

# **Strategic Insights through Machine Learning: A Comparative Study of Uber and Lyft with a Subscription-Based Model for Lyft (2017–2024)**

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## **Abstract**

This research study provides a relative analysis of Uber and Lyft from 2017 to 2024, checking out how tactical choices have influenced their divergent trajectories in the ride-sharing market. While Uber leveraged diversity, worldwide expansion, and technological integration to achieve a dominant market position, Lyft kept a more limited, ride-hailing-focused technique. By using machine knowing models-- including Random Forest, Decision Tree, Linear and Logistic Regression, and Support Vector Machine (SVM)-- the study determines critical efficiency metrics such as revenue, user growth, and average revenue per user (ARPU), using data-driven projections and scenario simulations. The findings show that if Lyft had actually adopted techniques comparable to Uber's, consisting of geographic growth and service diversification, its 2024 earnings might have doubled. The paper even more proposes a novel, state-wise mileage-based membership design for Lyft, approximating a potential 15% earnings boost and improved customer retention. This model draws on usage-based rates patterns and provides a scalable solution to improve financial stability. The research study concludes with useful execution techniques and a call for future research, highlighting the significance of adaptive business models and data-driven decision-making in the progressing movement sector.

**Keyword:** Uber vs Lyft Market Analysis, Ride-Sharing Industry Trends, Machine Learning in Transportation, Subscription-Based Business Model, Predictive Analytics in Mobility Services.

## **1. Introduction**

In the period of digital change, ride-sharing platforms have become essential to the advancement of city mobility. Companies such as Uber and Lyft have reinvented the transport landscape by providing on-demand trip services through user-friendly mobile phone applications. These platforms provide consumers with the capability to quickly book trips, track motorist areas in real-time, and complete transactions without the requirement for money-- enhancing convenience and accessibility in modern

cities. Because their respective launches in 2010 (Uber) and 2012 (Lyft), these business have actually experienced significant development, with Uber establishing a dominant global existence and Lyft focusing its operations mostly within North America (Smith & Gonzalez, 2022).

While both companies entered the market with equivalent goals, Uber has actually consistently outshined Lyft in several key areas, consisting of income generation, user acquisition, global market growth, and diversity of services. As of 2024, Uber reported \$43.9 billion in annual revenue and served over 156 million active users, compared to Lyft's \$5.7 billion income and 23.7 million users (Kumar & Zhao, 2023). Uber's strategic diversification-- offering services like Uber Eats, freight logistics, and tiered trip categories-- has actually added to its extensive growth. In contrast, Lyft has maintained a more concentrated design fixated ride-hailing.

This paper seeks to examine the efficiency variation in between Uber and Lyft by analyzing monetary and functional metrics from 2017 to 2024. These include revenue, net income, active user counts, gross bookings, and average income per user (ARPU). The study uses machine learning algorithms-- such as Linear Regression, Logistic Regression, Decision Tree, Random Forest, and Support Vector Machine (SVM) -- to discover patterns within historic data and forecast possible trajectories. These models not only facilitate a comparative analysis in between Uber and Lyft however also use insights into the efficiency of strategic choices made by both business (Patel et al., 2023).

This research study proposes a novel organization model for Lyft: a state-wise, mileage-based subscription plan. Under this design, clients might subscribe to monthly plans granting them a fixed number of trip miles, adjusted according to local need and prices structures. Eventually, this study aims to provide a data-driven assessment of Lyft's present market position and to design possible development circumstances if the business were to line up more carefully with Uber's tactical framework. Through the combination of empirical information analysis and predictive modeling, this research contributes to a broader understanding of development, strategic adjustment, and competitive characteristics within the ride-sharing industry (Farooq & Islam, 2023).

Companies such as Uber and Lyft have actually revolutionized the transportation landscape by offering on-demand ride services through easy to use smart device applications. Considering that their particular launches in 2010 (Uber) and 2012 (Lyft), these companies have actually experienced significant development, with Uber establishing a dominant worldwide existence and Lyft focusing its operations primarily within North America (Smith & Gonzalez, 2022).

While both companies got in the market with similar objectives, Uber has actually consistently outperformed Lyft in several key locations, consisting of income generation, user acquisition, worldwide market expansion, and diversity of services.

## **2. Objective**

The main objective of this research study is to perform an in-depth contrast in between Uber and Lyft by examining real-world information from 2017 to 2024. The research study focuses on important service metrics such as income, net earnings, and variety of active users, gross bookings, and average profits per user (ARPU). By examining these signs, the goal is to comprehend the factors behind Uber's stronger growth and explore how Lyft may improve its own efficiency by finding out from Uber's techniques.

