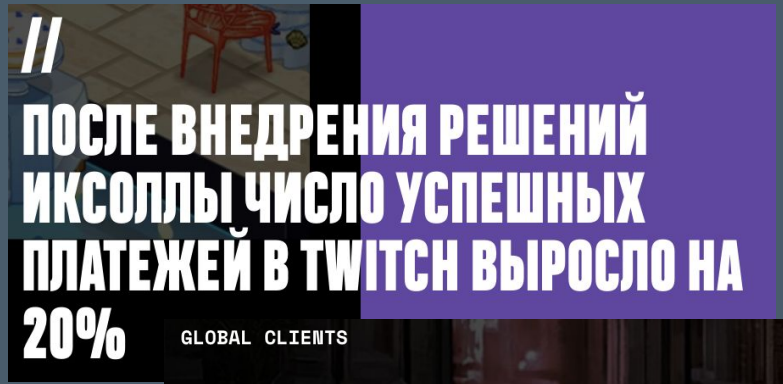
Payment flow auto forecast

SEPTEMBER, 2019

Xsolla

Наши уникальные разработки в сфере платежей выросли в комплексный продукт, позволяющий компаниям и игрокам взаимодействовать и развиваться. Независимые разработчики, крупные студии, художники, игроки, стримеры, — игры объединяют нас всех!



ПОСЛЕ ВНЕДРЕНИЯ РЕШЕНИЙ ИКСОЛЛЫ ЧИСЛО УСПЕШНЫХ ПЛАТЕЖЕЙ В TWITCH ВЫРОСЛО НА 20%

GLOBAL CLIENTS

twitch STEAM PUBG EPIC GAMES ROBLOX UBISOFT ATARI NEXON

SOLUTIONS

LEVEL UP – WHETHER YOU'RE A STARTUP OR A GLOBAL POWERHOUSE

Increase revenue

Create consistent sales experiences from alpha to post-launch.

Grow your audience

Streamline communications, for broader reach and more sales.

Expand your payments footprint

Accept more payment methods and prevent more fraud, for less cost.

Get funding

Access practical resources and strategies for funding your video game.

SOLUTIONS

ML MODELS IN SOLUTIONS

Discount campaign effect

Recurrent payments lift

Current revenue forecast

Connected revenue forecast

New regions effect

Increase revenue

Create consistent sales experiences from alpha to post-launch.

Grow your audience

Streamline communications, for broader reach and more sales.

Influencers half-year effect

Marketing campaign

Antifraud 1st

Antifraud 2nd

PS monitor

Expand your payments footprint

Accept more payment methods and prevent more fraud, for less cost.

Get funding

Access practical resources and strategies for funding your video game.

