2023

Mindcraft

Illuminating Student Performance with Game Data Mining

BROUGHT TO YOU BY TEAM BIG DATA CRUSHERS

CONTENTS

01 INTRODUCTION

OBJECTIVE

To predict student performance in real-time during game-based learning using a large dataset of game logs.

GOALS

1. Advance research into knowledge-tracing methods for game-based learning

2. Help developers create more effective educational games and providing educators with dashboards and analytic tools.

PART TWO

02

BUSINESS PLAN

PRODUCT

CUSTOMER ANALYSIS

REVENUE MODEL

GO TO MARKET STRATEGY

02

BUSINESS PLAN: PRODUCT

A

An enhancement and refining of game-based learning platforms, better designed to improve student performance in multiple different aspects of education

B

Product development in a consistently occurring feedback loop involving both students and educators, providing insights and suggestions for future iterations

C

A mixture of ad-supported and freemium pricing, potential for a subscription-based model. Depending on data, the pricing models may vary devices.

D

Games for mobile and desktop. Mobile users on any compatible device. Desktop users in tutoring/after school educational programs, in-school, and at-home usage.

02

BUSINESS PLAN: CUSTOMER ANALYSIS

SEGMENTATION, VALUE, EQUITY

Customer Segments:

- Elementary to Middle School
  - In-School Implementation
  - Tutoring Programs
- High School
  - Tutoring Programs
  - At-Home Use

Individual Customer Value:

- CLV Factors: Average age of end user, rate of churn by age and place (potentially acquisition method)

Customer Equity:

- Customer Equity Factors: Age demographics success rate, location in educational journey, may vary based on success rates on mobile vs. desktop

02

BUSINESS PLAN: REVENUE MODEL

- **Advertisements**: We can incorporate ads along with the game play, where we can monetize off a cost-per-click model.
- **Freemium Model**: The basic features could be free. Advanced features could play the most trending games/access the most fancy features in games, initial adoption 5-10%
- **Data Licensing**: Sell analytical gameplay data to researchers, educators and other interested partners and collaborators for something in between $1000-$2000.
- **In-App Purchases**: Solutions to complex problems can be offered as in-app purchases for $0.99-$4.99.
- **Subscription Model**: Potential once the product matures. 3 tiers: basic($2.5), standard($5), premium($10). Differentiated between level of games and engagement.

02

BUSINESS PLAN: GO TO MARKET STRATEGY

Positioning: Enhanced student learning, personalized insights improves academic performance. Focus is on being intuitive, user friendly to contrast other game learning platforms out there.

Place: App Stores, In- Game advertisement (Mobile), Facebook Ads, forum groups, discord channels, community pages on social media (Desktop). Launch events in schools , partnering with game arcades and virtual reality equipment shops.

Promotion: Collaboration with tutor programs like Kumon, App store advertisements, word-of-mouth, school collaborations. Partner with educational courses sites. Newsletters, email campaigns, TV ads, influencer marketing

Product: Educational gaming market, competitive analysis and compelling gamification to keep users motivated. Feedback mechanisms for educators and students.

Segmentation: Upper Elementary School Students (9.2M) Middle School Students (8.6M) High- School Students(12.4M)

PART THREE

03

BUSINESS OBJECTIVES

BUSINESS OBJECTIVE

KEY ACTIONABLE BUSINESS INITIATIVES

METRICS OF SUCCESS/KPI'S

03 BUSINESS OBJECTIVE

The main objective is to enhance the effectiveness of educational games and improve learning outcomes for students. The priority initiatives include:

1. Personalized Learning
2. Student Engagement and User Experience
3. Knowledge Retention and Transfer

By prioritizing these initiatives, we aim to create impactful educational games that engage students, support personalized learning, and optimize learning outcomes.

03 KEY ACTIONABLE BUSINESS INITIATIVES

ADAPTIVE LEARNING

Predict New User Behaviour

1

Predict competency levels of new users and personalize the game experience to their needs, improving onboarding, engagement, and learning outcomes.

Enhancement of Content and User Experience

2

Improve educational game engagement by enhancing narratives, gameplay mechanics, visuals, and audio. Address challenges with additional resources, hints, and alternative learning paths.

Educator Support and Continuous Improvement

3

Provide educators with F1 score predictions to tailor classroom discussions and interventions, while establishing a feedback loop for ongoing game refinement based on user feedback and research.

