Towards an Online Service to Detect NFT Wash Trading Activities on the Ethereum Blockchain

Baran Kalkavan, 23.05.2022, Kick-Off Presentation

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Outline

1. Personal Information

2. Motivation

3. Problem Statement and Goal of Thesis

4. Research Questions

5. Approaches

6. Timeline

Personal Information

TUM

BSc. Information Systems 2019-current

Teaching Assistant for Introduction to Informatics (WS 21/22)

Seminar: Scientific Methods in Information Systems

Working student at Hypovereinsbank in Chief Data Office 10.2021-04.2022

Working student at BNP Paribas in Risk Anticipation 05.2022-current

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Motivation

NFT

- Cryptographic assets with unique identification code
- Non-fungible: cannot be exchanged
- Digital art, mp3, tweet…

NFT Marketplace

- Purchase, sell, create NFT
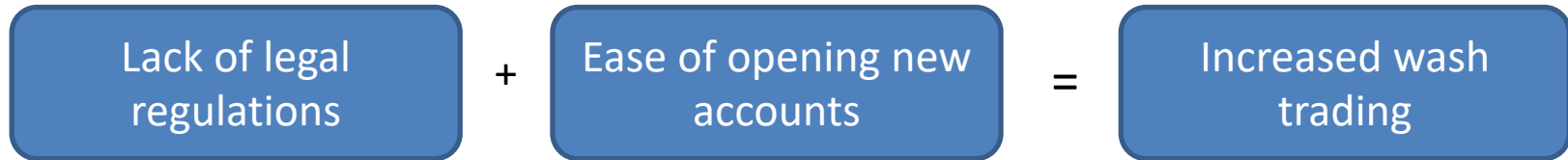- Account, digital wallet
- OpenSea, Axie, CryptoPunks

Wash Trading

- Market manipulation
- Without actual position
- Illusion of demand
- Illegal since 1936

Outline

Problem Statement and Goal of Thesis

TUM

Lack of legal regulations

+

Ease of opening new accounts

=

Increased wash trading

Wash trader group	Number of addresses*	Profits from wash trading
Profitable wash traders	110	$8,875,315
Unprofitable wash traders	152	– $416,984
All	262	$8,458,331

Chainanalysis 2022 Crypto Crime Report

*number of addresses, who have sold an NFT to a self-financed address more than 25 times

Problem Statement and Goal of Thesis

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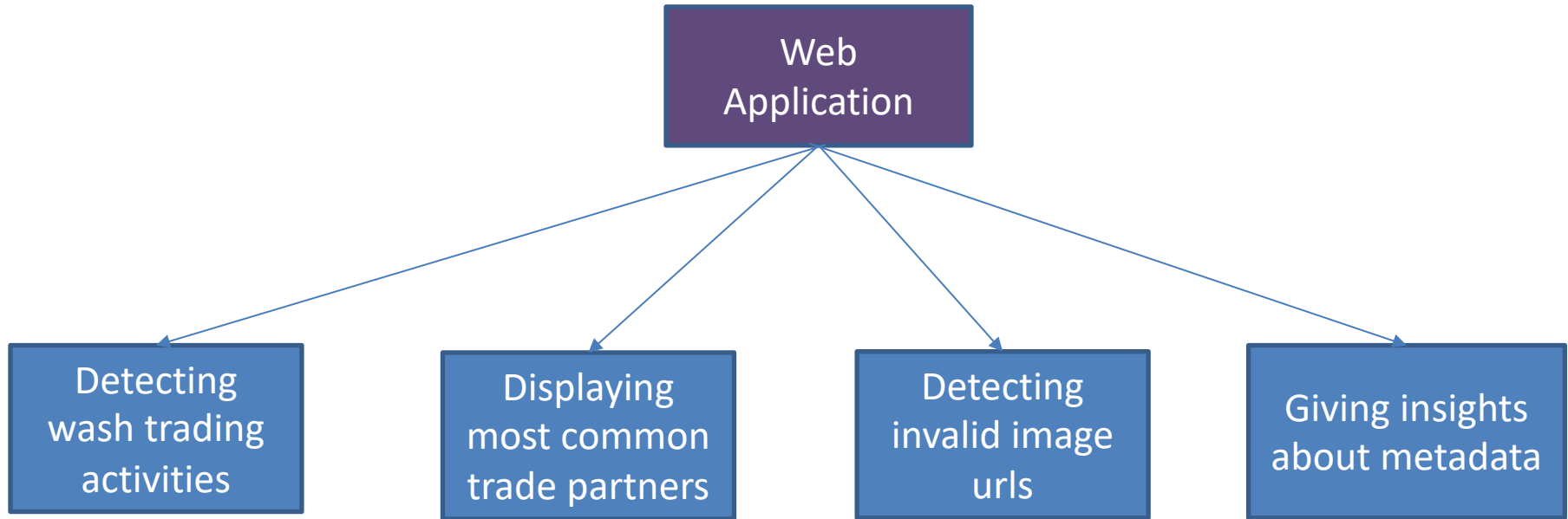
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Research Questions

RQ1 — Which research has been conducted so far on detecting wash trading on NFT marketplaces?

