Insights from Customer Trends

Turtle Games

Background & Analytical Approach

- We sought to understand loyalty accrual, segment customers, mine reviews and test predictive models.

- Techniques used:
  - Regression (R^2, RMSE, MAE)
  - Decision Trees (pruned thresholds)
  - Clustering (5-segment solution)
  - NLP Sentiment (polarity & keywords)
  - EDA in R (distribution and outliers analysis)

How Customers Earn Points

- Regression shows Spending Score and income explain ~84% of the variance.
  - Customers with higher Spending Scores accumulate points at a much faster rate (≈ 33 extra points per one-point increase), so loyalty multipliers or bonus offers at key Spending Score thresholds can drive meaningful engagement and lift overall accrual.
  - Income also plays a critical role (≈ 34 points per additional £1,000 in annual remuneration), suggesting that tiered premium rewards and exclusive perks for higher-income cohorts will reinforce their loyalty and encourage incremental spend.

- We observed "activation gaps" where mid-to-high spenders fall below the expected points line. Targeted reminders or "you could have earned X more points" nudges at checkout will help close these gaps and boost point balances for under-engaged yet high-value customers.


Loyalty Points vs Remuneration

Distribution of Loyalty Points
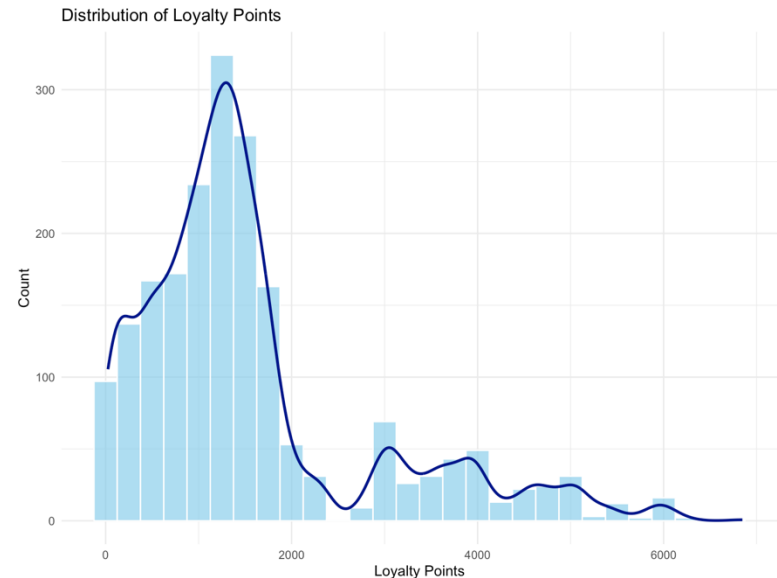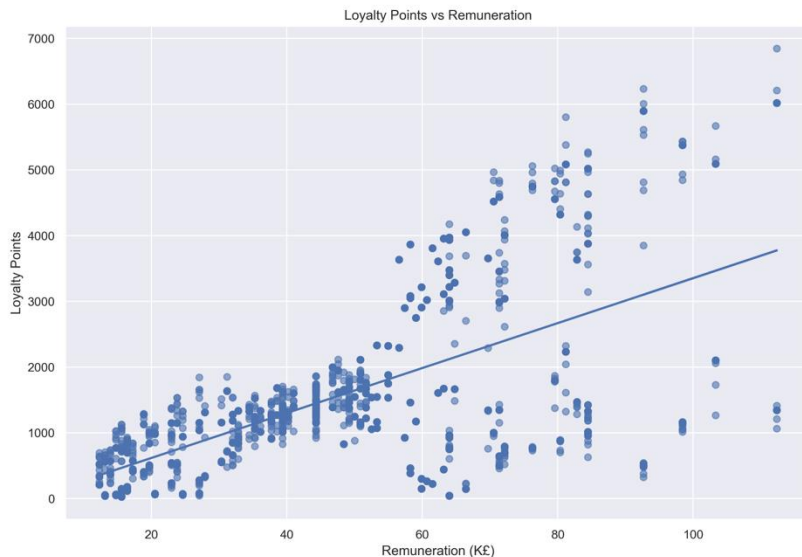
Decision-Tree Insights