03 SUCCESS METRICS

Engagement Rate

By tracking the time spent per session, we can gain insights into how engaged students are with the game and its adaptive learning features. A higher average time spent per session generally indicates that students are actively involved in the learning process, exploring various activities, and utilizing the adaptive elements provided by the game.

Dropout Rate

Measure the percentage of students who discontinue using the game or drop out before completing desired learning objectives. A lower dropout rate signifies higher user satisfaction and suggests that the adaptive learning features effectively maintain student interest.

Learning Outcomes

Measure the impact of the game's adaptive learning features on students' academic performance or learning outcomes. Compare the scores of students who have engaged with the adaptive learning system to those who have not, and evaluate the difference in achievement.

PART FOUR

04

ROLE OF ANALYTICS

DATA OVERVIEW

ANALYTICS METHODOLOGY

RESULTS

EXECUTING ANALYTICS

IMPLEMENTING ANALYTICS

SCALING UP

04 DATA OVERVIEW - PART 1

01

Game Initialization

User enters the game, and gameplay provides the initial context

02

Checkpoint 1

User is asked three questions based on the game play after which progress is saved

03

Checkpoint 2

After solving the first three questions, the game proceeds with another chapter where users are asked another set of 8 questions

04

Checkpoint 3

Similarly, after checkpoint 2, user moves onto another chapter, where they are again asked 8 more questions

04 DATA OVERVIEW - PART 2

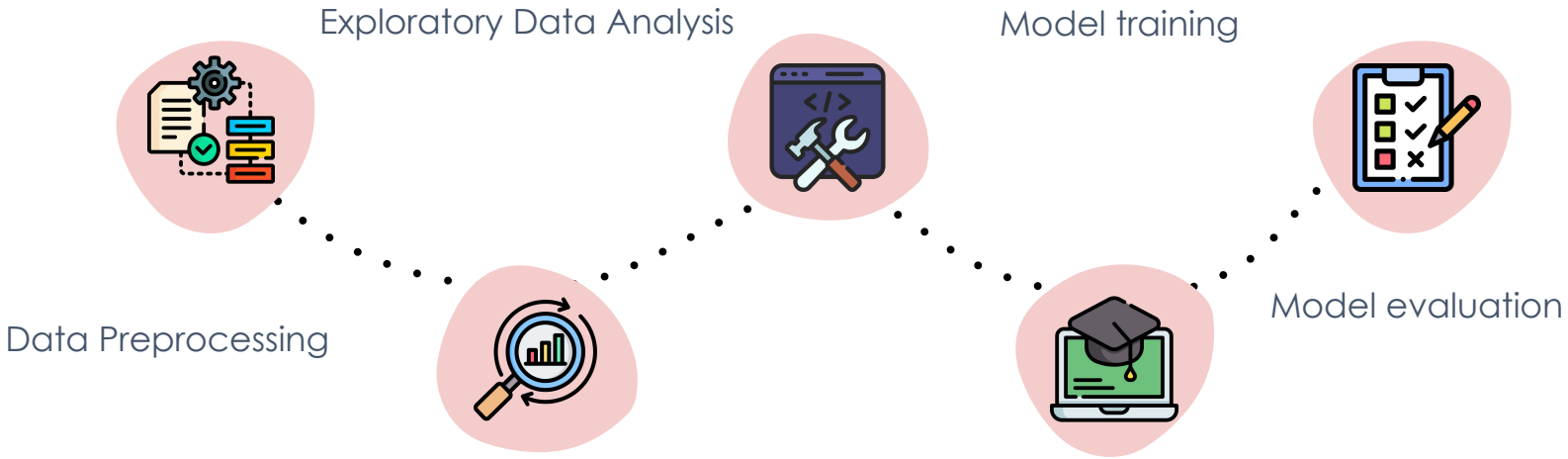
1. Covariates include fields related to Game Related Events, User Behaviour

2. Target Variable is whether a student answers questions correctly at different checkpoints in the game

3. Training Data for almost 25k different sessions (unique user identifier), with correct labels (answered correctly/or not) for all 18 questions

