

# Revenue Optimization & Business Recommendation

Beyond prediction accuracy, this analysis translates model insights into actionable business decisions. The objective was to identify ticket prices that maximize expected revenue while maintaining realistic operational constraints.

## 1. Business Assumptions

- Venue capacity is approximately fixed.
- Attendance depends on ticket price and crowd energy.
- Crowd energy indirectly influences repeat attendance and spending.
- Fixed and variable costs per show are constant.

## 2. Demand Modeling

A simplified linear demand model was assumed:  $\text{Crowd\_Size} = a + \alpha \cdot \text{Crowd\_Energy} - b \cdot \text{Ticket\_Price}$ . Ordinary Least Squares regression was used to estimate price sensitivity and energy effects separately for each venue.

## 3. Revenue & Profit Formulation

Revenue was defined as  $\text{Ticket\_Price} \times \text{Crowd\_Size}$ . Profit incorporates fixed and variable costs. Taking the derivative of revenue with respect to price yields a closed-form optimal price. This analytical solution provides interpretability and transparency for decision-makers.

## 4. Constraints & Practicality

Unconstrained optimization produced unrealistic prices due to linear extrapolation. Therefore, optimal prices were constrained within observed historical ranges. This ensures recommendations remain actionable and credible.

## 5. Business Recommendation

The recommended prices should be interpreted as directional guidance rather than exact values. For premium venues, higher prices can be sustained without harming engagement, while other venues benefit more from affordability-driven volume. This framework enables data-driven pricing decisions adaptable to future tours.