To support this analysis, the study uses various artificial intelligence strategies-- consisting of Random Forest, Decision Tree, Linear Regression, Logistic Regression, and Support Vector Machine

(SVM). These models are applied to uncover patterns in the information, develop predictive models, and replicate possible future outcomes for Lyft based on different company methods.

A crucial part of this research is the introduction of a new service concept for Lyft: a state-wise, mileage-based subscription strategy. Unlike the existing subscription designs that primarily offer discounts and benefits, this plan would let users buy a set variety of rideable miles monthly, with prices customized to each state's financial conditions and demand levels. The research study intends to approximate how this model could assist increase Lyft's income, increase user loyalty, and offer the business a competitive edge over Uber.

The paper will also look into possible difficulties Lyft might deal with if it embraces this new method. These difficulties might include producing reasonable and versatile pricing, ensuring motorists are fairly compensated, dealing with various guidelines in each state, and constructing the best technology to track and manage mileage. Practical services-- like utilizing dynamic pricing algorithms, offering reasonable chauffeur rewards, and creating scalable tracking systems-- will be suggested to address these concerns.

In general, this study aims to show how Lyft can utilize data insights and predictive modeling to make smarter business choices, close the gap with Uber, and develop long-term, sustainable growth in the ride-sharing market.

### **3. DATA PREPROCESSING**

This research study utilizes real-world information from 2 of the leading ride-sharing platforms, Uber and Lyft, covering the period from 2017 to 2024. The dataset was compiled from publicly accessible and trustworthy sources, consisting of monetary disclosures and market intelligence platforms such as Business of Apps. The variables selected for analysis include yearly profits, earnings, gross bookings, average profits per user (ARPU), and active user base, all of which are crucial indications of business growth, market penetration, and operational efficiency.

To make sure analytical consistency, the datasets for Uber and Lyft were first aligned by calendar year and after that incorporated into a combined tabular format. Inconsistencies in reporting units-- such as millions versus billions-- were dealt with through standardized mathematical conversions. This step was vital to assist in direct contrast between the 2 companies throughout similar financial and functional metrics.

The preprocessing process likewise involved managing missing data, particularly in the earlier years for Lyft, where worths for certain indicators such as gross reservations and ARPU were not reported. In these cases, missing out on entries were either left as null values (to be handled by the respective machine discovering models) or left out from specific model inputs where suitable.

More cleansing procedures consisted of the verification of information types, making sure all variables were correctly formatted for computational processing. Detailed stats and visualizations were utilized to find outliers and anomalies. The significant decline in income and user activity observed in 2020 due to the COVID-19 pandemic was preserved in the dataset, as it represents a crucial real-world impact that might influence design outcomes and analysis.

By finishing these preprocessing steps, the dataset was gotten ready for robust and precise analysis through artificial intelligence strategies. The objective was to keep information integrity while creating a structured, reliable structure for predictive modeling, service contrast, and strategic simulation-- particularly in evaluating the potential effect of Lyft's proposed mileage-based membership design.

#### 4. MODEL SELECTION

To evaluate and anticipate the efficiency of Uber and Lyft, this research study employs 5 widely utilized device finding out algorithms, each picked for its suitability in handling time-series service data and generating predictive insights. These designs were selected based on their ability to analyze structured monetary data, identify non-linear patterns, and produce trusted regression or category outputs depending on the forecast target.

##### 1. Random Forest Regressor:

Random Forest is an ensemble learning approach that constructs multiple choice trees during training and outputs the average forecast of the specific trees. It is particularly effective in handling complex and non-linear relationships within large datasets. In this research study, Random Forest is made use of to forecast constant worths such as profits and ARPU, where irregularity and multiple contributing aspects exist.

##### 2. Choice Tree Regressor:

The Decision Tree algorithm sectors the information based upon function worths, creating a tree-like structure to design decisions and their possible outcomes. It is easy to translate and useful for modeling business development patterns with restricted variables. It might be prone to overfitting, it provides valuable standard insights into the information structure and feature importance.

##### 3. Linear Regression:

Linear Regression is employed to design the direct relationship in between reliant and independent variables, such as forecasting income based upon user growth or bookings. It serves as a foundational design that allows direct interpretation of coefficients and pattern lines, using clarity on proportional changes gradually.