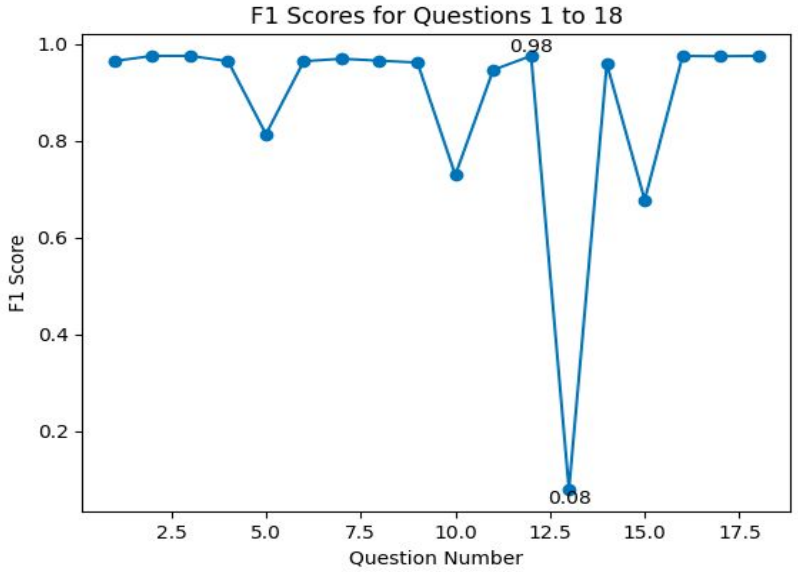
04 ANALYTICS METHODOLOGY

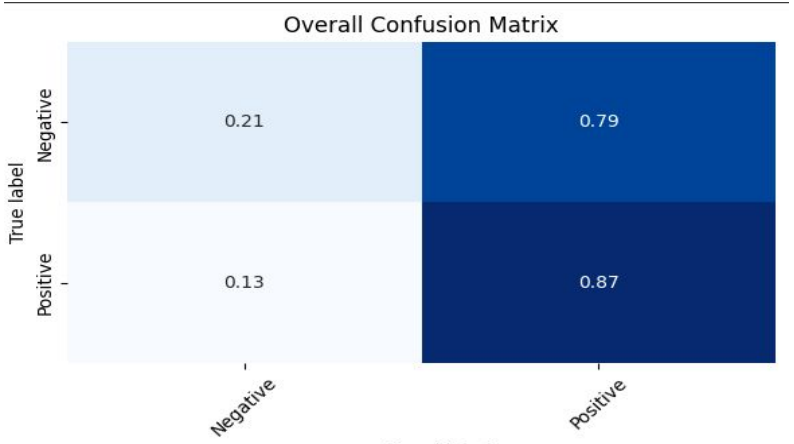
Implementation of a predictive analytical framework, which will use user responses from the previous questions to predict their probability of answering the next questions correctly and personalize the next course of action

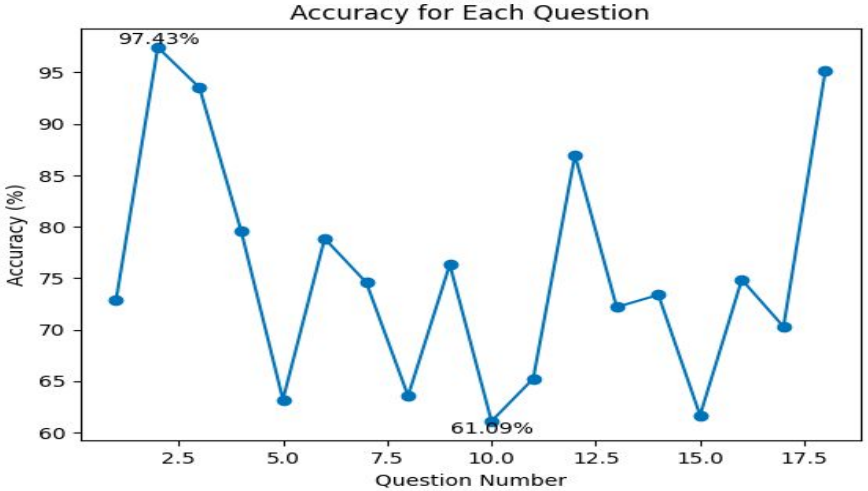


04

RESULTS







Given the imbalance in the datasets, we plan on using F1 scores over accuracy for our datasets for model evaluation.

04 ROLE OF ANALYTICS: EXECUTING ANALYTICS

ACQUISITION

App downloads, User Sign Ups, Hover Rates, Newsletter Subscriptions.

ACTIVATION

Analytics tools and platforms: Google analytics, Firebase, MixPanel to measure user journeys, tracking user interactions, events, performance data.

RETENTION

Measure user behavior and measure retention. Track session durations, frequency of gameplay and level upliftment rate pertaining to learning.