Funding rate potencial

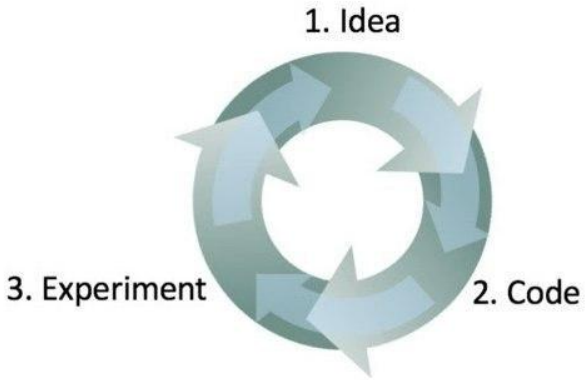
Finance accaunter

Support categories

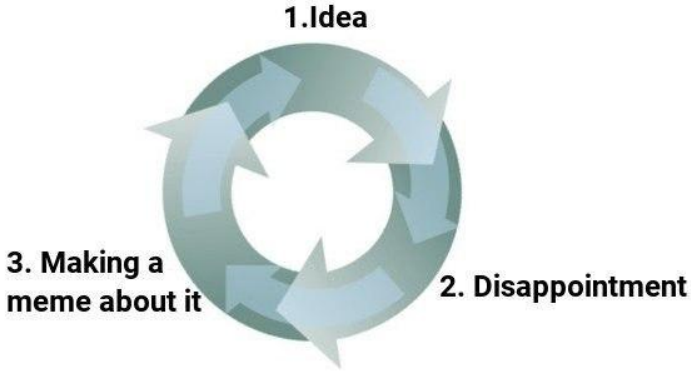
Task assigner

Meeting summariser

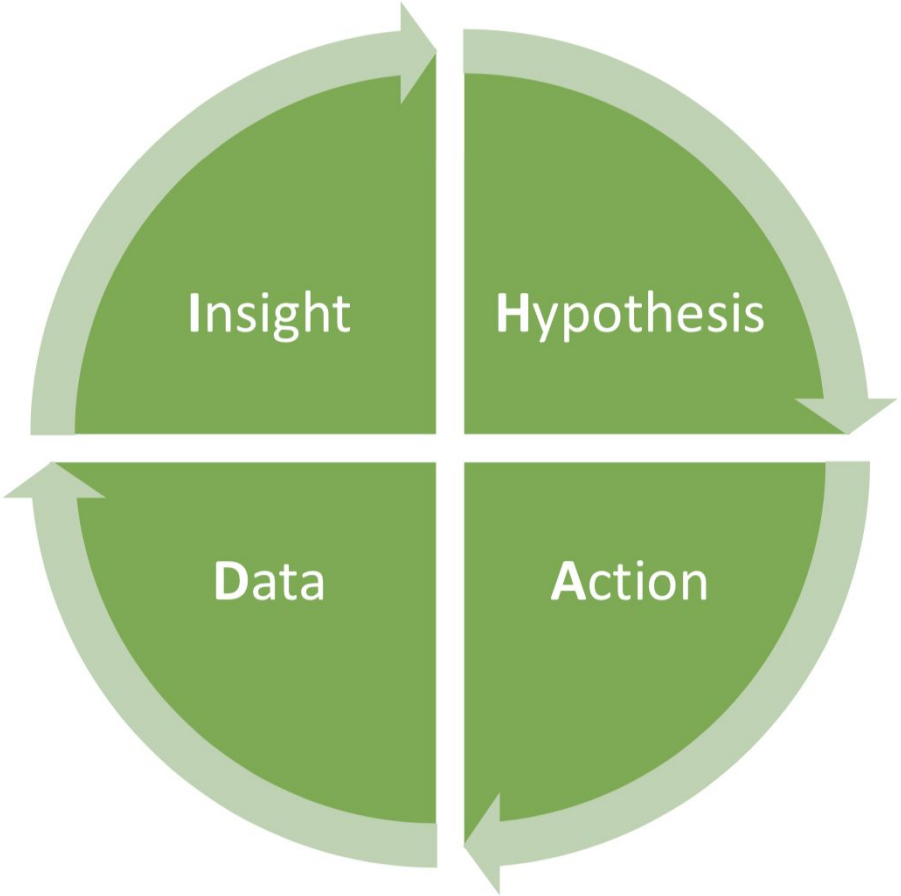
Userflow detection

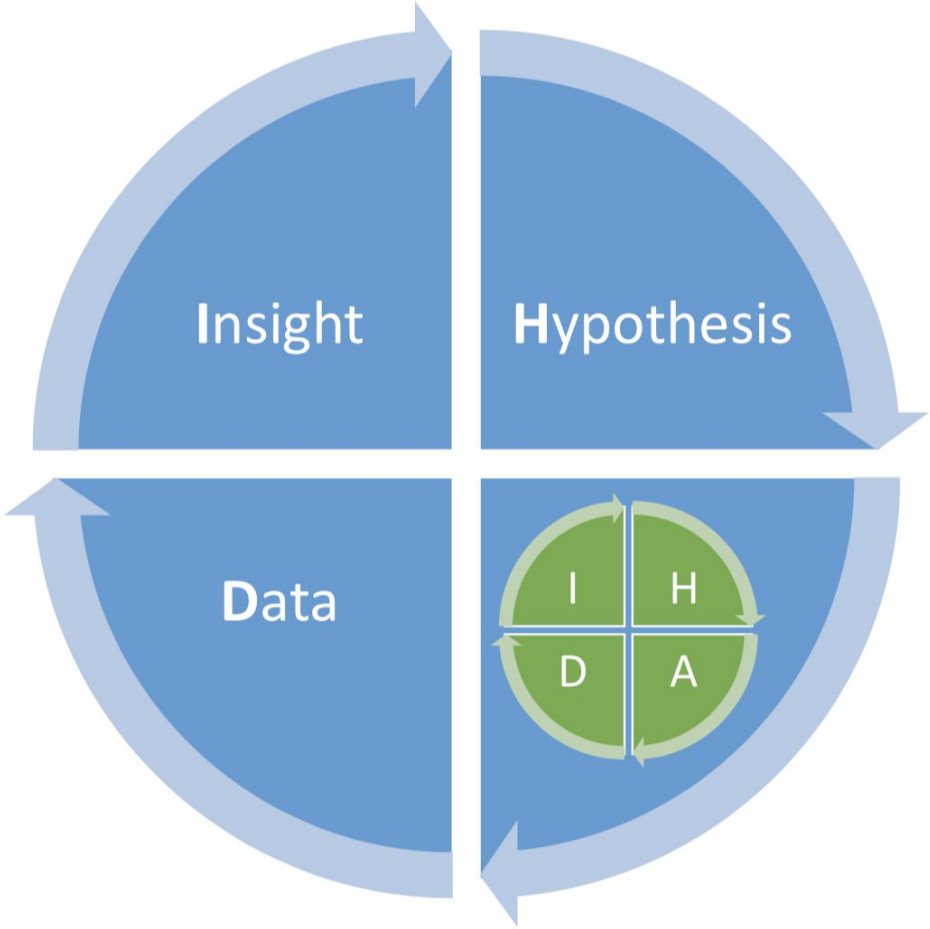


Normal ML iteration cycle



My ML iteration cycle


Insight
Hypothesis
Data
Action


Insight
Hypothesis
Data
I
H
D
A

ML SOLUTION BUILDING WORKFLOW

NEW IDEA

Do we know, what to do?

NO

Problem analysis:

- Target
- Business problem
- Data
- Limitations

YES

Build experiment

Research tech and live

Check hypos

Post check:

- Model losses and metrics
- Business metrics
- Visualise

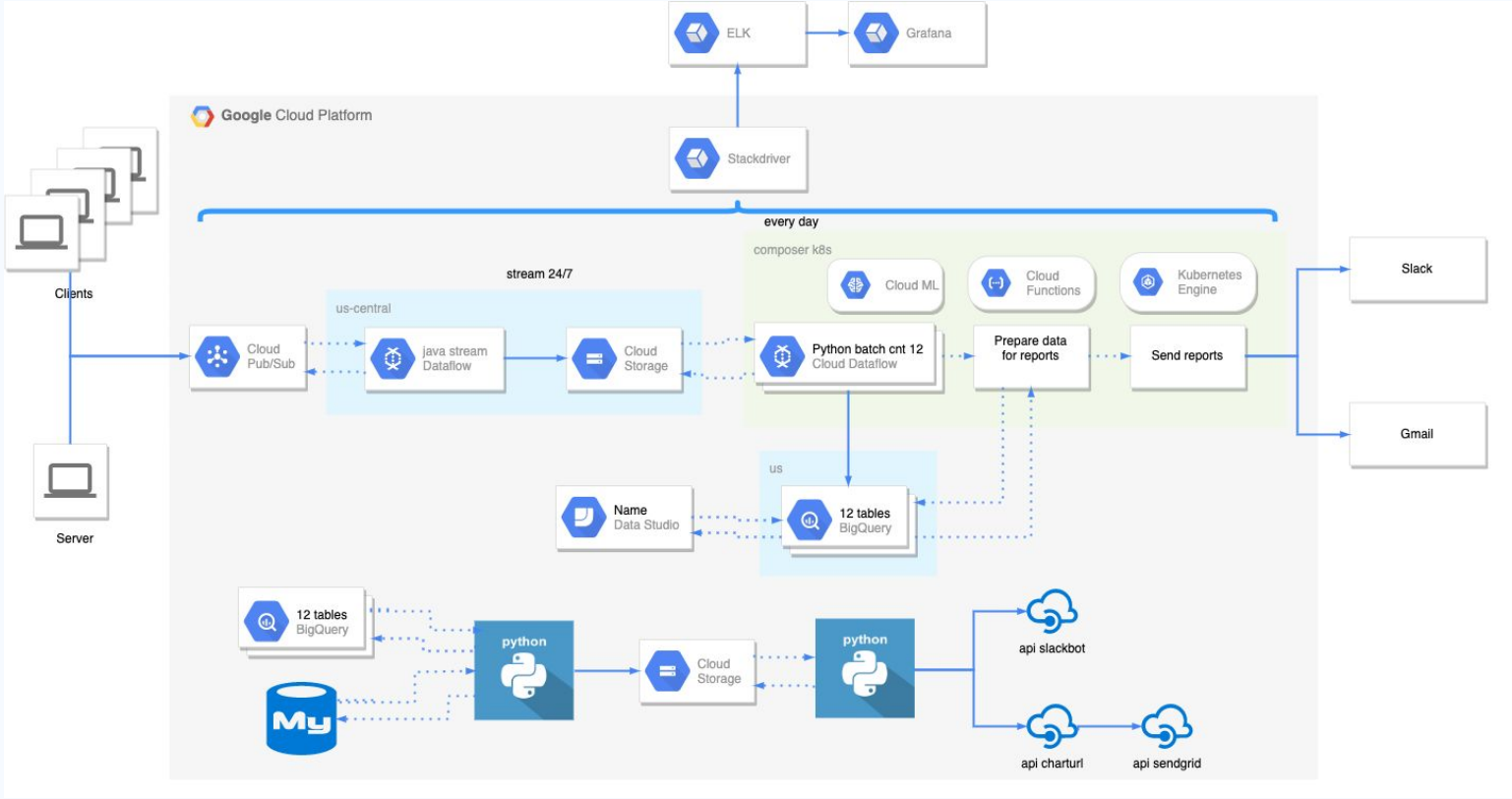
Post check good?

