1)MLP

a)BITCOIN

Mean Squared Error (MSE): 159662931.8312254

Root Mean Squared Error (RMSE): 12635.779826794442

b)ETHEREUM

Mean Squared Error (MSE): 364527.3581542231

Root Mean Squared Error (RMSE): 603.7610107933627

c) RIPPLE

Mean Squared Error (MSE): 0.006156502713682101

Root Mean Squared Error (RMSE): 0.07846338454133941

d) TRON

Mean Squared Error (MSE): 0.00010194906377529406

Root Mean Squared Error (RMSE): 0.010096982904575705

e) TETHER

Mean Squared Error (MSE): 8.337113615100623e-05

Root Mean Squared Error (RMSE): 0.009130779602586311

2)CNN

a) BITCOIN

Root Mean Squared Error (RMSE) for Bitcoin: 683.6913156009592

b) ETHEREUM

Root Mean Squared Error (RMSE) for Ethereum: 74.22451373748846

c) RIPPLE

Root Mean Squared Error (RMSE) for Ripple: 0.06417224152674651

d) TRON

Root Mean Squared Error (RMSE) for Tron: 0.020086942345759497

e) TETHER

Root Mean Squared Error (RMSE) for Tether: 0.013675331405514402

3)KNN

a) BITCOIN

Test Score (R^2) for Bitcoin: 0.9966142814714305

Root Mean Squared Error (RMSE) for Bitcoin: 636.5333506776401

b)ETHEREUM

Test Score (R^2) for Ethereum: 0.9923784761639287

Root Mean Squared Error (RMSE) for Ethereum: 48.85467294279682

c) RIPPLE

Test Score (R^2) for Ripple: 0.9786176660527716

Root Mean Squared Error (RMSE) for Ripple: 0.04847352645911533

d)TRON

Test Score (R^2) for Tron: 0.9244774148417524

Root Mean Squared Error (RMSE) for Tron: 0.007560606319102617

e)TETHER

Test Score (R^2) for Tether: 0.6465882691907134

Root Mean Squared Error (RMSE) for Tether: 0.005174177755453585

4)SVM

a) BITCOIN

Test Score (R^2) for Bitcoin: -0.09764497121104809

Root Mean Squared Error (RMSE) for Bitcoin: 11461.110085796621

b)ETHEREUM

Test Score (R^2) for Ethereum: 0.22844101386893323

Root Mean Squared Error (RMSE) for Ethereum: 491.55234355379514

c) RIPPLE

Test Score (R^2) for Ripple: 0.9385746105593826

Root Mean Squared Error (RMSE) for Ripple: 0.08215821994286225

d)TRON

Test Score (R^2) for Tron: -6.840802604008455

Root Mean Squared Error (RMSE) for Tron: 0.07703684023935588

e)TETHER

Test Score (R^2) for Tether: -34.62375987030086

Root Mean Squared Error (RMSE) for Tether: 0.05194822840860085

Out of the above 4 models used .What is the best model to choose for prediction cryptocurrecy price?

**Model Selection**

Choosing the best model for predicting cryptocurrency prices depends on various factors, including prediction accuracy (RMSE), model performance (R² score), and the specific characteristics of the data for each cryptocurrency. Let’s analyze the performance of each model based on the provided results.

**Summary of Model Performances**

1. **MLP (Multi-Layer Perceptron)**
   * **Bitcoin**: RMSE = 12635.78
   * **Ethereum**: RMSE = 603.76
   * **Ripple**: RMSE = 0.0785
   * **Tron**: RMSE = 0.0101
   * **Tether**: RMSE = 0.0091
2. **CNN (Convolutional Neural Network)**
   * **Bitcoin**: RMSE = 683.69
   * **Ethereum**: RMSE = 74.22
   * **Ripple**: RMSE = 0.0642
   * **Tron**: RMSE = 0.0201
   * **Tether**: RMSE = 0.0137
3. **KNN (K-Nearest Neighbors)**
   * **Bitcoin**: RMSE = 636.53, R² = 0.9966
   * **Ethereum**: RMSE = 48.85, R² = 0.9924
   * **Ripple**: RMSE = 0.0485, R² = 0.9786
   * **Tron**: RMSE = 0.0076, R² = 0.9245
   * **Tether**: RMSE = 0.0052, R² = 0.6466
4. **SVM (Support Vector Machine)**
   * **Bitcoin**: RMSE = 11461.11, R² = -0.0976
   * **Ethereum**: RMSE = 491.55, R² = 0.2284
   * **Ripple**: RMSE = 0.0822, R² = 0.9386
   * **Tron**: RMSE = 0.0770, R² = -6.8408
   * **Tether**: RMSE = 0.0519, R² = -34.6238

**Analysis**

* **KNN** consistently performed well across all cryptocurrencies, with very low RMSE values and high R² scores, indicating it explains a significant proportion of the variance in the data.
* **CNN** also showed good performance, particularly for Ethereum and Ripple, with low RMSE values, but it generally had higher RMSE than KNN.
* **MLP** performed well for Ethereum and Ripple, but the RMSE for Bitcoin is considerably higher than that of KNN and CNN.
* **SVM** had poor performance for most cryptocurrencies, with negative R² scores for Bitcoin, Tron, and Tether, indicating a lack of fit.

**Recommendation**

Based on the performance metrics:

1. **Best Overall Model**: **KNN** is the best choice among the models tested for predicting cryptocurrency prices, as it has the lowest RMSE values and the highest R² scores across all cryptocurrencies.
2. **Alternative Considerations**:
   * If computational efficiency and complexity are concerns, you might consider **CNN** for its balance of accuracy and complexity, especially for Ethereum and Ripple.
   * If specific features of the dataset require further tuning, you might consider experimenting with the MLP model by optimizing its architecture or hyperparameters.

**Conclusion**

In summary, **KNN** appears to be the most robust model for your cryptocurrency price predictions, but you may also want to explore other models based on specific requirements or dataset characteristics. Always consider cross-validation and hyperparameter tuning for each model to ensure the best performance on unseen data.

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