**INPUT DESIGN AND OUTPUT DESIGN**

**INPUT DESIGN**

The input design is the link between the information system and the user. It comprises the developing specification and procedures for data preparation and those steps are necessary to put transaction data in to a usable form for processing can be achieved by inspecting the computer to read data from a written or printed document or it can occur by having people keying the data directly into the system. The design of input focuses on controlling the amount of input required, controlling the errors, avoiding delay, avoiding extra steps and keeping the process simple. The input is designed in such a way so that it provides security and ease of use with retaining the privacy. Input Design considered the following things:

* What data should be given as input?
* How the data should be arranged or coded?
* The dialog to guide the operating personnel in providing input.
* Methods for preparing input validations and steps to follow when error occur.

**OBJECTIVES**

1. Input Design is the process of converting a user-oriented description of the input into a computer-based system. This design is important to avoid errors in the data input process and show the correct direction to the management for getting correct information from the computerized system.

2. It is achieved by creating user-friendly screens for the data entry to handle large volume of data. The goal of designing input is to make data entry easier and to be free from errors. The data entry screen is designed in such a way that all the data manipulates can be performed. It also provides record viewing facilities.

3. When the data is entered it will check for its validity. Data can be entered with the help of screens. Appropriate messages are provided as when needed so that the user will not be in maize of instant. Thus the objective of input design is to create an input layout that is easy to follow

**Introduction**

The input design outlines the methods by which data is input into the system for the purpose of predicting employee attrition and layoffs. Effective input design ensures that data is captured accurately, securely, and efficiently, providing a solid foundation for the predictive models. This document describes the various inputs, their sources, validation methods, and the processing techniques applied to each.

**Input Overview**

The system requires two distinct sets of input data for predicting employee attrition and layoffs. These inputs are gathered from HR databases and organizational records and are used to feed machine learning models for accurate prediction. The following sections describe the specific inputs used for both employee attrition and layoff prediction tasks.

**Employee Attrition Prediction Inputs**

*Dataset Overview*

Source: Internal HR Database

Number of Records: 1,470

Features/Attributes: 35

**Key Features:**

Age: Numerical value representing the employee’s age.

Attrition: Binary value (Yes/No) indicating whether the employee has left.

BusinessTravel: Categorical value indicating frequency of business travel.

DailyRate: Numerical value representing the daily wage.

Department: Categorical value specifying the department (e.g., Sales, HR).

DistanceFromHome: Numerical value representing the distance between home and work.

Education: Numerical value (1-5) representing the education level.

EducationField: Categorical value indicating the field of education.

JobRole: Categorical value specifying the employee’s role.

MonthlyIncome: Numerical value representing monthly salary.

OverTime: Binary value indicating if the employee works overtime (Yes/No).

WorkLifeBalance: Numerical value (1-4) indicating satisfaction with work-life balance.

YearsAtCompany: Numerical value indicating years the employee has been with the company.

(A full list of features includes Gender, EnvironmentSatisfaction, MaritalStatus, JobInvolvement, StockOptionLevel, etc.)

**Input Forms**

HR Data Entry Form: Used by HR professionals to upload employee data, including individual profiles and job details.

CSV/Excel Upload: Batch upload functionality where HR teams can input data via CSV files with predefined fields.

Real-time Data Stream: In future iterations, real-time data from HRIS systems can be integrated.

**Data Validation**

Age: Ensure age is a valid numerical range (18-65).

Attrition: Validate input as binary (Yes/No).

Department, JobRole, EducationField: Validate categorical values against predefined options.

Salary Data: Validate numerical data (MonthlyIncome, DailyRate) within reasonable limits for the industry and location.

Missing Data Handling: Ensure missing data is handled through default values, data imputation, or exclusion as necessary.

**Preprocessing Techniques**

Encoding: Convert categorical values (e.g., Department, JobRole) into numerical formats using one-hot encoding or label encoding.

Normalization/Scaling: Apply Min-Max scaling or standardization to numerical features such as Age, MonthlyIncome, DistanceFromHome.

