Low Level Design Document

Introduction

This Low Level Design (LLD) document outlines the implementation details for **PulseCare - Healthcare KPI Dashboard**. The project aims to deliver an interactive Tableau dashboard visualizing key hospital metrics such as patient admissions, average length of stay, and readmission rates, with user-driven filters and summary KPIs.

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1. System Components

Component	Description	Key Responsibilities
Data Source	Sample hospital dataset (CSV/Excel/DB)	Store and provide raw healthcare data
Data Preparation	ETL/cleaning scripts (Tableau Prep/Excel)	Clean, transform, and aggregate data
Tableau Workbook	Tableau dashboard file (.twb/.twbx)	Visualize KPIs, implement filters
User Interface	Tableau dashboard UI	Display metrics, enable interactivity

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2. Class/Interface Overview

Class/Interface	Description	Key Methods/Attributes
DataConnector	Connects Tableau to data source	`connect()`, `refresh()`, `getSchema()`
DataModel	Represents cleaned data	`admissions`, `length_of_stay`, `readmissions`
KPIView	Tableau worksheet for each KPI	`render()`, `applyFilter()`
FilterControl	Interactive filter interface	`onChange()`, `getSelectedValues()`

Relationships:

- `DataConnector` feeds data to `DataModel`
- `DataModel` is visualized by `KPIView`
- `FilterControl` interacts with `KPIView` to update views

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3. Data Structure Overview

Field Name	Type	Description
patient_id	String	Unique patient identifier
admission_date	Date	Date of hospital admission

discharge_date	Date	Date of discharge
readmission_flag	Boolean	Indicates if patient was readmitted
department	String	Hospital department
age	Integer	Patient age
gender	String	Patient gender

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4. Algorithms/Logic

KPI Calculation Pseudocode:

```
# Admissions
admissions = COUNT(DISTINCT patient_id WHERE admission_date IN selected_period)

# Average Length of Stay
length_of_stay = AVG(DATEDIFF(discharge_date, admission_date))

# Readmission Rate
readmission_rate = COUNT(patient_id WHERE readmission_flag=True) / COUNT(patient
```

Filter Application Flow:

1. User selects filter(s) (e.g., date range, department)
2. Dashboard updates data context
3. KPI views refresh with filtered data

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5. Error Handling

Scenario	Handling Approach
Data source unavailable	Show error message, prompt to retry
Data format/schema mismatch	Log error, notify admin, halt refresh
Invalid filter selection	Reset to default, show warning
Calculation error (e.g., divide by zero)	Display “N/A” or fallback value

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