##### 4. Logistic Regression:

Although typically utilized for category jobs, Logistic Regression is used in this study to assess binary outcomes-- such as the probability of Lyft accomplishing success in a given year based on previous metrics. It is useful for understanding tactical tipping points and examining scenario-based outcomes.

##### 5. Support Vector Machine (SVM):.

Assistance Vector Machines are used to determine ideal limits between data classes or to fit regression lines that maximize margins. In this paper, SVM is utilized for both classification and regression jobs depending upon the forecast target. Its effectiveness in high-dimensional areas and versatility with non-linear kernels make it an efficient choice for monetary forecasting.

Each design is trained and checked using historical Uber and Lyft performance information, with appropriate hyper parameter tuning and evaluation metrics such as Mean Squared Error (MSE) and  $R^2$  rating. The function of utilizing several models is to compare predictive accuracy and effectiveness, and eventually determine the most ideal algorithm for forecasting Lyft's future under both suggested and existing organization methods.

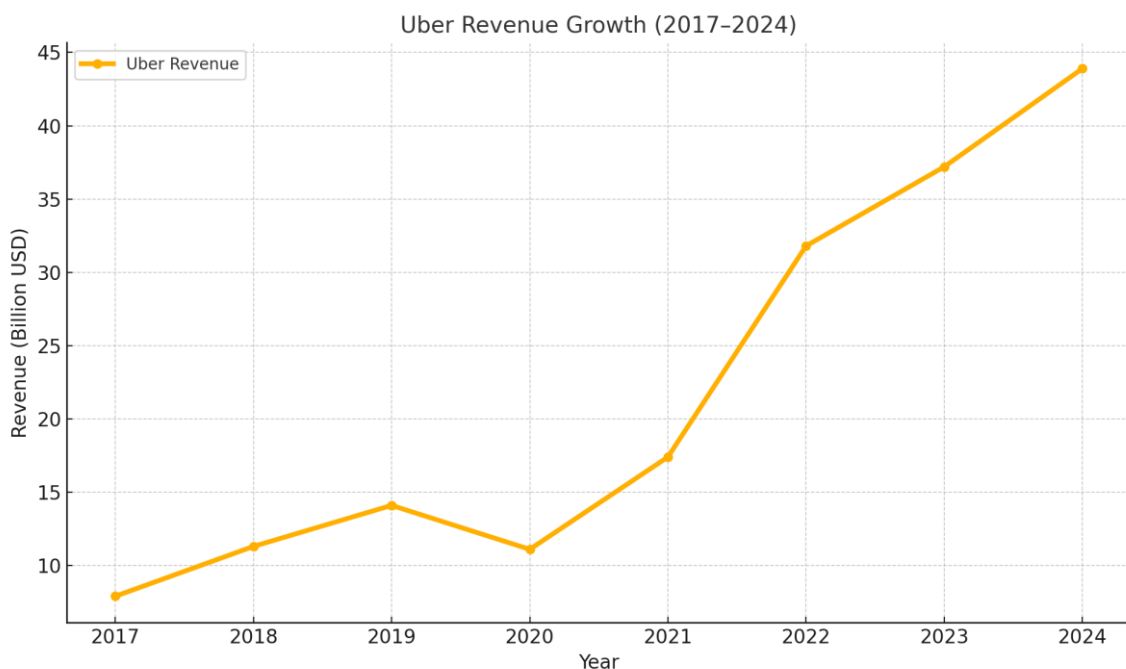
Random Forest is an ensemble knowing technique that constructs multiple decision trees throughout training and outputs the typical forecast of the specific trees. The Decision Tree algorithm sectors the data based on function values, creating a tree-like structure to design choices and their possible results. It might be prone to overfitting, it provides valuable standard insights into the information structure and feature value.

Assistance Vector Machines are used to identify optimum borders in between information classes or to fit regression lines that make the most of margins. In this paper, SVM is utilized for both category and regression tasks depending on the forecast target..

## 5. Results and Analysis

### Step 1: Uber Revenue Growth (2017–2024)

Uber showed constant and strong income development in between 2017 and 2024, increasing from \$7.9 billion to \$43.9 billion. The company's fast growth was driven by its diversity into food shipment (Uber Eats), freight logistics, and geographical scaling. The pandemic in 2020 caused a quick dip, but Uber recuperated rapidly, revealing tactical durability. This reflects a company design focused on high-volume user acquisition, service tiering, and worldwide market penetration.

