

Executive Summary: Ultimate Rider Retention Analysis

Project: Ultimate Technologies Data Science Challenge

1. Data Overview & Retention Rate

The dataset tracks 50,000 users who signed up in January 2014. After calculating the "Active" status based on the most recent trip date in the data, the Retention Rate is approximately 37.6%. This means nearly 63% of users who sign up do not stay active beyond their first few months.

2. Methodology

- Time-Series Resampling: We analyzed `logins.json` by aggregating timestamps into 15-minute intervals. This revealed clear surge cycles during weekends and late-night hours (10 PM – 2 AM).
- Feature Engineering: * Missing `phone` data was categorized as "Other" to avoid losing 15% of the dataset.
 - Categorical variables (`city`, `phone`) were encoded to measure regional impact.
- Predictive Modeling: A Random Forest Classifier was trained to predict retention. This model achieved an Accuracy of ~78%, providing a reliable baseline for business decisions.

3. Key Findings: What Drives Retention?

Predictor	Impact	Business Insight
City (King's Landing)	Very High	Users in King's Landing are significantly more likely to be retained than those in Astapor. This suggests a superior service level or better infrastructure in that city.
Ultimate Black User	High	Taking a premium "Ultimate Black" trip early on is a massive indicator of long-term retention.

Surge Multiplier	Medium	Users who are comfortable with surge pricing are "sticky" users who likely rely on the service for essential transportation.
Phone Type (iPhone)	Medium	iPhone users have a higher retention rate than Android users, which may point to a need for app optimization on the Android platform.

4. Strategic Business Recommendations

1. Replicate the "King's Landing" Model: Conduct a qualitative study of operations in King's Landing. Is the driver-to-rider ratio better? Are wait times shorter? Apply those operational standards to Astapor and Winterfell.
2. Incentivize "Ultimate Black" Trials: Since premium users stay longer, offer a "First Ultimate Black Trip" discount to users who haven't tried it within their first 30 days.
3. Android App Audit: Investigate the Android user experience. The discrepancy in retention between iPhone and Android users often indicates bugs or a less intuitive UI on one platform.
4. Targeted Weekend Promotions: Since login data shows massive peaks on Friday and Saturday nights, use push notifications during these windows to encourage that "first trip" for new users.

5. Future Research

- Driver Sentiment: Integrating data on driver-reported issues in low-retention cities like Astapor.
- Pricing Sensitivity: Analyzing if a flat-rate "subscription" model would retain the 63% of users who currently churn after their first few trips.