NO

YES

Task done / to prod

ML CLOUD INFRASTRUCTURE

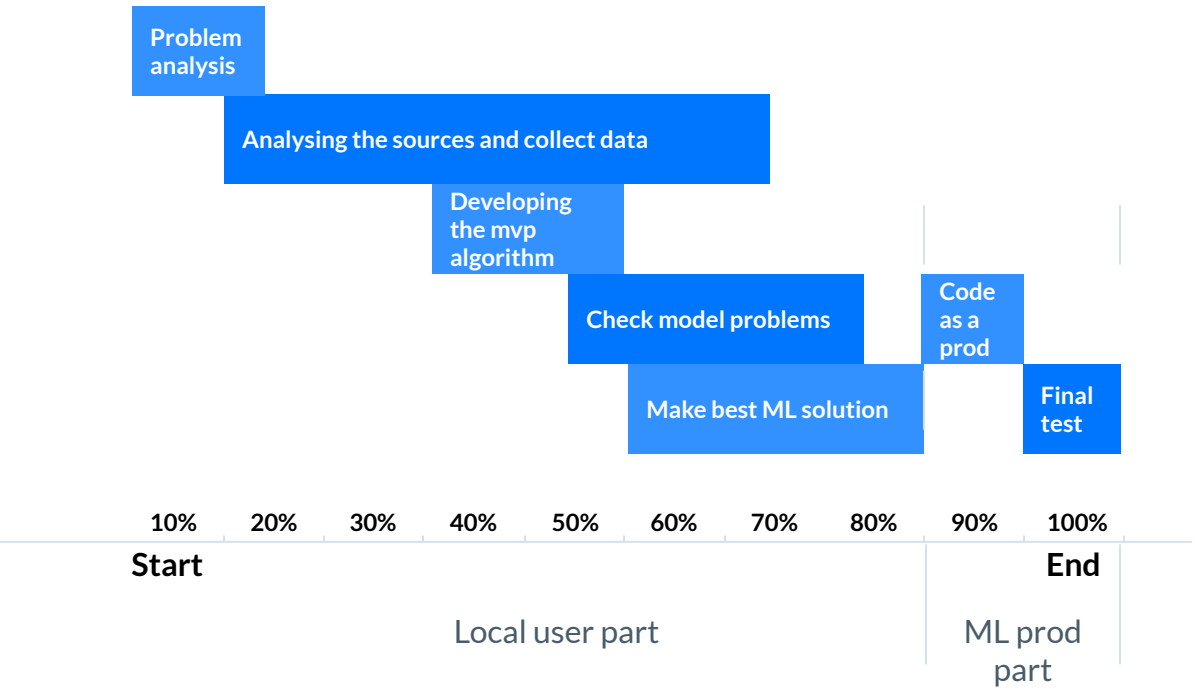


Libs:
Airflow.models
Airflow.plugins_manager
Airflow.utils.decorators

Google.cloud.storage
Google.oauth2

pymysql
sendgrid
pandas_gbq

ML SOLUTION TIME PLANNING



Time spending:

10% - Problem analysis

20% - Analysis sources (and humans) and collect data. 50% parallel till best ML solution

15% - Make mvp algo

5% - Check mvp algo problems. 25% parallel till best ML solution

30% - Make best ML solution

10% - Make a prod version

10% - Final test and fixes if need

CONNECTED PROJECTS REVENUE PREDICT

Daily lifecycle:

Weekly seasonal

Trends

Day-to-day changes

Numeric metrics

Single-player game lifecycle:

Fast up first months

Fast down after 3 months

Main revenue concentrate first months

Free MMO game lifecycle:

Get payments from first days

Strong long monthly revenue

INPUT TARGET

Transactions:

- 30 days revenue forecast
- Year revenue forecast
- Change trend direction

Metrics:

- Revenue increase/decrease
- Count payments increase/decrease
- Unique paying users increase/decrease
- Average payment value increase/decrease