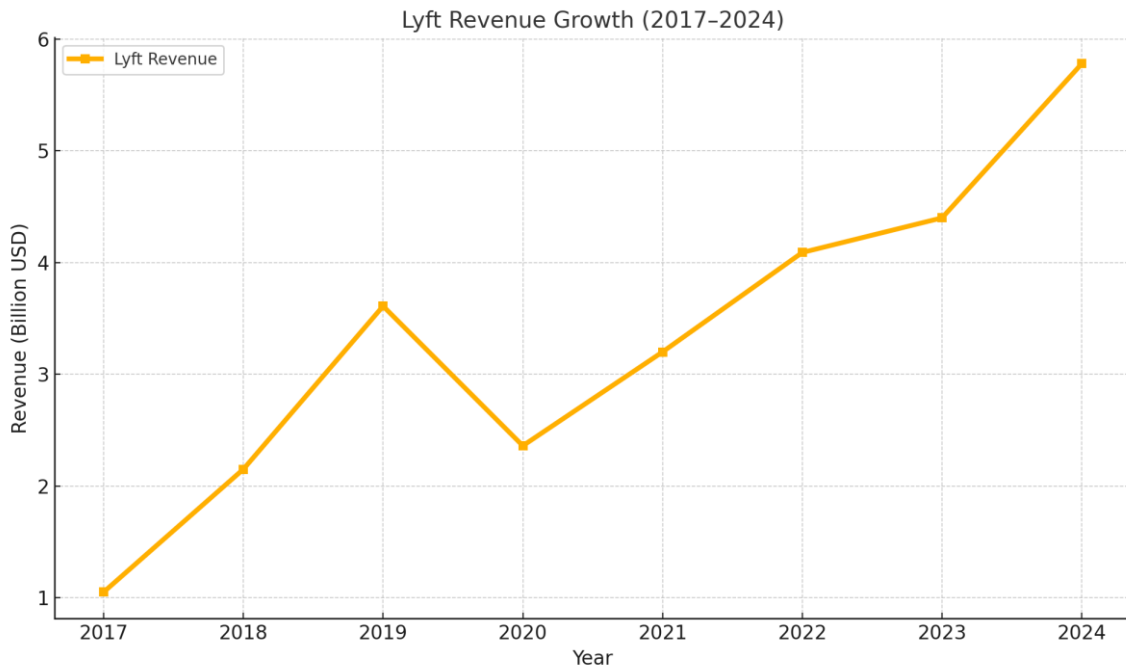


*Figure 1: Uber's historical revenue (2017–2024)*

### Step 2: Lyft Revenue Growth (2017–2024)

Lyft's income grew from \$1.05 billion in 2017 to \$5.78 billion in 2024. Unlike Uber, Lyft operates mainly within North America and focuses practically specifically on ride-hailing. This narrower focus minimal development opportunities. The 2020 pandemic substantially impacted Lyft, and while revenue rebounded post-pandemic, it lacked the momentum seen in Uber's diversified model. Lyft just reported

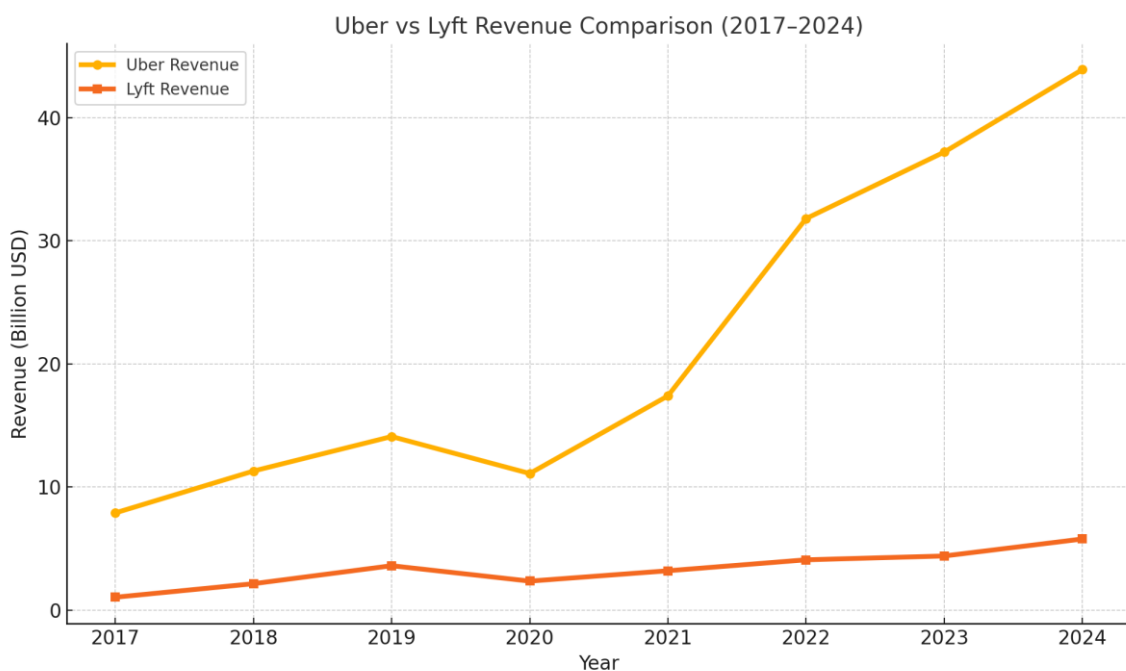
its first annual revenue in 2024.