Feature Selection: Use feature importance analysis to prioritize inputs that have the greatest impact on predictions.

**Employee Layoff Prediction Inputs**

*Dataset Overview*

Source: Organizational Records and Market Data

Number of Records: 3,612

Features/Attributes: 8

**Key Features:**

Company: Categorical value specifying the company name.

Location: Categorical value representing the geographic location of the company.

Industry: Categorical value indicating the industry sector (e.g., Technology, Finance).

Total\_Laid\_Off: Numerical value representing the total number of employees laid off.

Percentage\_Laid\_Off: Numerical value showing the percentage of employees laid off in relation to the total workforce.

Date: Date of the layoff event.

Funds\_Raised: Numerical value indicating the funds raised by the company (if applicable).

Stage: Categorical value indicating the business stage (e.g., Startup, Growth, Mature).

**Input Forms**

Company Data Entry Form: Allows HR managers to input data specific to layoffs, including company information and layoff details.

CSV/Excel Upload: Provides bulk data upload functionality for historical layoff records.

API Integration: In future iterations, the system could integrate with financial and market databases to automatically fetch relevant inputs.

**Data Validation**

Date: Validate format (YYYY-MM-DD).

Percentage\_Laid\_Off: Ensure the value is between 0 and 100.

Industry: Validate against predefined industry categories.

Funds Raised: Validate as a positive numerical value.

Total\_Laid\_Off: Ensure it is a non-negative integer.

**Preprocessing Techniques**

Handling Time-Series Data: For date-based inputs, transform time variables (e.g., extracting features like month, quarter).

Encoding: Convert categorical values (e.g., Industry, Location, Stage) into numerical formats.

Feature Engineering: Generate new features (e.g., Company Growth Rate) based on existing inputs to improve model performance.

**Input Methods**

*Manual Data Entry*

HR professionals can manually enter data using forms. Input fields will be clearly labeled, and dropdown menus will be provided for categorical data to prevent errors. Validation rules will be applied to ensure data consistency.

*Integration with External Systems*

In future implementations, the system may integrate with HRIS or payroll systems to fetch real-time employee data, minimizing manual input efforts and ensuring data accuracy.

**Error Handling**

Data Type Mismatch: If an input field contains a mismatched data type (e.g., text in a numerical field), the system will prompt an error message and request correction.

Missing Required Fields: The system will highlight missing mandatory fields before allowing the data to be submitted or processed.

Invalid Data Entries: Entries that do not conform to validation rules (e.g., out-of-range salary values) will trigger alerts for correction.

**Conclusion**

The input design for this project ensures that all necessary data for predicting employee attrition and layoffs is gathered accurately and efficiently. By employing manual entry forms, batch upload capabilities, and real-time data integration (in future iterations), the system provides flexibility for users. Comprehensive validation processes and preprocessing techniques are employed to ensure that the data fed into machine learning models is clean, structured, and optimized for accurate predictions.

This document serves as a guideline for designing the input process, ensuring data integrity, consistency, and ease of use for HR professionals and stakeholders.

**OUTPUT DESIGN**

A quality output is one, which meets the requirements of the end user and presents the information clearly. In any system results of processing are communicated to the users and to other system through outputs. In output design it is determined how the information is to be displaced for immediate need and also the hard copy output. It is the most important and direct source information to the user. Efficient and intelligent output design improves the system’s relationship to help user decision-making.

1. Designing computer output should proceed in an organized, well thought out manner; the right output must be developed while ensuring that each output element is designed so that people will find the system can use easily and effectively. When analysis design computer output, they should Identify the specific output that is needed to meet the requirements.

2. Select methods for presenting information.

3. Create document, report, or other formats that contain information produced by the system.

The output form of an information system should accomplish one or more of the following objectives.

* Convey information about past activities, current status or projections of the
* Future.
* Signal important events, opportunities, problems, or warnings.
* Trigger an action.
* Confirm an action.