REFERRAL

Word-of-mouth effects measured through CSLV (CLV+ CSV), signups through invites

REVENUE

Monetization model using cost versus benefits analysis. Conversions if we are using a subscription

04

ROLE OF ANALYTICS: IMPLEMENTING ANALYTICS

Defining User Demographics

User segments based on educational levels. Data collection mechanisms: data pipelines, data analytics models, visualization models to measure game level and user level data.

Event Tracking

Events such as level completion, power up usage, quiz scores and time spent on specific activities.

Integrating APIs

Multiple touchpoints for incorporating game data, academic performance measurements against user game profiles, business analytics to measure engagement, productivity and retention.

04 **ROLE OF ANALYTICS:** IMPLEMENTING ANALYTICS, CONTD.

Analyze Performance Improvement

Pre-games and post-games metrics measuring results on performance. Analyze relationship between specific game activities or achievements and performance outcomes.

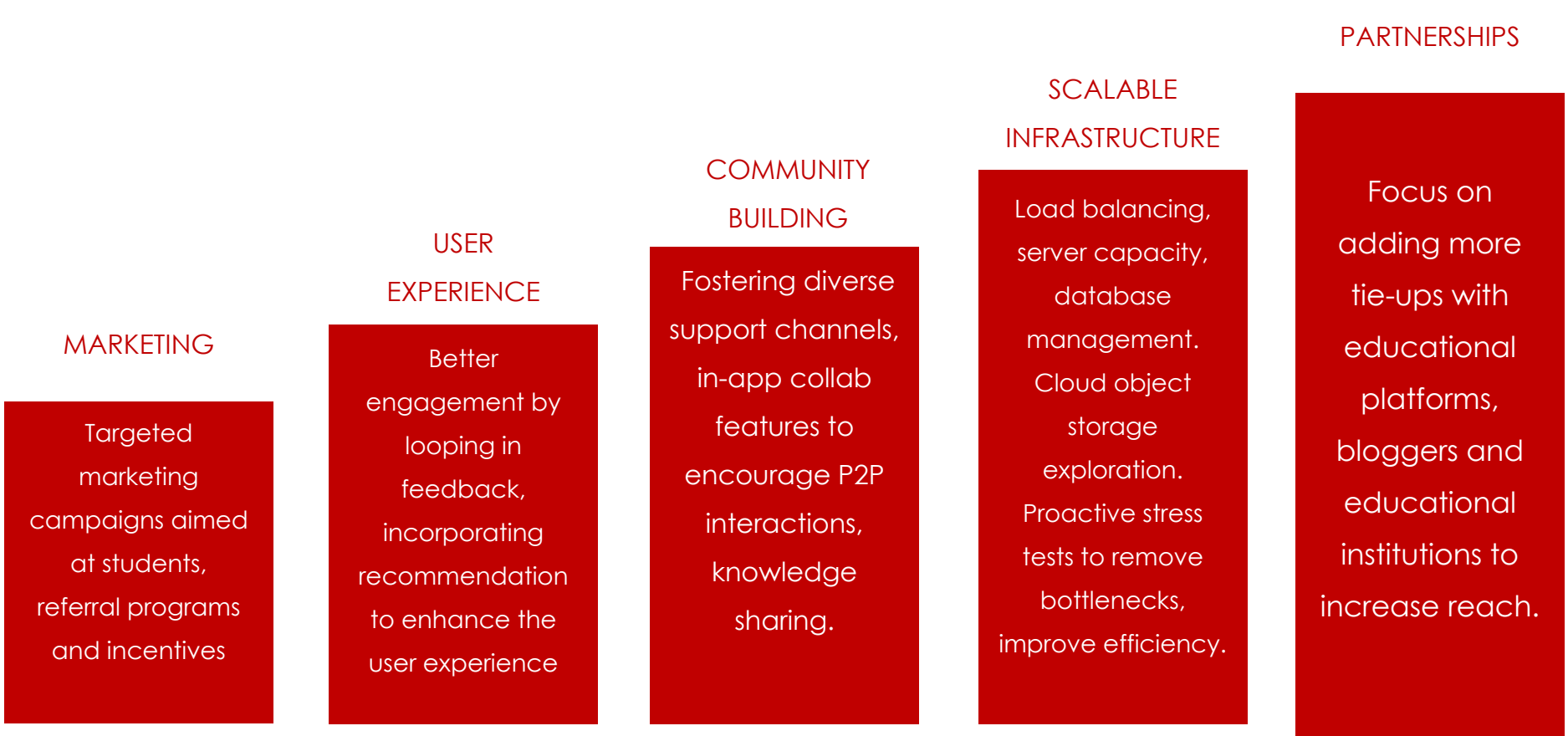
Cohort and Revenue Analysis

Evaluating student demo/psychographics over time to measure intertemporal bias, heterogeneity on learning, game performance. Observe if monetization affecting performance or engagement.