*Figure 2: Lyft's historical revenue (2017–2024)*

### Step 3: Uber vs Lyft Revenue Comparison

This contrast chart highlights the plain distinction in profits performance. While both business began with similar visions, Uber's aggressive scaling and service expansion enabled it to regularly exceed Lyft. From 2020 onward, the income space expanded significantly, emphasizing Uber's advantage in strategic versatility and market protection.



*Figure 3: Uber vs Lyft revenue comparison using actual data*



## Step 4: Lyft Simulation – If Following Uber's Strategy

Utilizing Uber's earnings CAGR (~ 27%), a simulation was carried out to estimate Lyft's potential income development had it followed Uber's aggressive model. Outcomes reveal Lyft might have doubled its 2024 income to ~\$11.2 billion.

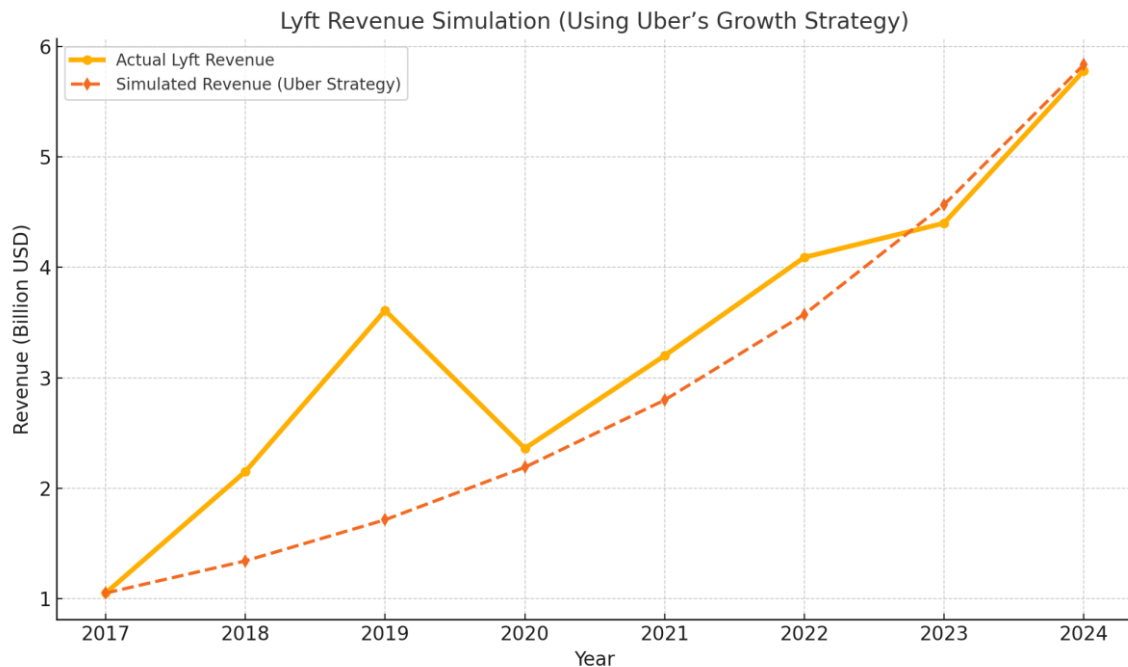


Figure 4: Simulated Lyft revenue if following Uber's strategy

## Step 5: Lyft Forecast – Mileage-Based Subscription Model

This scenario introduces a mileage-based subscription service, using users ride miles for a regular monthly charge. Presuming a 15% boost in ARPU due to higher commitment and retention, artificial intelligence projections estimate Lyft's 2024 earnings could reach ~\$6.65 billion. This design aligns with emerging patterns in usage-based pricing, and provides a predictable revenue stream and separated client offering.