Tree splits at Spending Score ≈ 67 and Income ≈ £44k for high loyalty accrual, allowing clear cut-offs for premium reward tiers.
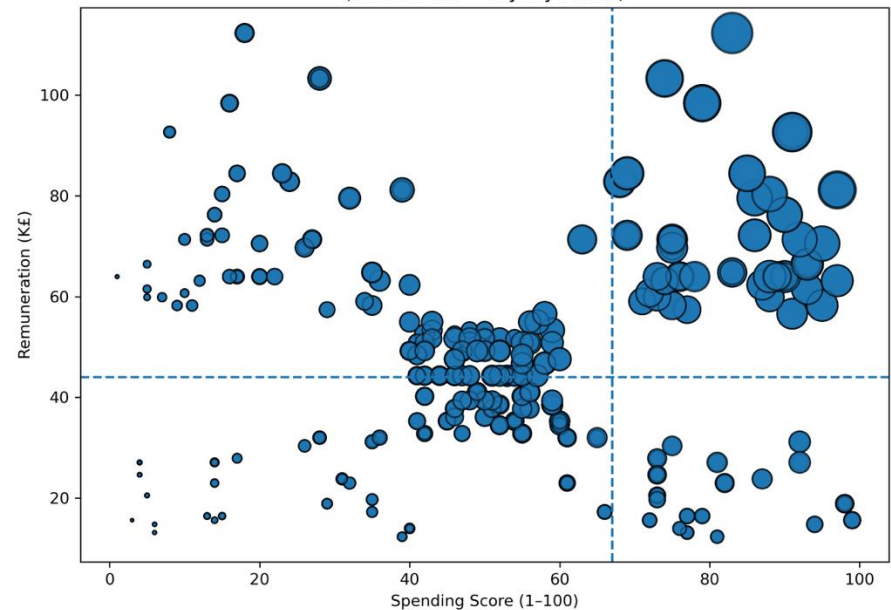
By focusing campaigns on customers above these two thresholds, marketing can efficiently allocate budget to the group most likely to respond, rather than diluting efforts across lower-value cohorts.
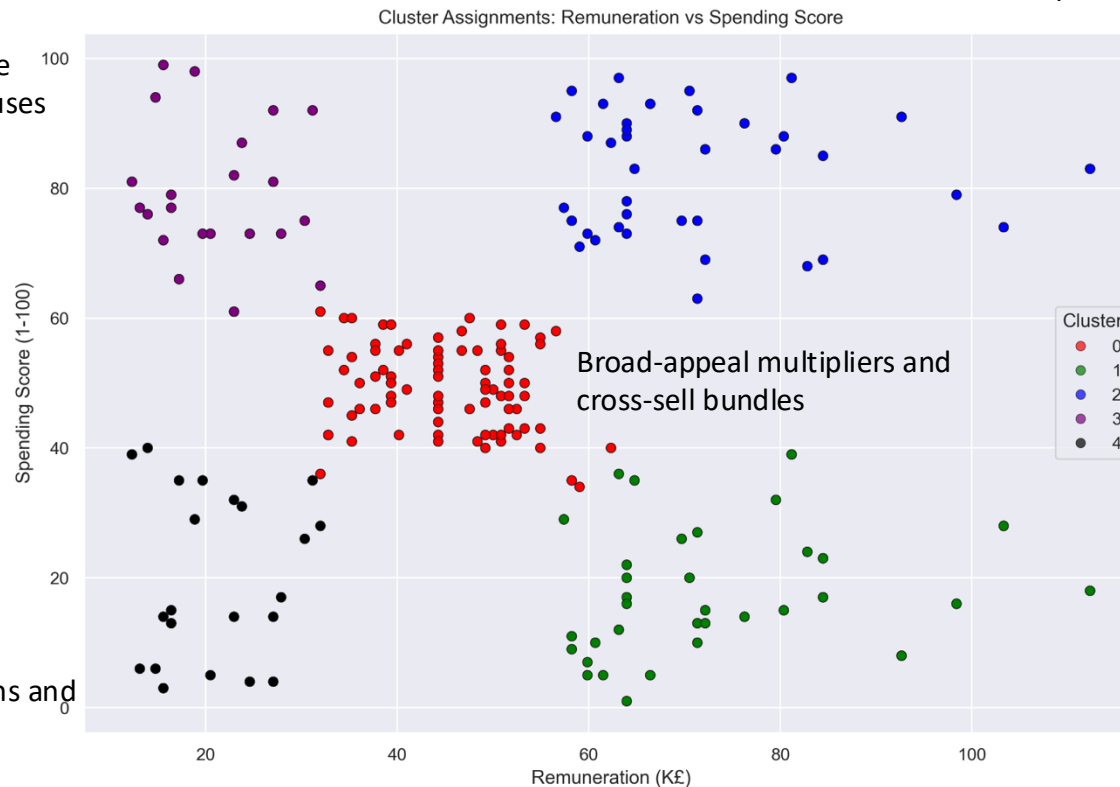

