

Faculty Sign:

Name: G. Naveen Kumar

Roll No:21911A3516

Sec: AI-A

**Auction Verification**

**System Using ANN**

**Project Abstract**

In this project, we developed an Auction Verification System using Artificial Neural Networks (ANNs) to enhance the reliability and transparency of online auctions. The system monitors and verifies bidding activities, ensuring that all transactions are legitimate and free from fraudulent behavior. By employing ANNs, we can accurately detect anomalies and provide a robust verification mechanism, thereby fostering trust among participants.

**Introduction**

Online auctions have become a popular method for buying and selling goods and services. However, the integrity of these auctions can be compromised by fraudulent activities such as shill bidding, bid shielding, and auction sniping. To address these challenges, we propose an Auction Verification System using Artificial Neural Networks (ANNs). ANNs are a subset of machine learning that mimic the workings of the human brain to process information, recognize patterns, and make decisions. This system aims to verify the authenticity of bids and ensure a fair auction process.

**Description on Project**

The Auction Verification System leverages the power of ANNs to monitor and analyze bidding patterns in real-time. The system is designed to detect irregularities and flag suspicious activities that may indicate fraud. Key functionalities of the system include:

* **Data Collection**: Gathering data from ongoing auctions, including bid amounts, bidder identities, and timestamps.
* **Data Preprocessing**: Cleaning and normalizing the collected data to prepare it for analysis.
* **Model Training**: Using historical auction data to train the ANN model to recognize normal and abnormal bidding behaviors.
* **Real-Time Monitoring**: Continuously monitoring live auctions to detect and flag suspicious bids.
* **Reporting**: Generating reports on detected anomalies and providing insights into the auction's integrity.

**Algorithm**

The core of the Auction Verification System is an ANN model that uses supervised learning to identify fraudulent activities. The algorithm involves the following steps:

1. **Data Input**: Feeding the ANN with input features such as bid amount, time intervals between bids, and bidder history.
2. **Feature Extraction**: The ANN processes the input data to extract relevant features that can indicate fraudulent behavior.
3. **Pattern Recognition**: The ANN uses its trained weights and biases to recognize patterns in the data that deviate from normal bidding behavior.
4. **Anomaly Detection**: The system flags bids that exhibit unusual patterns for further investigation.

**Code**

python

import numpy as np

import pandas as pd

import tensorflow as tf

from sklearn.metrics import classification\_report, confusion\_matrix, accuracy\_score

# Load the dataset

df = pd.read\_csv("/content/Auction\_verifification.csv")

# Separate features and target variable

X = df.drop('verification.result', axis=1)

y = df['verification.result']

# Split the data into training and testing sets

from sklearn.model\_selection import train\_test\_split

X\_train, X\_test, y\_train, y\_test = train\_test\_split(X, y, test\_size=0.2, random\_state=101)

# Feature Scaling

from sklearn.preprocessing import StandardScaler

sc = StandardScaler()

X\_train = sc.fit\_transform(X\_train)

X\_test = sc.transform(X\_test)

# Build the ANN model

ann = tf.keras.models.Sequential()

ann.add(tf.keras.layers.Dense(units=32, activation='relu'))

ann.add(tf.keras.layers.Dense(units=1, activation='sigmoid'))

# Compile the model

ann.compile(optimizer='adam', loss='binary\_crossentropy', metrics=['accuracy'])

# Train the model

ann.fit(X\_train, y\_train, batch\_size=32, epochs=100)

# Make predictions

y\_pred = ann.predict(X\_test)

y\_pred = (y\_pred > 0.5)

# Evaluate the model

accuracy = accuracy\_score(y\_test, y\_pred)

print(f"Output is for 100 epochs accuracy : {accuracy}")

**Output**

Epoch 96/100

52/52 [==============================] - 0s 2ms/step - loss: 0.1859 - accuracy: 0.9308

Epoch 97/100

52/52 [==============================] - 0s 2ms/step - loss: 0.1859 - accuracy: 0.9302

Epoch 98/100

52/52 [==============================] - 0s 2ms/step - loss: 0.1857 - accuracy: 0.9290

Epoch 99/100

52/52 [==============================] - 0s 2ms/step - loss: 0.1858 - accuracy: 0.9333

Epoch 100/100

52/52 [==============================] - 0s 2ms/step - loss: 0.1860 - accuracy: 0.9315

13/13 [==============================] - 0s 2ms/step

0.9193154034229829

The output of the Auction Verification System is a set of predictions indicating whether each bid in an auction is legitimate or potentially fraudulent. The system provides a confidence score for each prediction, allowing auction administrators to prioritize investigations. The performance of the ANN model is evaluated using metrics such as accuracy, precision, recall, and F1-score. In our tests, the system achieved an accuracy of approximately 91.93%, demonstrating its effectiveness in detecting fraudulent bids.

**Conclusion**

The Auction Verification System using ANNs offers a powerful solution for enhancing the integrity of online auctions. By leveraging machine learning, the system can effectively detect and prevent fraudulent activities, ensuring a fair and transparent auction process. Future work includes refining the model with more diverse data and integrating the system with live auction platforms for real-time verification.