TIMESERIES FORECAST ACTUAL METHODS

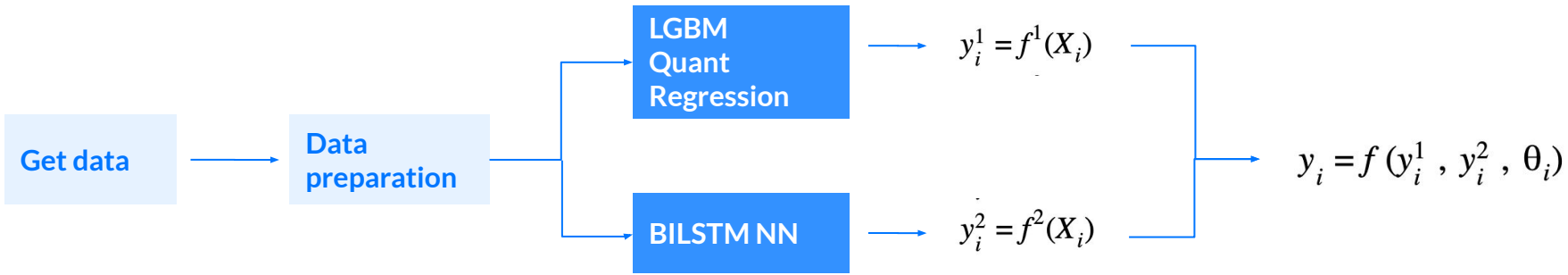
	Regression	Autoregression	Boosting	NN
Simple to make baseline model	+	+	-	-
Horizontal scaling	+	-	+	+
Low hardware apply	+	+	+ / -	-
High accuracy	-	+	+ / -	+
High interpretation	+	+	+	-
Non-linear applied	-	-	+ / -	+
Early data accessible	+	-	+	+
Simple model architecture	+	+	+ / -	-

Some links:

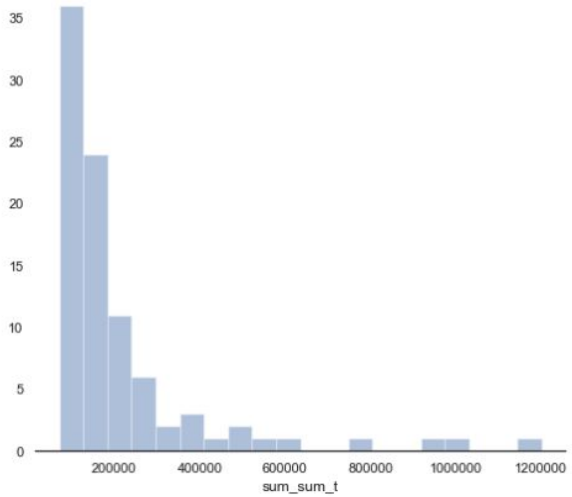
Link1 - https://bit.ly/2PA1Ysx

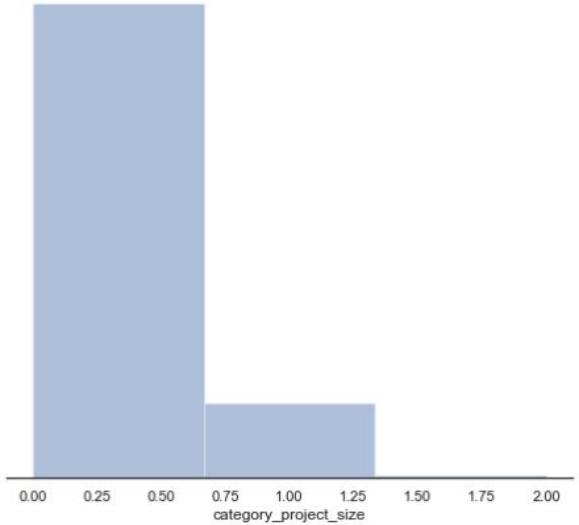
Link2 - https://bit.ly/2BUFOJc

XSOLLA MODEL



TARGET PREPARATION





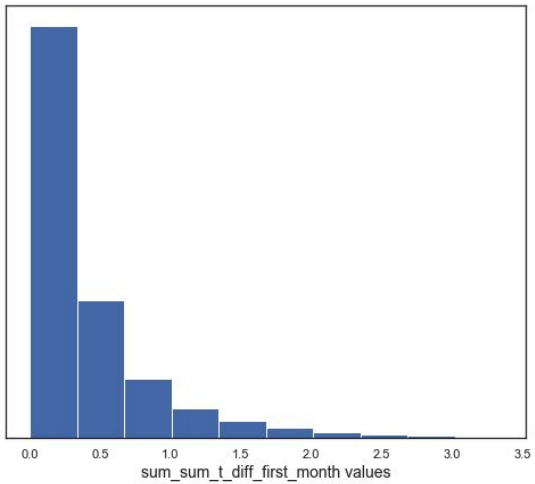
Long right tail problem in amount of transaction histogram.

Most projects is small size category with small average payment value.

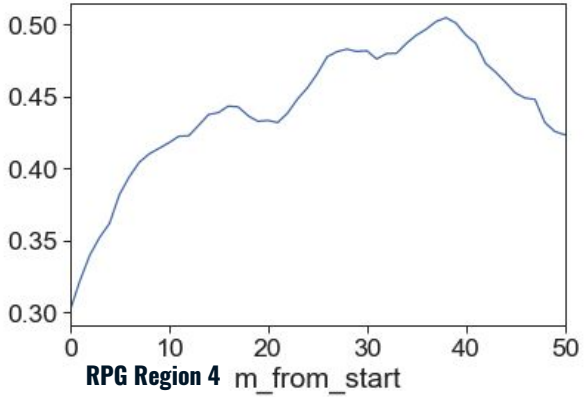
Boosting problem

TARGET PREPARATION

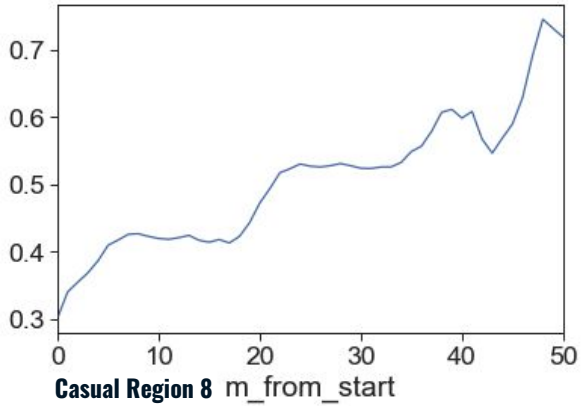
$$y_i = log_{10}(\frac{usersum_i}{usersum_0} + 1)$$