Final Pruned Decision Tree
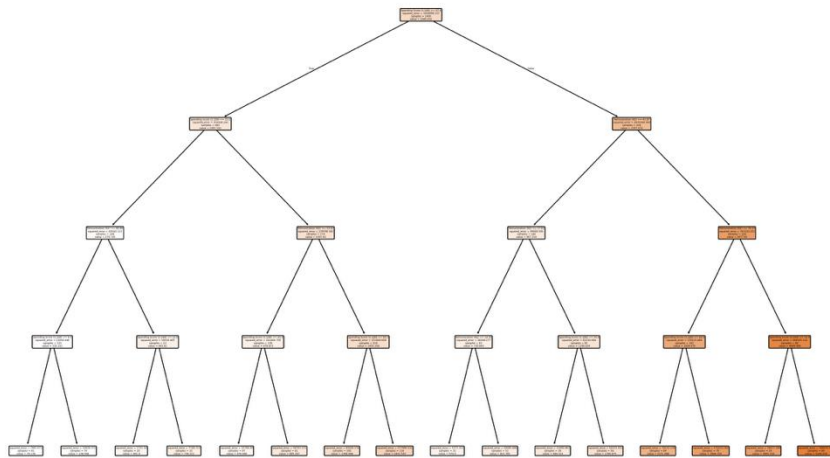
Customer Segments: Spending vs Income
(marker size ∝ Loyalty Points)

Customer Segmentation

- Five segments identified to tailor marketing tactics:
  - Mid/mid earners & spenders (39%)
  - High/high VIPs (14%)
  - High earners/low spenders (18%)
  - Low earners/high spenders (17%)
  - Low/low value seekers (13%)

VIP early access, exclusive products and concierge service

Entry-level bundles, flexible financing and referral bonuses

Broad-appeal multipliers and cross-sell bundles

Premium upsells emphasising quality and status

Value-driven drip campaigns and targeted discount offers

Customer Sentiment Analysis

Review Polarity Distribution
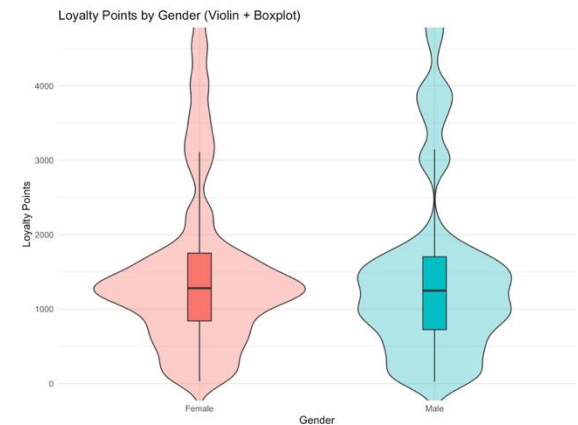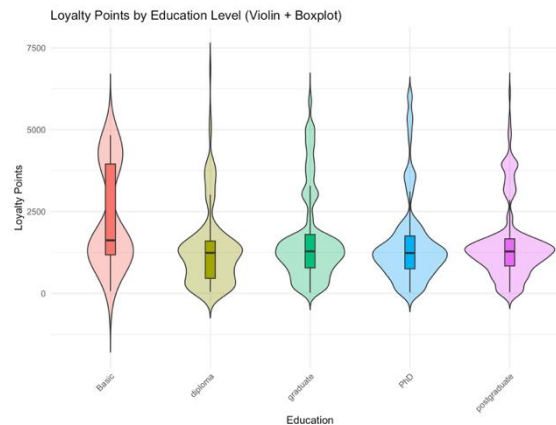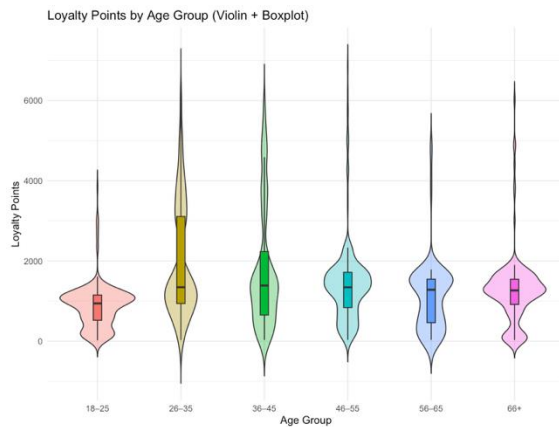
- **Overall positivity:** Eighty per cent of reviews score between 0.1 and 0.4 polarity, indicating strong customer satisfaction with core products.

