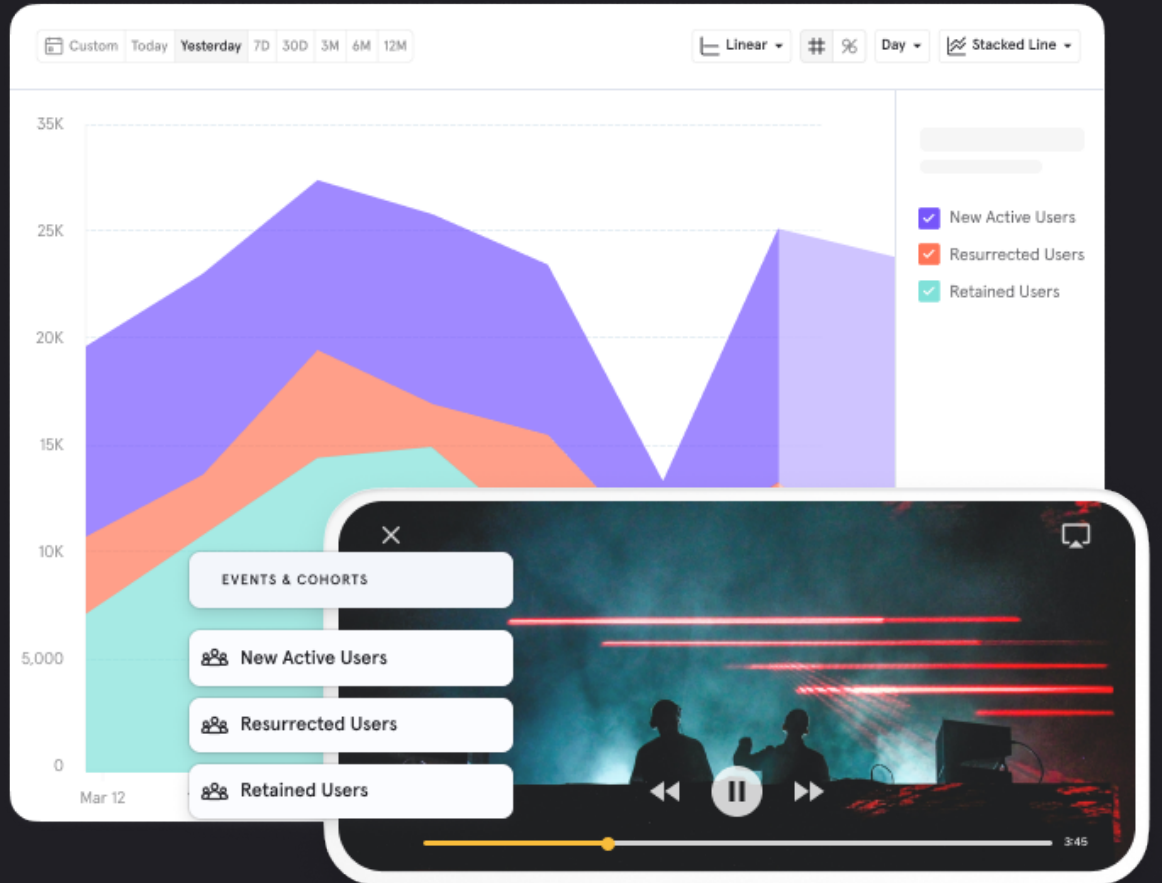
# Competition



# Financing History

2009	2009	2011	2012
\$15k	\$500k	\$1.25m	\$10.25m
Seed	Seed	Seed	Series A
Y Combinator	Max Levchin, Michael Birch	Sequoia Capital, Keith Rabois, Max Levchin, Michael Birch	Andreessen Horowitz, Marc Benioff, David Sacks

# What will your data teach **you**?





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