

# MACHINE LEARNING BASED ANALYSIS OF CRYPTO CURRENCY MARKET FINANCIAL RISK MANAGEMENT

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## Abstract

Digital currency is considered a form of currency which has a provocation for the related transaction through crypto currency and the users who Digital currency is considered a form of currency which is used in the digital world such as digital forms or electronic devices. Crypto currency is one causes several types of risks that effect on the intrinsic assessment of risk auditors. From the beginning the growth of crypto currency gives the financial business with the wide risk in term of presentation of money laundering. In the institution of financial supports such as anti-money laundering, banks and secrecy of banks proceed as a specialist of risk, manager of bank and officer of compliance which has a provocation for the related transaction through crypto currency and the users who hide illegal funds .The result section shows the proposed model is robust to various intervals which are re- balanced and the co-variance window estimation.

**Keywords:** Crypto currency, Unsupervised Machine Learning, Digital currency ,Hierarchical Risk Parity, Likelihood, Private Key

## Introduction

Day by day, digital currency significance increases rapidly. Despite the fact that the digital currency concepts are not new, the use of this kind of currency has grown up remarkably. Money is not set in banks or safe boxes, but it is available in processors and storage of the cyber world, and it is traded in the form of information. The main purpose of such technology is to increase the payment efficiency. Till now, the standards for digital currencymechanism are not clear, and therefore its boundaries are not set yet, so the customers communicate together with the absence of regulators. However, the public acceptance of digital bank transactions allow alternative types of money to be developed; these new types are not related to traditional bank accounts and are fully based on digital environment is called digital currency financial market is one of the complex systems that the definition of complexity didn't get accepted from universities. Complex system modeling is similar to daunting task which thestructure of this system organized based onhierarchical manner that collected their own subsystems. This resources extracted by the name of hierarchical models.

Unfortunately, in the process of portfolio construction there is a hug challenge regarding the lack of correlation matrix in hierarchical structure. This issue worsen the matrices for large covariance. In recent decades, around 2500 type of crypto currencies which contains the 252.5 trilliondollar of trading in this Market. Thecryptocurrency reverberation transpire in, out of order environment. Even newspublishers had more interest and closer attention to the price changes.

## Related Work

Cryptocurrency is a decentralized type of currency that developed and designed in2008 which without the need of involving bank makes the possibility of peer-to-peer transaction Huge number of articles reported that the cryptocurrency plays an import role in term of growth of financial crimes. Based on the report of anti-money in CipherTrace, almost 125 million dollar lost and stolen regarding the different breaches of security. Regarding to the report of BIS Annual Economic Report in 2018, crypto currency makes an agreementto update the long-standing financial institution trust with the system of decentralized architecture. Based on the universal aspect of Internet, most of the cryptocurrencies become convenient based on passing from associated financial feesto the system of traditional banking.Rules set up is for investors protecting and try to stop the money laundry.

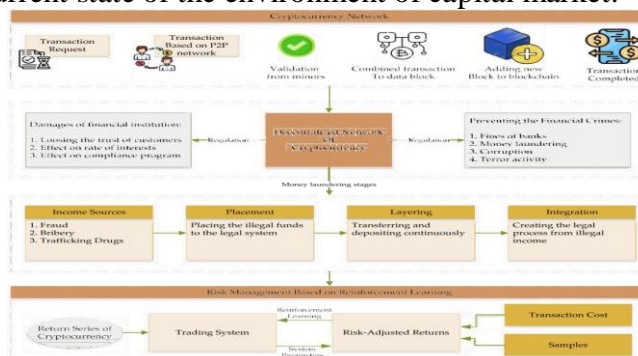
Similarly, stop the crowd for the fiat currency. Lahre propose the strategy of Hierarchical Risk Parity (HRP) on the multi-asset multi- factor allocation which achieves the good results on tail risk. Moreover, Jain applied the same strategy for the individual stocks to comport the fifty indexes of NIFTY. Raffino compares different variants of HRP (HERC and HCCA) and evaluates the performance of them. Like this most of the have investigated what are the risksinvolved due to the cryptocurrency.

Thebelow list shows the cryptocurrency special risks mentioned as below:

- Choosing the exchange of cryptocurrency based on the entity contains no control on transactions and its over- balanced for the maintained account of the entity.
- Cryptocurrency wallet which isbelonging to the entity has no account. It’s not possible to access cryptocurrency by losing the private key.
- If an unauthorized party get any access tothe private key then all the cryptocurrency stolen.
- Misrepresentation of private key of entity. Sending the incorrect address from entity which is not possible of recovery from cryptocurrency.
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## DESIGN

Reinforcement learning (RL) is a learning-based machine learning algorithm which is based on the correct input that improves the performance of system. The meaning of risk management in the proposed system is to identify, evaluate and prioritization the system risks. As it shown, the management problem of the portfolio describes the RL-based trading system with specifications by considering the risks and profits of the management issues. Regarding the expressing of the portfolio management problem in the RL architecture the system agent provides the strategies of trading the assets in the current state of the environment of capital market.



## EXPERIMENTAL RESULTS

### Performance Evaluation of Proposed Risk Management

The comparison between existing research works and the most common benchmarks in this area, the

Layer Name	Profit	SR	MDD
PAMR [47]	9.7058	0.0138	0.4789
UBAH [48]	5.1587	0.0132	0.6332
Basic DQN [49]	7.3628	0.0132	0.4321
UCRP [50]	6.3277	0.0153	0.4277
EG [51]	0.7552	0.0207	0.4401
Proposed RL	20.8785	0.0142	0.2750

two management portfolio algorithms and the basic DQN of the trading system compared with the proposed RL. The Uniform Buy and Hold (UBAH) strategy support the portfolio until the end of process and investing the assets during process. Uniform Constant Re-balanced Portfolio (BCRP) uses

intrading duration to re-balance the portfolio. Passive Aggressive Mean Reversion strategy(PAMR) and Exponential Gradient(EG) are the other two portfolio algorithms. Table shows the comparison of the proposed RL algorithms with other existing works in term of risk management of cryptocurrency network.

shows the risk index regularity in cryptocurrency market in time period of 2018 to 2020. The highest volatility extracted from uncertain policy. The movement of risk index is synchronous.

## CONCLUSION

The risk management of cryptocurrency network will be analyzed using the Reinforcement Learning(RL) technique and asset allocation method named as Hierarchical Risk Parity (HRP) that will apply in cryptocurrency portfolio.

Reinforcement learning will give us a high performance evaluation result as compared to other machine learning techniques that have been used in this area. The main reason of applying RL in this process is the learning-based aspect of this approach which gives the opportunity to system structure to get the high accuracy in terms of giving the right information to the system. Moreover, the HRP has the highest properties and desirable diversification.

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