- **Key themes:** Words such as "game", "fun" and "love" appear most frequently, so marketing and creative copy should emphasise these elements.

- **Improvement areas:** A small number of negative reviews mention pricing and the boringness of the game; the marketing team should test value-focused promotions and collaborate on gameplay refresh initiatives.

Top 15 Most Frequent Words in Reviews
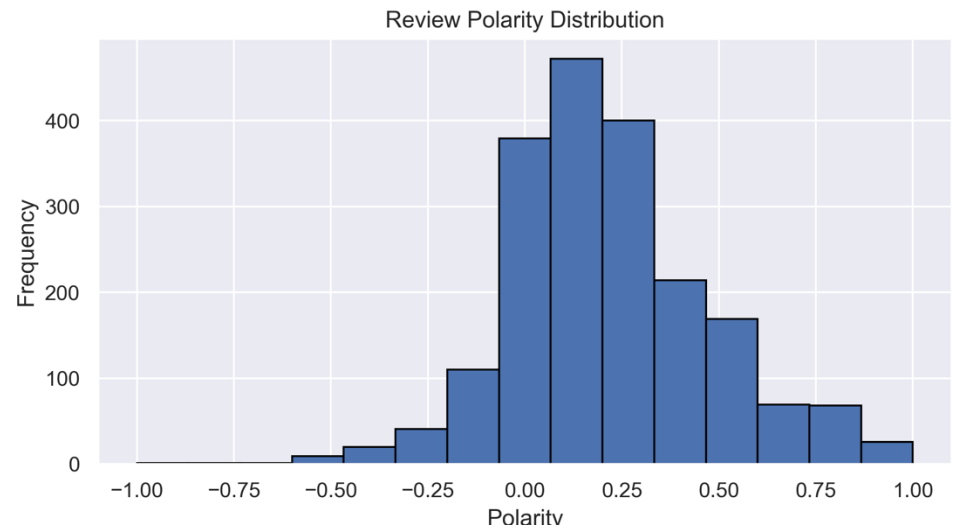
Exploratory Data Analysis Highlights

- **Age cohorts:** 26-35 and 36-45 groups show the highest median and mean loyalty points, while 18-25-year-olds lag significantly - indicating an activation gap for younger customers.

- **Education levels:** "Basic" holders exhibit the greatest variance and a high mean (albeit on a small sample), whereas diploma holders sit at the lower end - highlighting diploma-educated customers as a potential focus for engagement campaigns.

- **Gender differences:** Median loyalty is similar for males and females, but females display a wider distribution and more extreme outliers - suggesting opportunities for tailored high-value offers to the most engaged female customers.

Loyalty Points by Age Group (Violin + Boxplot)

Loyalty Points by Education Level (Violin + Boxplot)

Loyalty Points by Gender (Violin + Boxplot)

Exploratory Data Analysis Highlights

- **Core cluster:** Mid-paid (20–40 K£) and mid-spending customers concentrate around 500–2 000 points - this segment (Mid/Mid Cluster) represents nearly 40 % of the base and should be targeted with broad multipliers and cross-sell bundles.

- **Under-earning high spenders:** Noticeable points-vs-spend gaps for some high-spending bubbles below the trend line; sending "you could earn X more points" prompts can boost linkage and accrual.