Refine and Reiterate

Reporting on weekly, quarter and annual basis with analytics on user, games and their interactions. Data used to refine and guide feature enhancements, gameplay, monetization updates, coupled with user feedback.

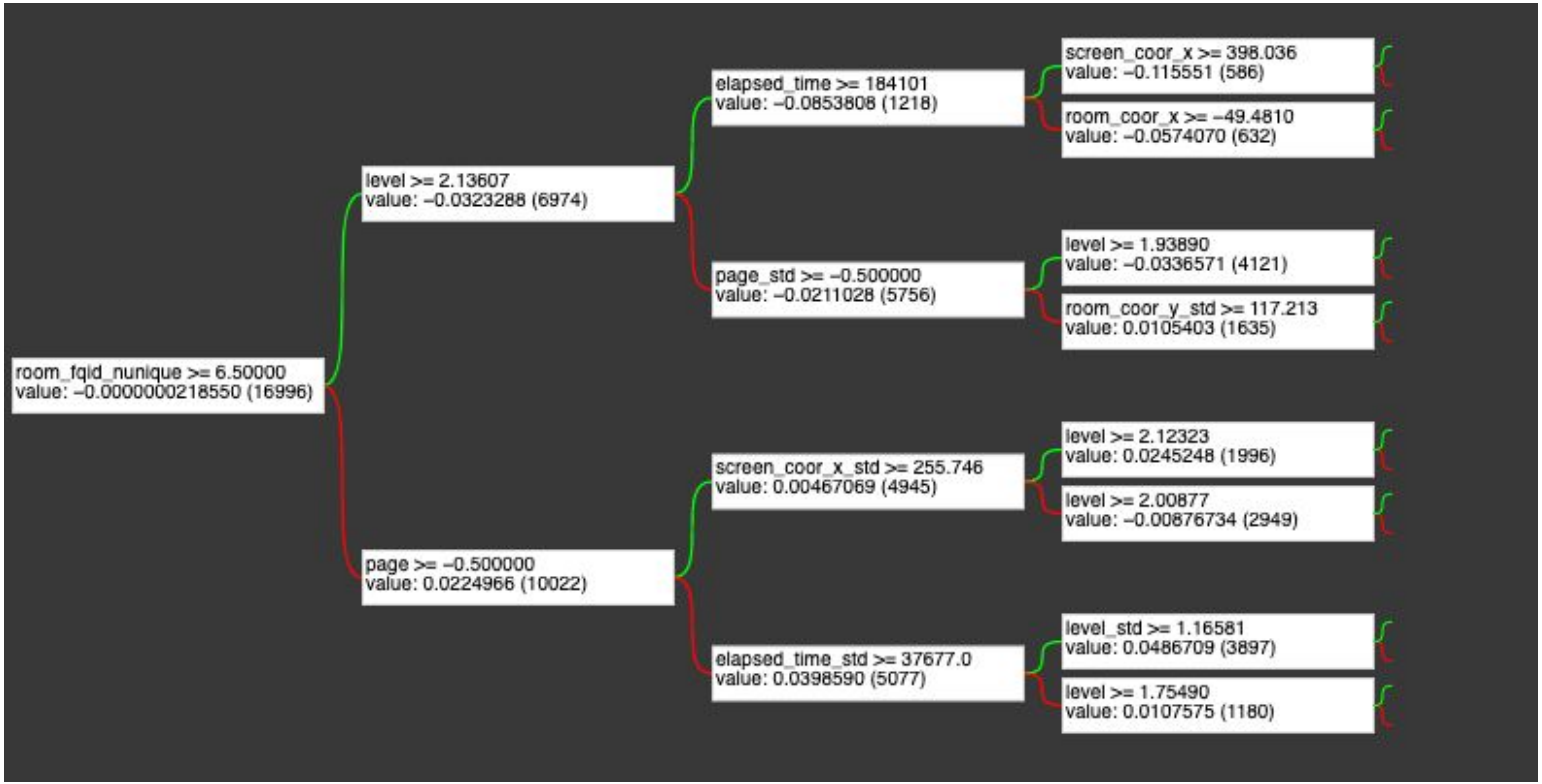
04 ROLE OF ANALYTICS: SCALING UP



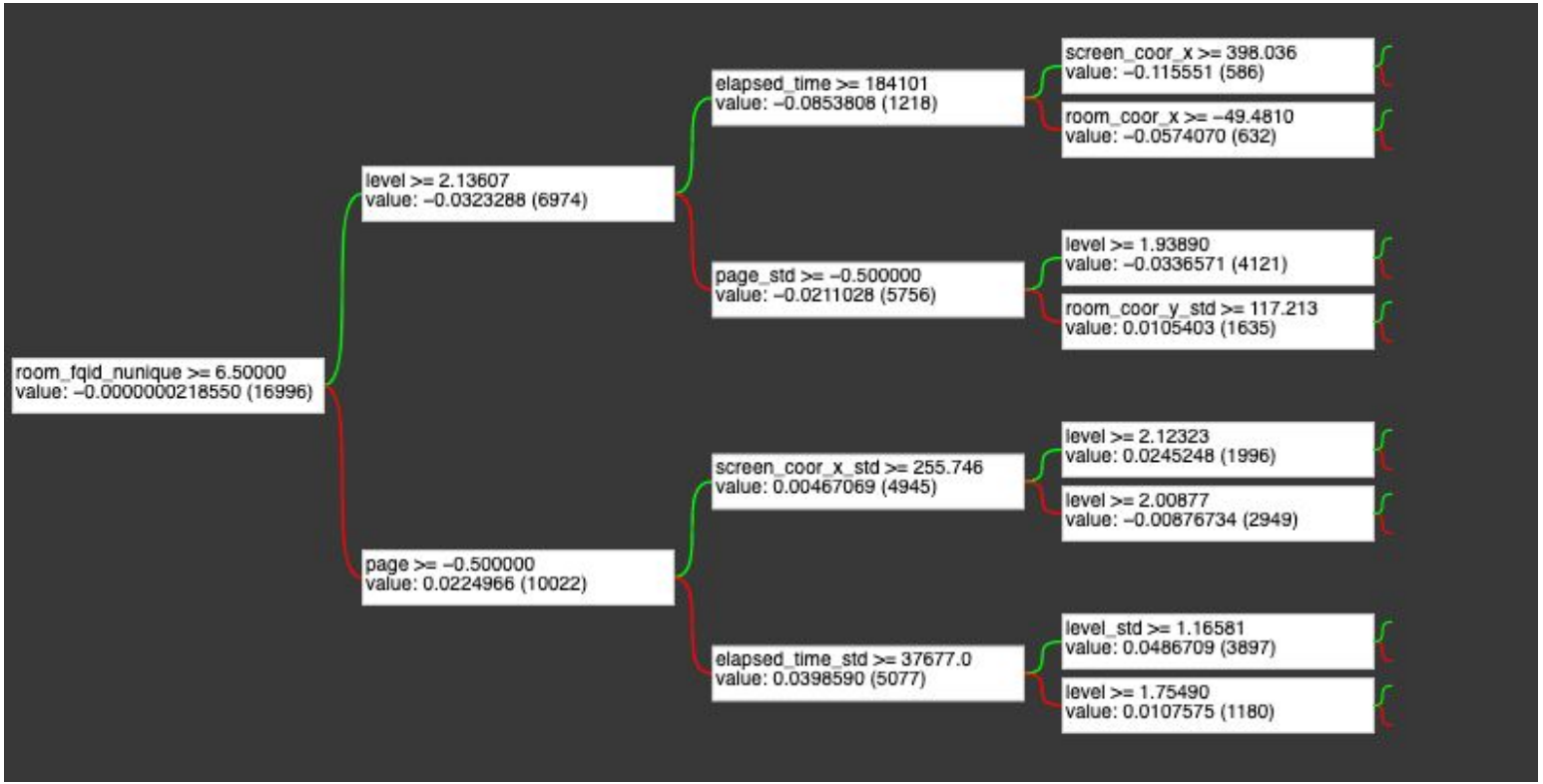
THANK YOU !

APPENDIX

Check point 1: Group 1 - 4



Check point 2: Group 5 - 13



Check point 3: Group 14 - 22