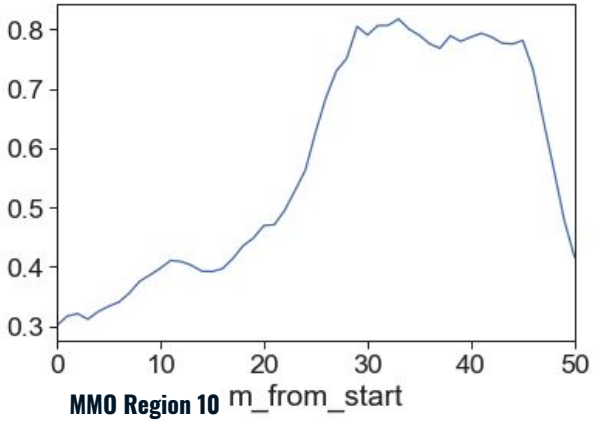
REGION-GENRES-MONETIZATION SEGMENTATION



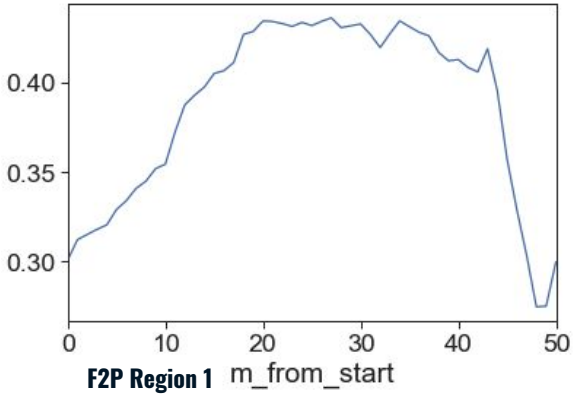
RPG Region 4



Casual Region 8



MMO Region 10



F2P Region 1

DATA

Aggregative:

- Genres - 18
- Monetization types - 6
- Platforms - 8
- Internal types - 8
- Regions - 14

Categorial features

Aggregative statistics

Numeric:

- Count transactions per past days - 360
- Amount transactions per past days - 360

Continuous features

Technical features

DATA PREPARATION

Categorial features

- Binaries (B)

Aggregative statistics

- Mean, Std, Perc25, Perc75 (A)

Continuous features

- Prev y values (P)
- Timeseries statistics (T)

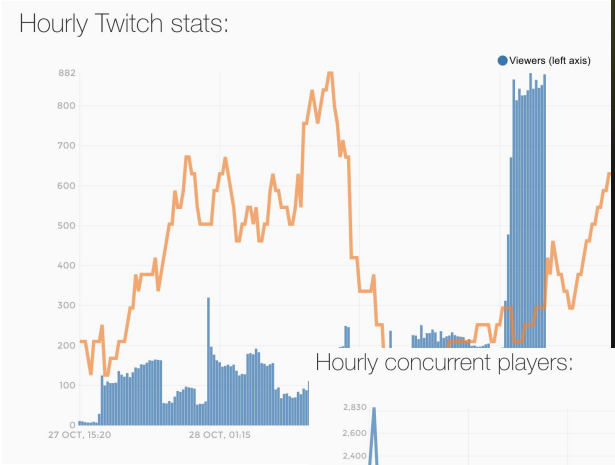
Technical features

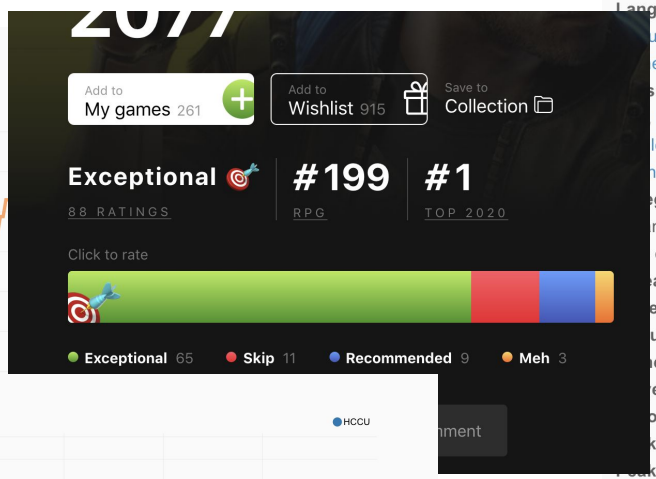
- Squares, Rollings, Trends (SR)