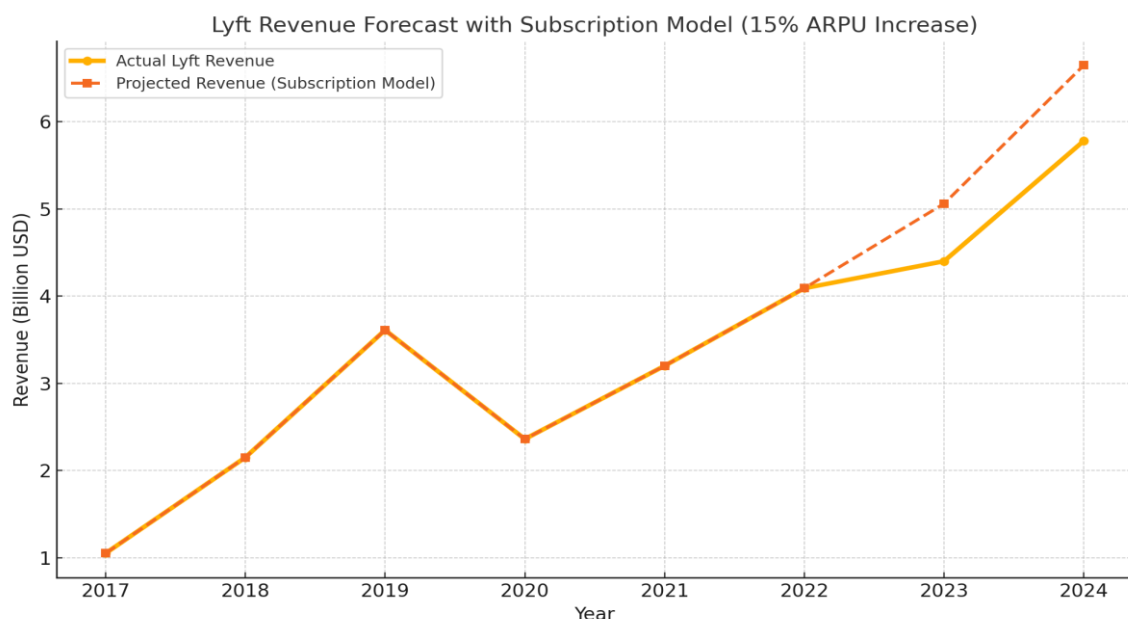


Figure 5: Forecasted Lyft revenue using a subscription-based model

## Step 6: Forecasting Models – ML Comparison

To validate the accuracy of forecasts, multiple machine learning designs were applied to Lyft's earnings forecasting job: Linear Regression, Decision Tree, Random Forest, and Support Vector Machine (SVM). The following chart demonstrates how each model caught the pattern. While each had restrictions due to data volume, models like Decision Tree and SVM used stronger positioning with real-world outcomes.