- **Super-earners as VIPs:** Top earners span all income bands; flagging these outliers for exclusive VIP programmes or data-quality audits will ensure the highest-value customers receive premium experiences.

Loyalty Points vs. Remuneration (size & color = Spending Score)
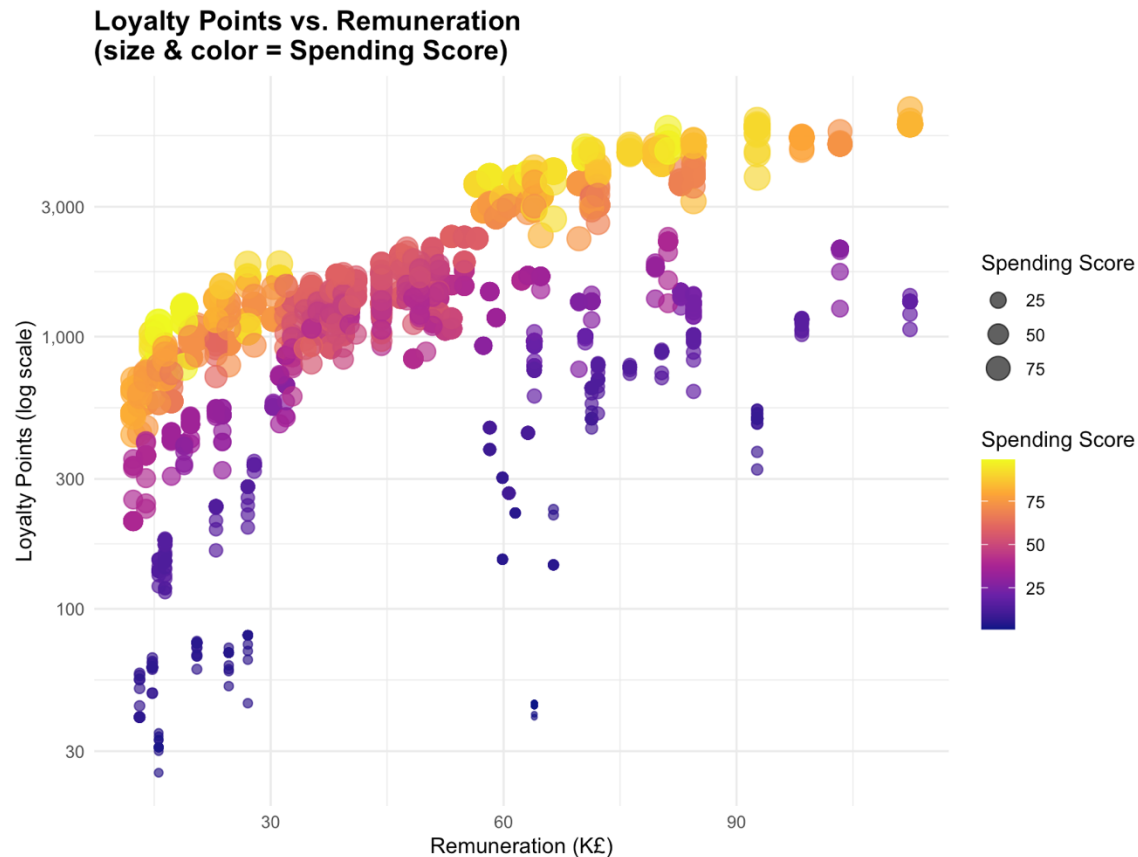
Model Performance & Diagnostics

- We can forecast each customer's loyalty points with over 80 % accuracy on new data, so our predictions are reliable.

- By plugging in a customer's spending score, income, age and gender, the model estimates their likely points balance before they even shop.

- Those forecasts let us assign customers to the right reward tier or offer in real time, personalising outreach and driving engagement.

- We can integrate this simple four-input model into our CRM to trigger "you could earn X more points" nudges and targeted promotions.

