**📄 Entity Relationship Diagram (ERD)**

**Project Name:** Bank Churn & Loan Repayment Prediction  
**Document Type:** Entity Relationship Diagram (ERD)  
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**🧾 1. Objective**

This document outlines the **data model structure** and relationships between entities involved in the *Bank Churn & Loan Repayment Prediction* project. It helps visualize how the customer and loan data interact and supports the data preparation and analysis processes.

**📘 2. Entity Descriptions**

**🔹 Entity: Customer**

|  |  |
| --- | --- |
| **Column Name** | **Description** |
| **customer\_id** | **Unique identifier for each bank customer** |
| **credit\_score** | **Customer's credit score** |
| **country** | **Country of residence** |
| **gender** | **Gender** |
| **age** | **Age of the customer** |
| **tenure** | **Years the customer has been with the bank** |
| **balance** | **Bank account balance** |
| **products\_number** | **Number of active products with the bank** |
| **credit\_card** | **Whether customer holds a credit card** |
| **active\_member** | **Customer's activity status** |
| **estimated\_salary** | **Estimated salary of the customer** |
| **churn** | **Target: Whether the customer churned (1/0)** |

**🔹 Entity: Loan\_Application**

|  |  |
| --- | --- |
| **Column Name** | **Description** |
| loan\_id | Unique loan application ID |
| customer\_id | Foreign key linking to Customer entity |
| gender | Gender of loan applicant |
| married | Marital status |
| dependents | Number of dependents |
| education | Education level (Graduate/Not Graduate) |
| self\_employed | Employment status |
| applicantincome | Income of the applicant |
| coapplicantincome | Income of the co-applicant |
| loanamount | Loan amount requested |
| loan\_amount\_term | Loan term in months |
| credit\_history | Credit history (1 = good, 0 = bad) |
| property\_area | Area type of the property (Urban, Rural etc.) |
| loan\_status | Target: Whether loan was approved (Y/N) |

**🔗 3. Relationship Summary**

* The customer\_id column in the **Loan\_Application** entity is a **foreign key** referencing the customer\_id in the **Customer** entity.
* A **one-to-many** relationship exists:  
  👉 *One customer can apply for one or more loans.*

**✅ 4. Notes**

* The ERD is designed based on a merged dataset combining customer churn and loan application records.
* The visual diagram (provided separately) represents this logical data structure and relationship.

**📊 5. Visual ERD Diagram**

*The following diagram illustrates the relationship between the Customer and Loan\_Application entities:*

