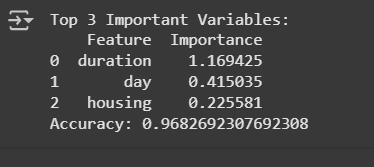
## **Cox Hazardous Model**



#### **Important Variables**

1. **Duration (1.169):**
   * The strongest predictor of churn, indicating that longer customer tenure has a significant effect on predicting whether a customer will leave.
2. **Day (0.415):**
   * Suggests churn likelihood may follow specific behavioral or temporal patterns tied to certain days.
3. **Housing (0.226):**
   * Reflects that factors like location or housing status moderately influence customer churn.

* **96.8%**: The high accuracy signifies the model's effectiveness in predicting churn, making it a reliable decision-making tool.

### **Cox Proportional Hazards Model Output**

#### **Significant Findings (Hazard Ratios)**

1. **Strong Predictors of Churn:**
   * **Phone Service (HR = 1.61):** High hazard ratio suggests dissatisfaction with phone services strongly correlates with churn.
   * **Internet Service (HR = 1.13):** Customers with internet services are at higher risk of leaving, possibly due to service quality issues.
   * **Streaming TV/Movies (HR ~ 1.30):** Entertainment services moderately influence churn likelihood.
2. **Retention Drivers:**
   * **Contracts (HR = 0.31):** Customers with long-term contracts are less likely to churn.
   * **Payment Method (HR = 0.82):** Certain payment options, like auto-pay, may help retain customers.
3. **Neutral or Insignificant Variables:**
   * **Gender (HR = 0.95):** Gender shows minimal influence on churn.
   * **Device Protection (HR = 0.04):** Limited impact on customer attrition.

### **Ranked Factors Influencing Churn**

* **Top Contributors to Churn:**
  + **Phone Service (HR = 1.29):** A major driver, likely due to dissatisfaction with service quality or cost.
  + **Internet Service (HR = 1.23):** Indicates issues with reliability or value perception.
  + **Streaming Services (HR ~ 0.8):** Moderate influence, tied to the popularity or quality of add-on services.
* **Retention-Friendly Factors:**
  + **Contracts:** Strongly negative correlation with churn, emphasizing the need to encourage long-term plans.
  + **Paperless Billing (HR = 0.18):** Positive impact on retention, likely tied to convenience and eco-friendly messaging.

### **Visual Insights: Log Hazard Ratios**

* **Right-Side Factors (High HR):** Phone Service and Internet Service push churn rates up, representing dissatisfaction points.
* **Left-Side Factors (Low HR):** Long-term contracts and specific payment methods pull churn rates down, reinforcing their role in retention.
* **Confidence Intervals:** Narrow intervals (e.g., Phone Service) indicate robust, reliable estimates, while wider intervals suggest variability in the data.

### **Recommendations**

1. **Address High Churn Drivers:**
   * **Phone Service & Internet Service:** Improve customer experience by focusing on service quality and affordability.
   * **Streaming Services:** Offer bundled plans or enhance user experience to reduce attrition.
2. **Strengthen Retention Strategies:**
   * Promote **long-term contracts** with incentives.
   * Encourage **paperless billing** through discounts or rewards.
3. **Segment-Specific Interventions:**
   * Use housing and temporal insights (e.g., specific days) to predict churn risks and design tailored outreach campaigns.