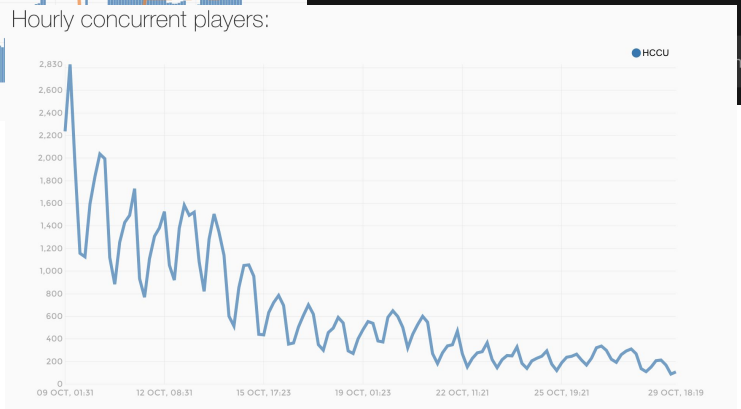
MODEL VECTORIZER

$$y_i^j = f^j(X_i) = f^j(B_i, A_i, P_i, T_i, SR_i)$$

GAMEDEV DATA INSIGHTS

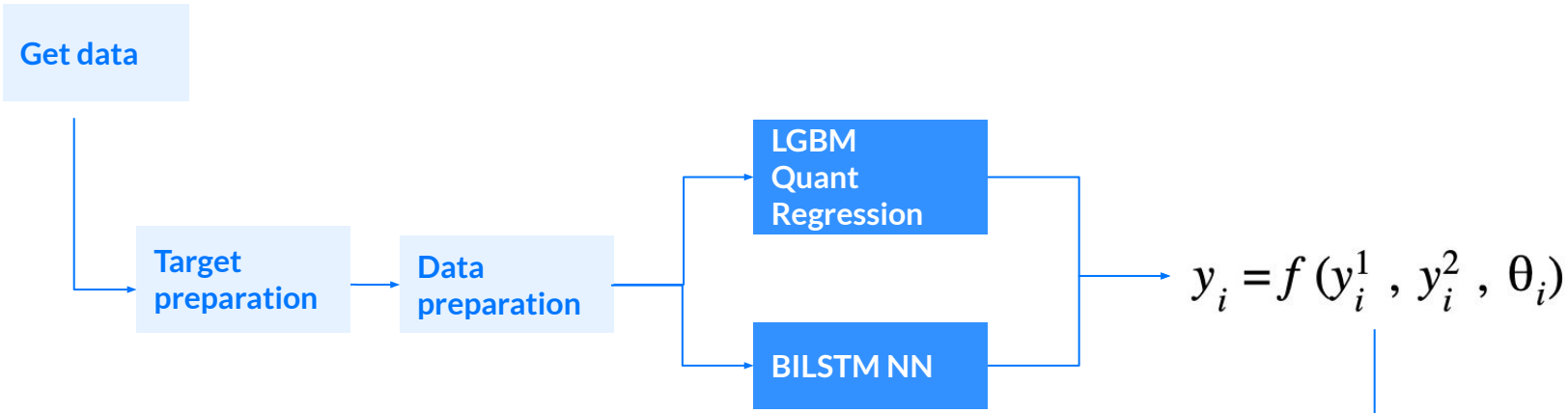






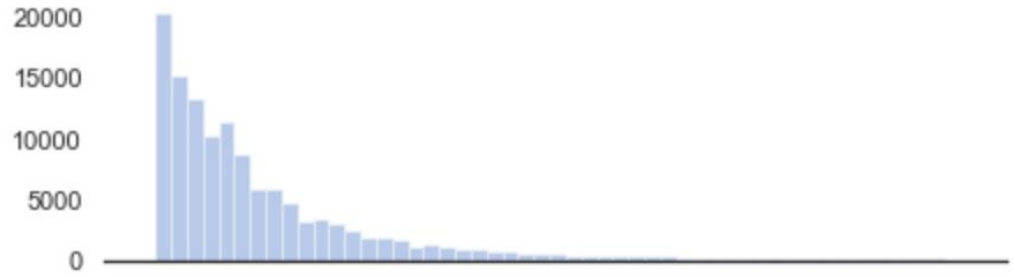
Indivisible is a hand drawn action RPG platformer from Lab Zero, creators of the critically acclaimed Skullgirls! Set in a huge fantasy world, Indivisible tells the story of Ajna, a fearless girl with a rebellious streak who sets out on a quest to save everything she knows from being destroyed.
Store | Hub | SteamDB | Site
Developer: Lab Zero Games **Publisher:** 505 Games
Genre: Action, Indie, RPG
Languages: English, French, Italian, German, Spanish - Spain, uguese - Brazil, Simplified Chinese, Korean, Russian, Traditional ese
s: RPG (51), Indie (48), Action (47), Female Protagonist (43), Anime Platformer (40), Hand-drawn (40), Metroidvania (33), 2D (24), leplayer (19), Side Scroller (19), Turn-Based Combat (18), Great ndtrack (16), Fantasy (12), Action RPG (11), JRPG (7)
egory: Single-player, Steam Achievements, Full controller support, m Cloud, Remote Play on Phone, Remote Play on Tablet, Remote on TV
ease date: Oct 8, 2019
e: $35.99 ↓10%
userscore: 73% **Metascore:** 81%
ers: 33,000
ers in the last 2 weeks: 100%
owers: 39,040
k concurrent players yesterday: 268
eak on Twitch yesterday: 882 viewers, 21 channels
YouTube stats: 65,912 views and 497 comments for videos uploaded last week, 44 new videos uploaded yesterday.
Playtime in the last 2 weeks: 03:27 (average) 03:27 (median)
Playtime total: 04:40 (average) 04:40 (median)

