

This project focuses on Customer Churn Prediction using Deep Learning (Neural Networks). It aims to identify customers who are likely to stop using a service based on various factors like tenure, charges, and internet service type.

Project Overview

- **Dataset:** The dataset contains customer demographics, service details, and payment methods.
 - **Goal:** Build neural network models to predict whether a customer will churn (leave) or stay.
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Key Steps

1. Data Preprocessing

- **Handled Missing Values:** TotalCharges was converted to numeric format, and missing values were replaced with 0.
- **Feature Selection:** Key features like tenure, MonthlyCharges, and TotalCharges were selected.
- **Label Encoding:** The target column Churn was encoded into binary values.

2. Data Visualization

- **Churn Distribution:** A pie chart was plotted to show the percentage of customers who churned vs. those who stayed.
- **Internet Service Distribution:** A count plot visualized different types of internet services used.

3. Model Building

Three different deep learning models were trained:

1. **Model 1:** A basic neural network using only tenure as input.
 2. **Model 2:** Similar to Model 1 but with Dropout layers to prevent overfitting.
 3. **Model 3:** A multi-feature model trained on tenure, MonthlyCharges, and TotalCharges.
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Results & Evaluation

- **Confusion Matrices:** Used to analyze the classification performance.
 - **Accuracy Trends:** Accuracy vs. epochs plots were generated for each model to compare training progress.
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Future Improvements

- Include categorical features (e.g., Contract Type, Payment Method) using one-hot encoding.
- Experiment with more complex architectures like LSTMs or Transformer-based models.
- Use hyperparameter tuning to optimize learning rates and neuron configurations.