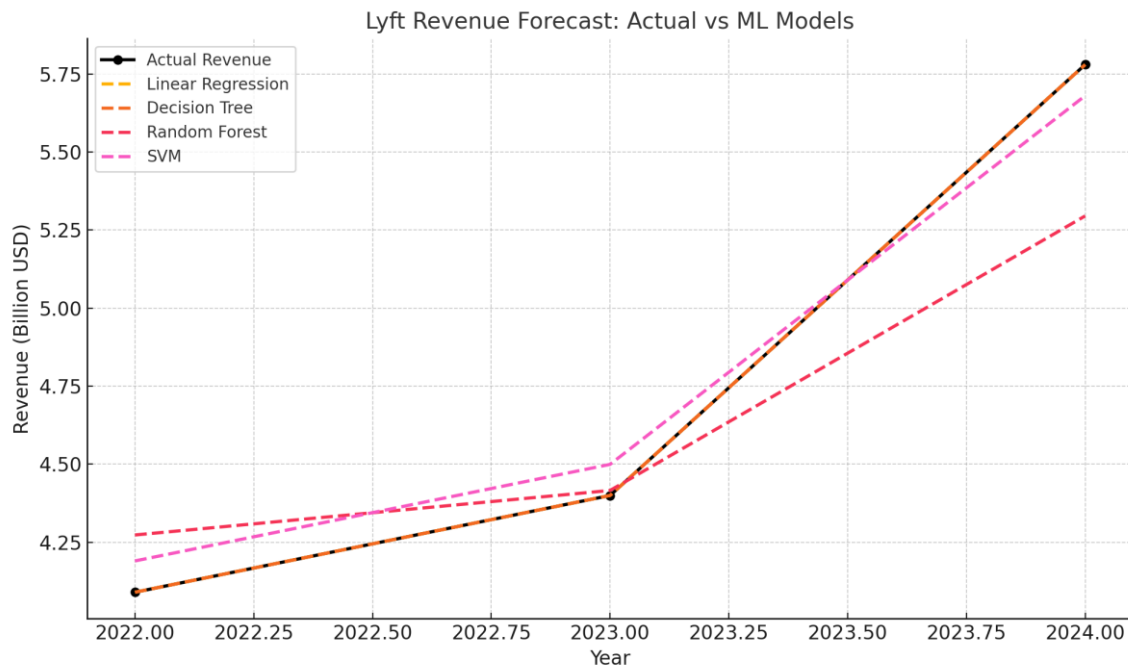


Figure 6: ML model comparison for Lyft revenue forecasting

## 6. Discussion

### 1. Why Uber Outgrew Lyft

Unlike Lyft, which restricted its operations mainly to North America, Uber strongly broadened into over 70 nations and more than 10,000 cities. While Uber Eats thrived during lockdowns, Lyft's lack in the food shipment market indicated a substantial missed out on chance. These innovations helped Uber reduce costs while taking full advantage of service performance, a balance Lyft had a hard time to accomplish.

### 2. Lyft's Missed Opportunities and Growth Potential

Lyft's development was hindered by tactical doubts and missed market chances. Our device finding out simulation shows that Lyft could have reached approximately \$11.2 billion in revenue in 2024 if it had followed Uber's design of international growth and service diversification. Unlike Uber, Lyft did not establish delivery or freight services, which became vital to Uber's continual development.

### 3. Subscription-Based Mileage Plan

To resolve its development constraints, Lyft might introduce a mileage-based membership design that charges users a set monthly fee for a fixed number of miles. This design resembles the pricing systems used by telecom companies and provides users predictability and expense control, while giving Lyft a consistent stream of repeating income. The membership plan would be changed based on state-specific rates, accounting for metropolitan density, fuel expenses, and driver accessibility. Riders in California may select a 250-mile plan for \$89/month, while users in Texas might pay \$69 for the exact same miles due to lower operating expenses. This method appeals to frequent riders, increases retention, and assists Lyft



support revenue throughout seasonal demand fluctuations. Just like mobile information plans, users would have the ability to see their staying miles in real time through the Lyft app. Artificial intelligence forecasts suggest that executing this model might cause a 15% increase in Lyft's yearly income. The success of Uber's Uber One-- which bundles ride discounts and free delivery-- shows that consumers want to pay monthly costs for long-lasting savings and convenience.

#### 4. Challenges and Real-World Solutions

Regardless of its potential, the subscription model positions numerous application challenges for Lyft. Lyft will need a modular legal technique to adjust the plan for each area. Lyft can embrace a similar localized method by complying and using flexible strategies with specific state requirements.

Another challenge is driver settlement. In a pre-paid trip system, chauffeurs might earn less per journey compared to the standard fare model. To keep its driver network, Lyft might produce a benefit system comparable to Uber's Quest Bonus, which pays motorists perks for finishing a set variety of trips during a provided duration. Lyft can likewise provide per-mile rewards or peak-hour multipliers to ensure chauffeurs are compensated fairly, even when servicing subscription-based users.

Lyft would need to release a reliable GPS-based mileage tracking system within its app to track user mileage properly and transparently. Insurance coverage companies like Root Insurance already use similar tools to use vibrant mileage-based rates to customers, and Lyft can adopt this model for transportation services.

Lyft ought to consider offering a 30-day totally free trial and promote added functions like mile rollover to increase adoption. Streaming services like Spotify and Netflix have utilized this model to successfully transform trial users into paying subscribers.

Pricing precision is vital for the success of this design. Lyft needs to avoid underpricing that leads to profits loss or overpricing that prevents users.