Actual vs Predicted Loyalty Points
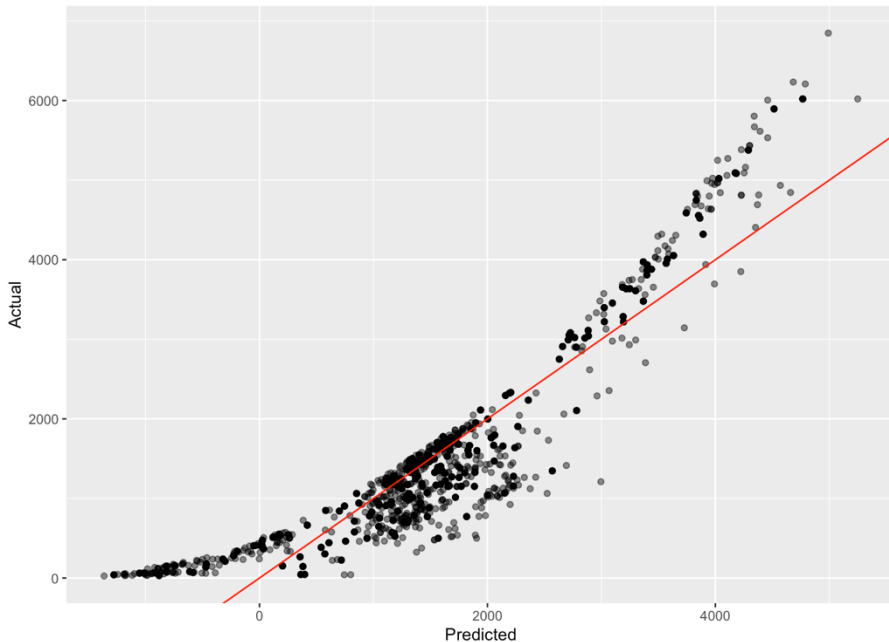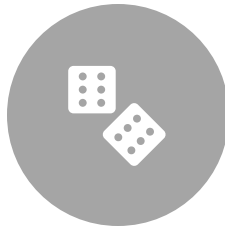
Residuals vs Fitted Values
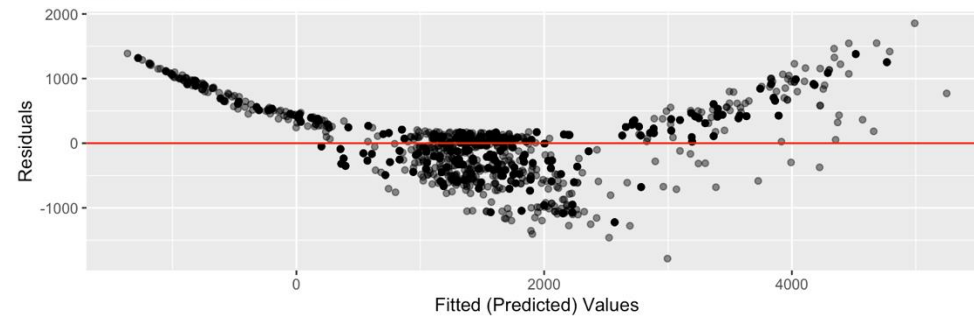
Recommendations

INTEGRATE THE LOYALTY-POINT MODEL INTO OUR CRM TO ASSIGN CUSTOMERS TO PREDICTED TIERS IN REAL TIME.

AUTOMATICALLY TRIGGER BONUS-POINT NUDGES FOR HIGH-VALUE CUSTOMERS WHOSE ACTUAL POINTS LAG THEIR PREDICTED BALANCE.

RUN A/B TESTS OF TAILORED MESSAGES AND OFFERS FOR EACH OF THE FIVE SEGMENTS TO MEASURE UPLIFT AND REFINE CREATIVE.

STAND UP A LIVE SENTIMENT DASHBOARD FOR MARKETING AND PRODUCT TEAMS SO THEY CAN SPOT SHIFTS IN "GAME BORINGNESS" FEEDBACK AND COURSE-CORRECT QUICKLY.

Future Exploration

Augment the loyalty model with purchase frequency and average basket value to sharpen predictions of point accrual.

Deploy topic-modelling on review and social-media text to pinpoint emerging themes, such as "game boringness", that inform product and marketing strategy.

Build a dashboard that tracks how customers move between segments over time so we can measure campaign impact and adjust targeting.

Incorporate real-time behavioural feeds (for example site clicks or support inquiries) to detect early shifts in engagement and loyalty.

Conclusion

A data-driven roadmap positions Turtle Games to strengthen loyalty and drive sales.