

New Time-Efficient Fraud Detection System Using a Random Forest Model and AI Chatbot Layer

Project Submitted to Dr. Yanqing Zhang for Artificial Intelligence (CS 4810)

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Application Manual

This manual provides detailed instructions to setup and run the AI Chatbot integrated Fraud Detection System.

Prerequisites

Before running the application ensure you have the following:

1. OpenAI API Key:

The OpenAI API key is required to run the chatbot part of the application. Follow these steps to obtain it.

- Log in to <https://platform.openai.com/>
- Navigate to “API Keys”
- Create a new Key
- Make sure to copy and store that API key as OpenAI only shows it once.

2. Python Installation:

Make sure python is installed on device in order to run the application. Check by using the following command:

```
python --version
```

If python is not installed, then:

- Download it from <https://www.python.org/downloads/>
- Run the installer and confirm that python installed

```
python --version
```

Steps to Run Application

1. Clone the Repository

Use the following command to clone the repository from git hosting platform:

```
git clone https://github.com/shadmaanakhand/Fraud-Detection-and-Risk-Assessment-AI-Chatbot-System.git
```

2. Move to Project Directory

Change your working directory to cloned repository folder using:

```
cd <Project-Directory>
```

3. Create and Activate Virtual Environment

For Windows:

I. Create a virtual environment:

```
python -m venv venv
```

II. Activate the Virtual Environment:

```
venv\Scripts\Activate
```

For Mac:

I. Create a virtual environment:

```
Python3 -m venv venv
```

II. Activate the Virtual Environment:

```
source venv/bin/activate
```

4. Install all required Dependencies

Install the necessary python libraries (with the correct versions) listed in requirements.txt

```
pip install -r requirements.txt
```

5. Create a “.env” File

To use the OpenAI API key safely, create a .env file in the same repository and store the API key like this:

```
OPENAI_API_KEY = "Your API key"
```

Replace “Your API key” with the actual API key that you stored earlier.

6. Run the Streamlit Application

After installing all the libraries needed, we are ready to run the application. Open the terminal and use the following command.

```
streamlit run fraud_detection.py
```

This command will execute the application in a localhost environment. It takes a few minutes for the application to initially load but once loaded, user should see the following UI:

Credit Card Fraud Detection

Enter the transaction details to predict if it's fraudulent or not.

Transaction Type: PAYMENT

Transaction Amount: 500.00

Old Balance of Origin Account: 10000.00

New Balance of Origin Account: 9500.00

Old Balance of Destination Account: 10000.00

New Balance of Destination Account: 10500.00

Predict

Prediction Results

Fraud Probability: 0.0%

LEGITIMATE: This transaction appears to be Legitimate

AI Explanation

This transaction has been predicted as legitimate with a very low fraud probability of 0.0, but remember, this is just a prediction, not a guarantee. One reason for this conclusion is that the transaction amount of \$500 is consistent with typical payments and does not appear unusually high. Additionally, both the sender and receiver had healthy balances before and after the transaction, which further indicates normal activity.

>  Technical Details