RQ2 — What insights can an online service provide regarding an NFT collection?

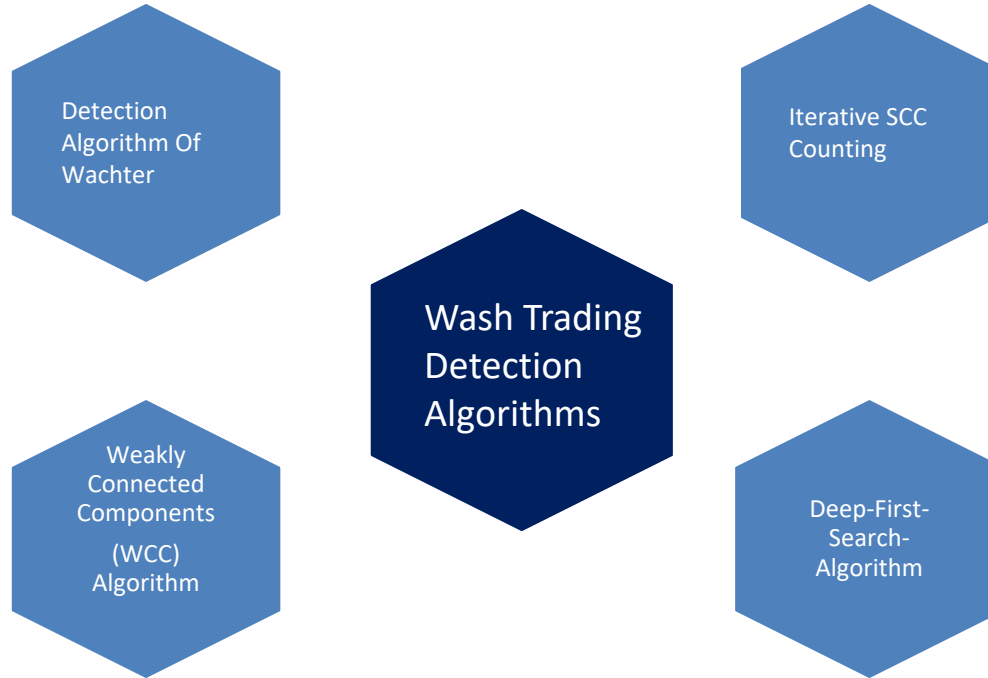**RQ3** — What are the most common wash trading patterns?

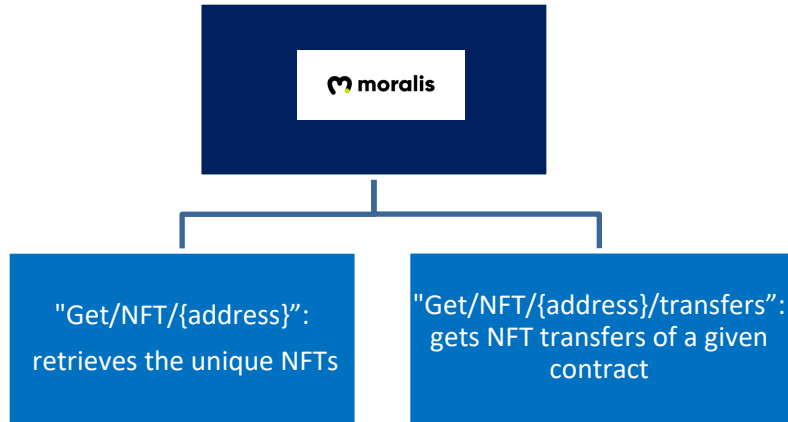**RQ4** — Can wash trading be detected by an online service, in an efficient way?

RQ5 — Can wash trading activity be avoided/regulated by marketplaces?