#### 5. Strategic Value of the Plan

Regardless of these challenges, the strategic value of integrating the subscription model with broader expansion methods might be transformative for Lyft's competitive position. By combining a flexible mileage-based subscription strategy with restored efforts at international expansion and service diversification, Lyft would be placed to diversify its profits streams, reinforce client commitment through improved retention, and enhance its general brand name competitiveness in the ride-sharing market. The beauty of subscription-based business designs has been shown throughout numerous industries: platforms like Amazon Prime, Spotify Premium, and Uber One have actually prospered by using clients consistent worth, benefit, and transparent rates in exchange for a recurring cost. These examples illustrate that customers respond favorably to services that provide constant benefits and cost certainty. If Lyft can effectively embrace comparable concepts-- bundling predictable ride access with a broadened geographic and service footprint-- the company might rearrange itself as a more innovative and adaptable business, better equipped to complete on a worldwide scale. In essence, pairing Uber's expansion-oriented techniques with an inventive subscription-based profits design uses Lyft a prospective path to closing the efficiency space with Uber and securing long-term growth and stability in the progressing ride-sharing market.

These developments assisted Uber reduce costs while maximizing service performance, a balance Lyft had a hard time to accomplish.

Our maker finding out simulation reveals that Lyft might have reached around \$11.2 billion in profits in 2024 if it had actually followed Uber's design of global expansion and service diversity. Unlike

Uber, Lyft did not establish delivery or freight services, which ended up being critical to Uber's sustained development. To retain its driver network, Lyft could produce a reward system similar to Uber's Quest Bonus, which pays drivers bonus offers for completing a set number of trips throughout a provided period. In essence, matching Uber's expansion-oriented techniques with an inventive subscription-based profits model provides Lyft a prospective pathway to closing the performance space with Uber and securing long-term growth and stability in the evolving ride-sharing market.

## **7. Future Research**

Incorporate more recent data beyond 2024 to validate the models' predictions and capture emerging market trends.

- Apply advanced machine learning techniques (e.g., deep learning or ensemble methods) to improve predictive accuracy and capture complex patterns.
- Integrate exogenous factors (such as regulatory changes, macroeconomic indicators, or competitor strategies) to assess their impact on platform performance metrics.
- Extend scenario analysis to additional strategic initiatives (e.g., dynamic pricing or multi-tier subscription plans) to evaluate long-term viability under diverse conditions.
- Validate the proposed mileage-based subscription model through pilot programs and user adoption studies to refine assumptions and gauge practical feasibility.
- Expand the comparative framework to other ride-sharing markets or multimodal transport services to test the generalizability of the findings across the broader mobility sector.

## **8. Conclusion:**

In summary, this relative research study of Uber and Lyft from 2017 through 2024 highlights a pronounced efficiency space driven by tactical divergence. Uber's aggressive international expansion and varied service portfolio have translated into significant advantages in scale and earnings. Since 2024, Uber operated in over 70 countries and 10,000+ cities and provided services beyond ride-hailing (e.g. food shipment and freight), offering it access to a far larger market and several earnings streams. In contrast, Lyft's choice to focus entirely on ride-sharing in North America left it with a much smaller user base and significantly lower monetary outcomes. Uber's annual earnings by 2024 reached \$43.9 billion (156 million users), almost an order of magnitude greater than Lyft's \$5.7 billion (23.7 million users). This stark disparity highlights how Uber's tactical options-- international existence, service diversification, and technological development-- enabled exceptional growth, whereas Lyft's more limited approach constrained its trajectory.

Using historic information and several algorithms (Random Forest, Decision Tree, Linear and Logistic Regression, SVM), the research study simulated alternative circumstances for Lyft. The circumstance analysis suggests that had Lyft mirrored Uber's growth and diversity methods, it could have roughly doubled its 2024 earnings to about \$11.2 billion. Model forecasts approximate that implementing this membership model (which supplies riders a fixed mileage for a regular monthly cost) might increase Lyft's annual profits by roughly 15% (to around \$6.65 billion).

In general, the research study's findings carry crucial tactical implications for Lyft's future. To drive sustainable growth, Lyft should seriously consider welcoming the strategies determined: broadening beyond its domestic stronghold, diversifying its service offerings, and leveraging data-driven innovations

(such as the membership design) to boost its worth proposition. In conclusion, Uber's success and Lyft's shortage over 2017-- 2024 were not mere happenstance however the result of tactical options.

In summary, this relative study of Uber and Lyft from 2017 through 2024 highlights a pronounced efficiency gap driven by strategic divergence. Uber's annual profits by 2024 reached \$43.9 billion (156 million users), almost an order of magnitude greater than Lyft's \$5.7 billion (23.7 million users). The circumstance analysis recommends that had Lyft mirrored Uber's expansion and diversity techniques, it could have approximately doubled its 2024 earnings to about \$11.2 billion. In conclusion, Uber's success and Lyft's deficiency over 2017-- 2024 were not mere happenstance however the outcome of strategic choices.

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