**📄 Functional Requirements Document (FRD)**

**Project Name:** Bank Churn & Loan Repayment Prediction  
**Document Type:** Functional Requirements Document (FRD)  
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**🧾 1. Objective**

The purpose of this document is to define the **functional requirements** for the Bank Churn and Loan Repayment Prediction project. It outlines how the system will behave and the data logic to be implemented to meet the project goals.

**🧩 2. Functional Scope**

This project combines bank customer data and loan application data to:

* Predict **customer churn**
* Predict **loan approval likelihood**
* Enable actionable insights through data modelling, visualization, and ML algorithms

**🔧 3. System Functional Requirements**

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| Req. ID | Functionality | Description |
| FR-001 | Data Ingestion | Load and clean both datasets (Customer + Loan Application) |
| FR-002 | Data Merging | Join both datasets using customer\_id as the key |
| FR-003 | Data Validation | Handle missing/null values, outliers, data type mismatches |
| FR-004 | Feature Engineering | Derive new fields (e.g., income ratio, loan-to-income ratio, churn risk score) |
| FR-005 | ERD Modeling | Build logical data model for analytics (done in ERD phase) |
| FR-006 | Churn Prediction | Use ML classification algorithm to predict churn label (1/0) |
| FR-007 | Loan Approval Prediction | Use ML classification model to predict loan\_status (Y/N) |
| FR-008 | Dashboarding (Power BI) | Create visual dashboards for churn and loan KPIs |
| FR-009 | Filtering & Drilldown | Enable filters by country, age, tenure, credit score, property area |
| FR-010 | Reporting | Export performance reports, churn trends, and loan approval analysis |

**📌 4. Assumptions**

* Unique customer identifiers (customer\_id) are consistent across both datasets.
* The test dataset (loan) will not be used for prediction, only for structure reference.
* Business stakeholders are primarily interested in **early churn signals** and **loan approval behaviour**.

**🧪 5. Non-Functional Requirements (Optional but Good)**

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| NFR-ID | Requirement | Description |
| NFR-001 | Performance | Dashboard should load under 5 seconds |
| NFR-002 | Usability | Visuals must be intuitive for non-technical users |
| NFR-003 | Accuracy | ML models must achieve ≥ 75% prediction accuracy |

**✅ 6. Success Criteria**

* Model accuracy ≥ 75% for both churn and loan predictions
* Dashboard adopted by stakeholders
* Business decisions supported by KPIs from the visual reports