Outline

Approaches: Detecting wash trading

Detection Algorithm Of Wachter

Iterative SCC Counting

Wash Trading Detection Algorithms

Weakly Connected Components (WCC) Algorithm

Deep-First-Search-Algorithm

Approaches: Data Collection


```
"Get/NFT/{address}":
retrieves the unique NFTs
```

```
"Get/NFT/{address}/transfers":
gets NFT transfers of a given
contract
```
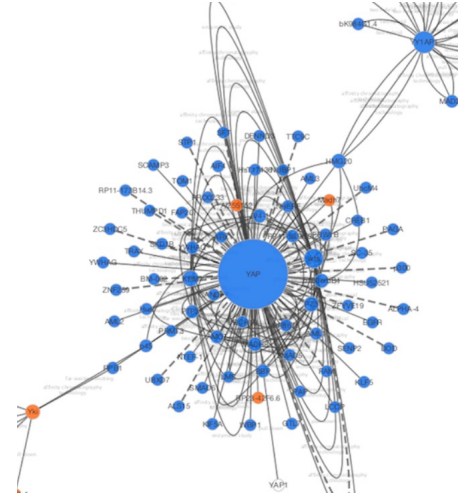
```
"result": [
  {
    "token_address": "0x057Ec652A4F150f7FF94f089A38008f49a0DF88e",
    "token_id": "15",
    "from_address": "0x057Ec652A4F150f7FF94f089A38008f49a0DF88e",
    "to_address": "0x057Ec652A4F150f7FF94f089A38008f49a0DF88e",
    "value": "1000000000000000",
    "amount": "1",
    "contract_type": "ERC721",
    "block_number": "88256",
    "block_timestamp": "2021-06-04T16:00:15",
    "block_hash": "string",
    "transaction_hash": "0x057Ec652A4F150f7FF94f089A38008f49a0DF88e",
    "transaction_type": "string",
    "transaction_index": "string",
    "log_index": 0,
    "operator": "0x057Ec652A4F150f7FF94f089A38008f49a0DF88e"
  }
],
"block_exists": true,
"index_complete": true
```
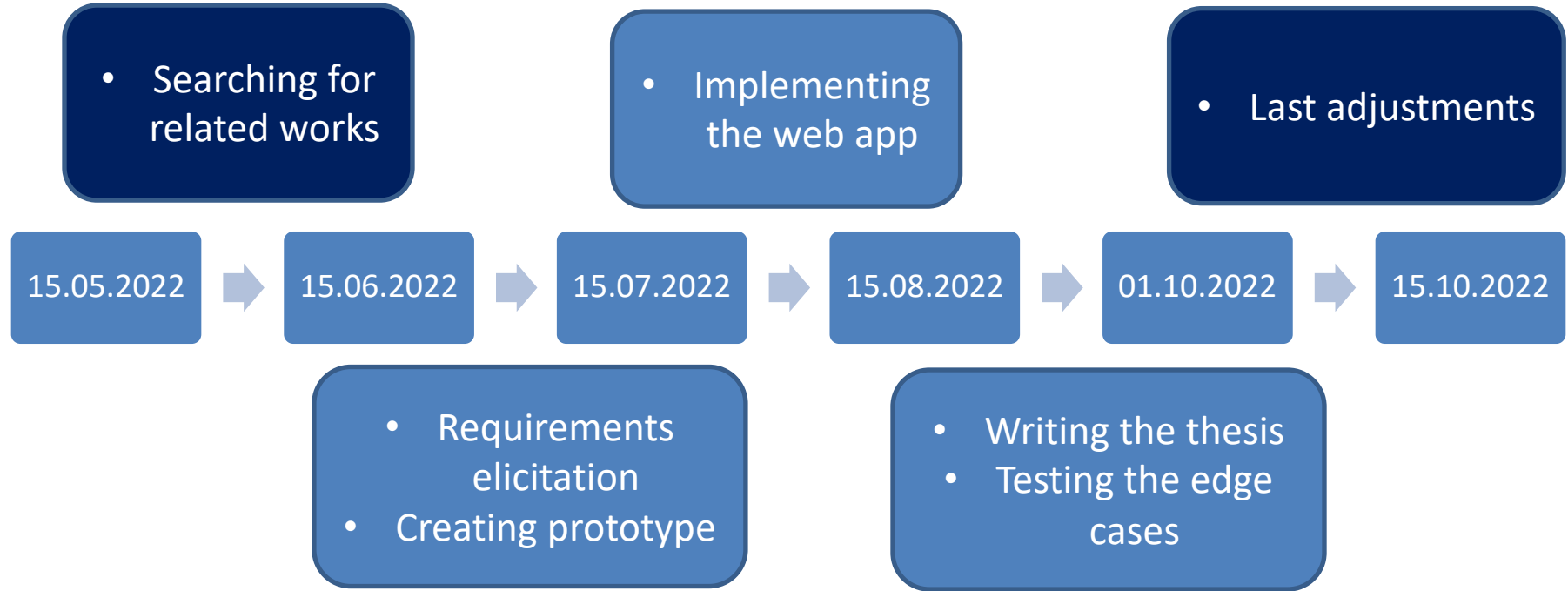
Approaches: Data Visualization

Database: neo4j

Graph visualizer: CytoScape

Outline

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TUM

Searching for related works		Implementing the web app		Last adjustments	

15.05.2022	→	15.06.2022	→	15.07.2022	→	15.08.2022	→	01.10.2022	→	15.10.2022

- Requirements elicitation
- Creating prototype

- Writing the thesis
- Testing the edge cases

Resources

- D. Das, P. Bose, N. Ruaro, C. Kruegel, and G. Vigna. "Understanding Security Issues in the NFT Ecosystem." In: (2022).
- S. Handagama. *'Jack Dorsey's First Tweet' NFT Went on Sale for $48M. It Ended With a Top Bid of Just $280*. 2022. url: https://www.coindesk.com/ business/2022/04/13/jack-dorseys-first-tweet-nft-went-on-sale- for-48m-it-ended- with-a-top-bid-of-just-280/.
- F. Victor and A. M. Weintraud. "Detecting and Quantifying Wash Trading on Decentralized Cryptocurrency Exchanges." In: (2021).
- V. von Wachter, J. R. Jensen, F. Regner, and O. Ross. "Quantifying suspicious behaviour in NFT markets." In: (2021).
- L. H. Wai. *10 OpenSea Statistics to Know in 2022*. 2022. url: https://www. followchain.org/opensea-statistics/.

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