TOTAL MODEL FLOW

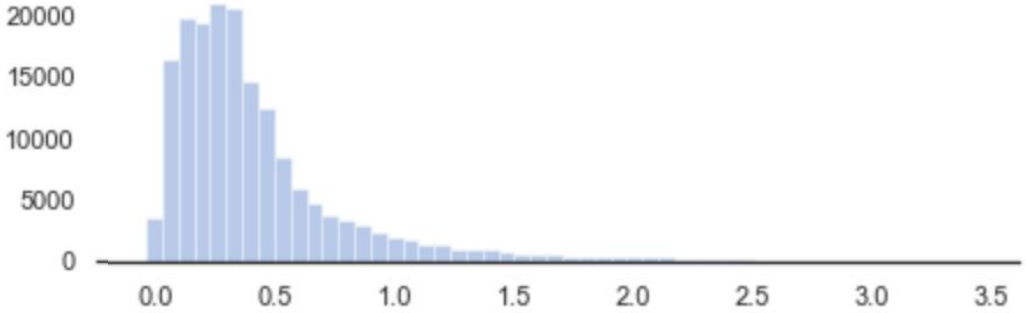


$$usersum_i = (10^{y_i} - 1) * usersum_0$$

TARGET DISTRIBUTION VALIDATION SUBSET

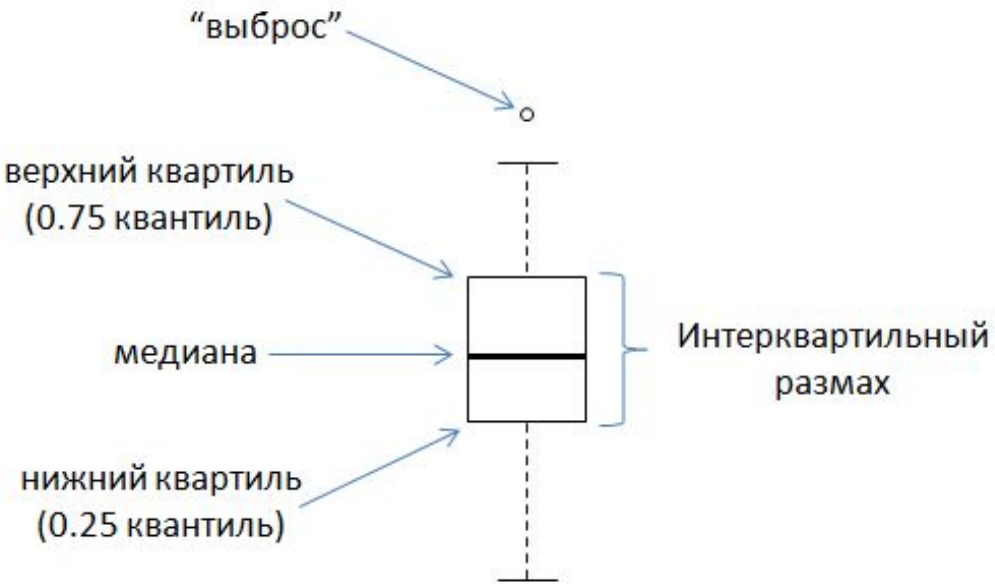


Real

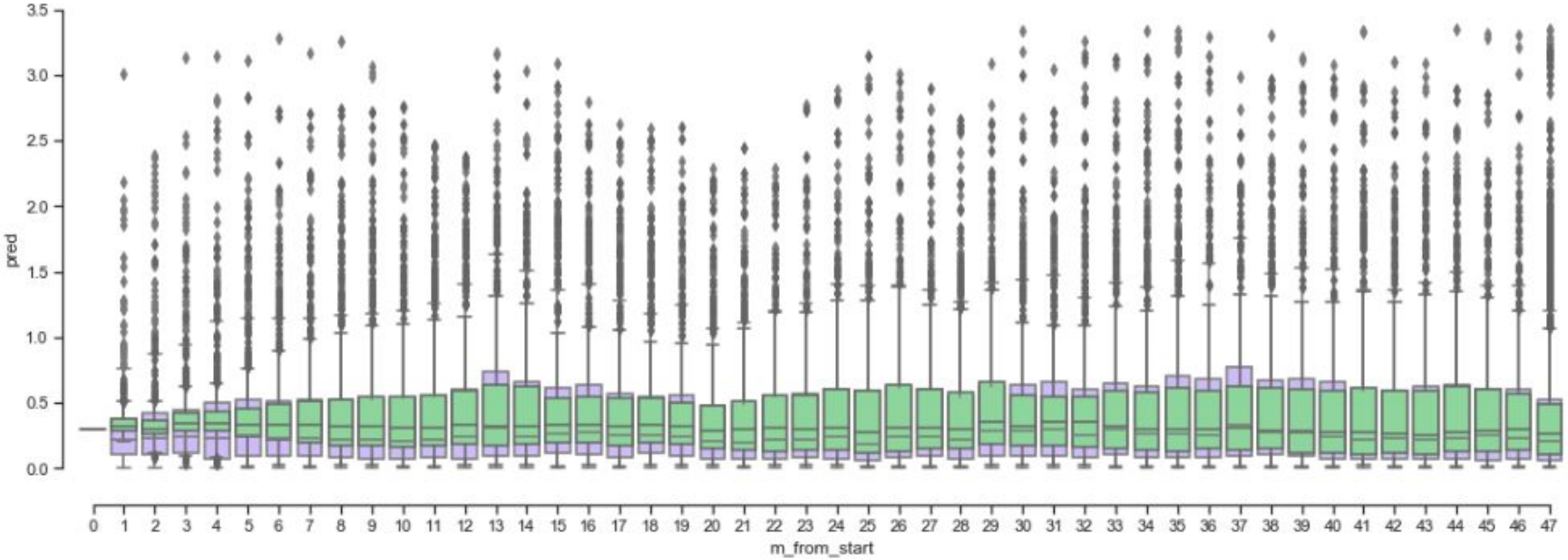


Predicted

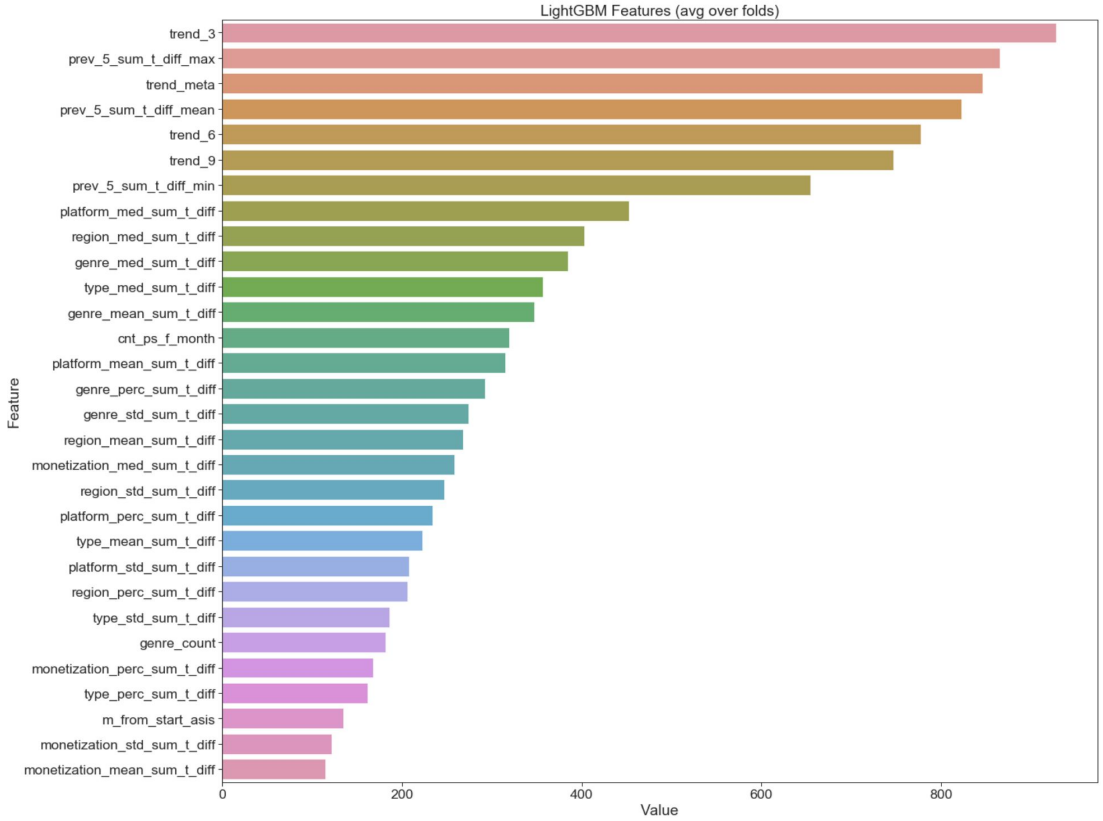
BOXPLOT ANALYSIS



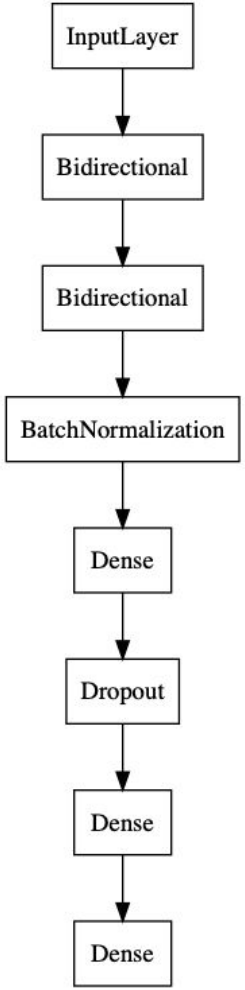
BOXPLOT BY PREDICTION STEPS VALIDATION SUBSET



LGBM FEATURE IMPORTANCE

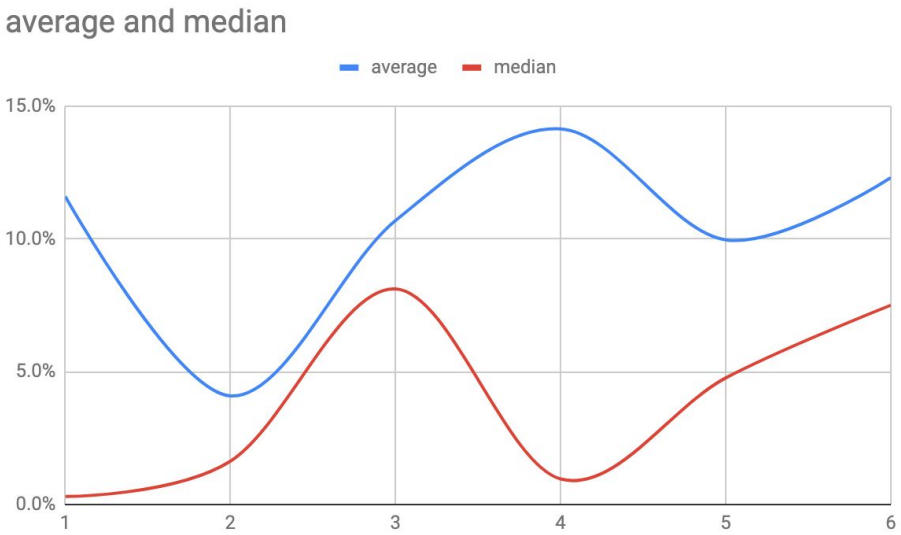


NN ARCHITECTURE



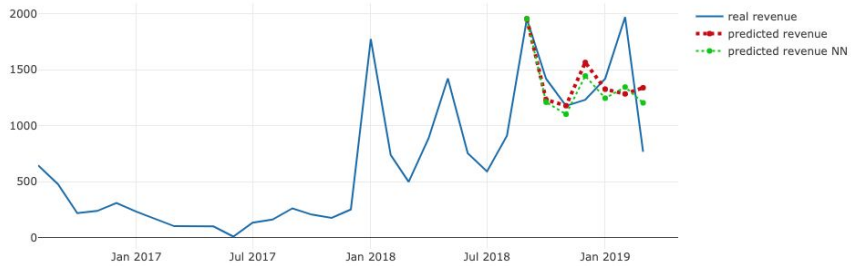
BUSINESS METRIC

$$error_rate = \frac{1}{N} \sum_{i=1}^{N} |(pred - real)/real|$$



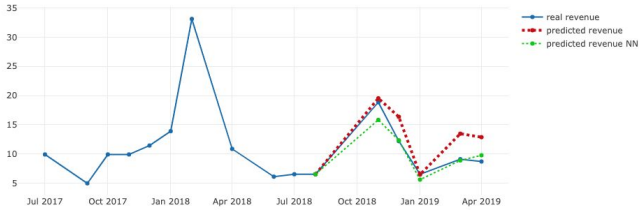
VISUALISATION

in period 6 month
real revenue 7985
pred revenue 7923
error rate -0.01
error rate NN -0.05

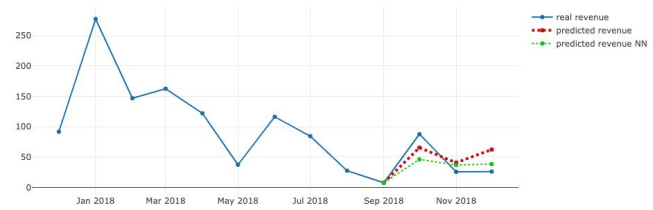


in period 7 month
real revenue 127
pred revenue 211
error rate 0.66
error rate NN 0.46

in period 5 month
real revenue 55
pred revenue 68
error rate 0.24
error rate NN -0.05



in period 3 month
real revenue 139
pred revenue 168
error rate 0.21
error rate NN -0.13



VISUALISATION INTEREST CASES

in period 7 month
real revenue 526
pred revenue 484
error rate -0.08
error rate NN -0.1

in period 7 month
real revenue 3318583
pred revenue 2784990
error rate -0.16
error rate NN -0.68

in period 7 month
real revenue 40494
pred revenue 39924
error rate -0.01
error rate NN -0.74

in period 6 month
real revenue 1425
pred revenue 3037
error rate 1.13
error rate NN 0.17

TASK RESULT

Transactions:

- 30 days revenue forecast
- Year revenue forecast
- Change trend direction

Metrics:

- Revenue increase/decrease
- Count payments increase/decrease
- Unique paying users increase/decrease
- Average payment value increase/decrease

SOLUTION PROFIT

Main profit:

- Transactions decrease detection and alerts
- Revenue forecast
- Metrics decrease detection and alerts
- Project full lifecycle and potencial

Additional profit:

- New regions potencial
- Project start examination
- Average payment value competitors analysis
- Attenuation detection

THANKS

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