

# Engineering Document for Integration with ClickPost System

**Aim:** Integrate the EDD prediction model into ClickPost's platform to enable real-time and bulk processing of SLA predictions.

## Integration Procedure:

### 1. Data Pipeline:

- Establish a robust pipeline to collect shipment data in real-time from ClickPost's database or API.
- Standardize and preprocess incoming data to ensure compatibility with the prediction model (e.g., encoding categorical features, converting dates).

### 2. Model Deployment:

- Deploy the RandomForestRegressor model as a REST API using Flask or FastAPI.
- API Endpoints:
  - `/predict_sla` for single predictions.
  - `/bulk_predict_sla` for batch processing.

```
[ ]: # Example Input JSON:
{
  "order_shipped_date": "2024-12-20",
  "pickup_pin_code": 110001,
  "drop_pin_code": 560001,
  "quantity": 2,
  "courier_partner_id": 5,
  "account_mode": "Air"
}
```

```
[ ]: # Example Output JSON:
{
  "predicted_exact_sla": 3
}
```

### 1. Batch Predictions:

- Extend the API to process bulk data (e.g., upload CSVs with multiple shipment records).
- Output predictions in CSV or JSON format for easy integration.

### 2. Database Integration:

- Store predicted EDD values in ClickPost's database alongside shipment records.
- Use database indexing to optimize query performance for large-scale predictions.

### 3. Dashboard Integration:

- Embed predictions in ClickPost's operational dashboards.
- Enable filters for SLA trends by courier, region, or other parameters.

#### 4. **Monitoring and Retraining:**

- Monitor real-time prediction accuracy by comparing with actual delivery dates.
- Retrain the model periodically using new shipment data to maintain high performance.

#### 5. **Error Handling:**

- Implement fallback mechanisms for cases where predictions fail or input data is incomplete.
- Default SLA values or simple heuristic-based predictions can act as a temporary substitute.

### **Conclusion:**

The integration of the EDD prediction model will enhance ClickPost's operational efficiency by providing accurate delivery timelines. The suggested deployment strategy ensures scalability, robustness, and seamless adoption into existing workflows.

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