



# Perceptual Hash Techniques for Audio Copyright Protection in Decentralized Systems

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## Introduction

- Music piracy causes economic losses for artists by enabling unauthorized sharing and distribution, while traditional hashing methods fail to detect subtly altered audio files.
- HADES employs perceptual hashing and blockchain technology (via Panako 2.0 and OLAF) to effectively detect and prevent piracy by identifying altered files and ensuring secure, transparent record-keeping.

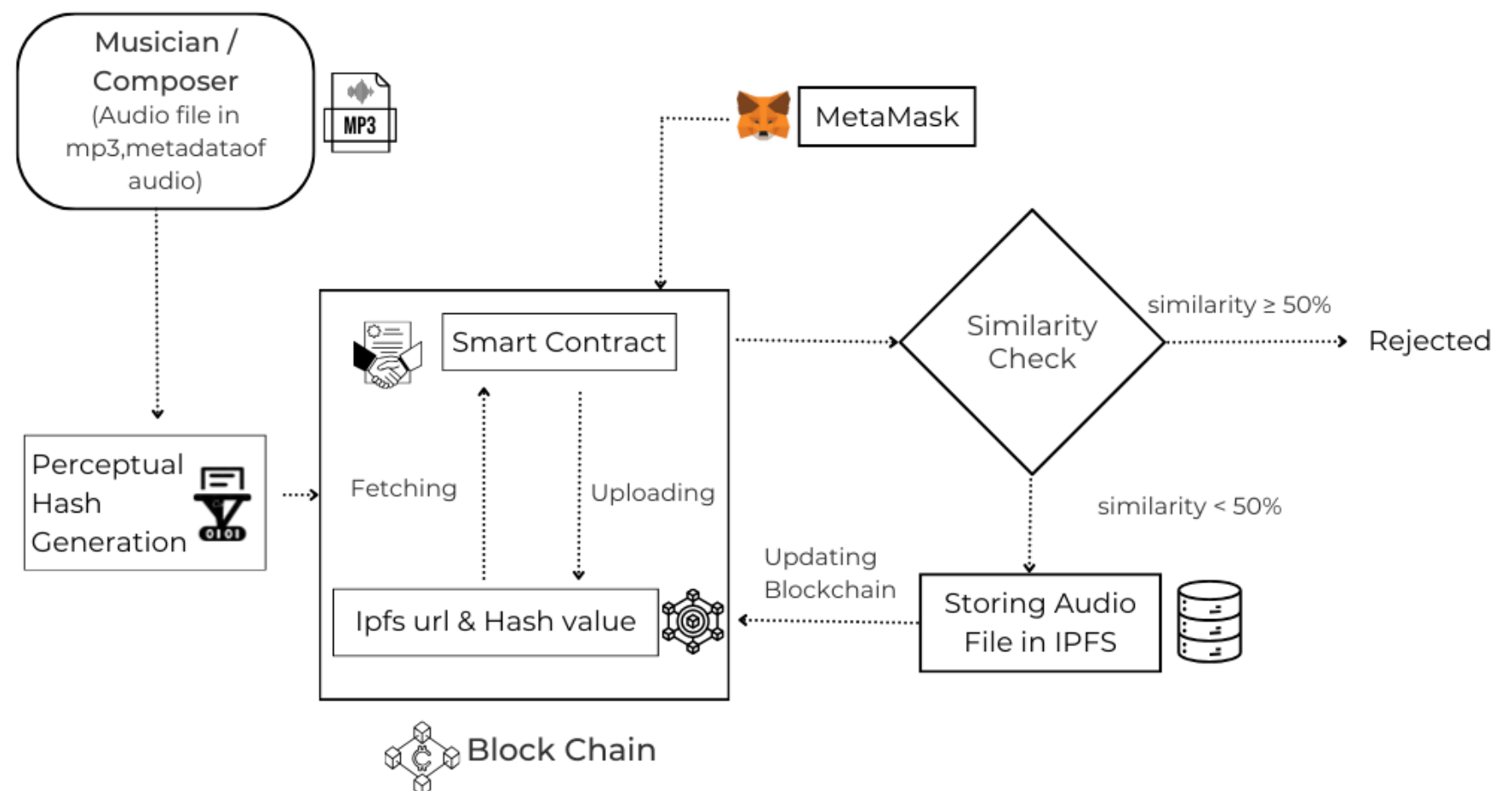
## Objectives

- To develop a robust audio detection system using alternative perceptual hashing to identify copyright infringement.
- To design a secure and efficient framework for integrating these hash functions into peer-to-peer music platforms.

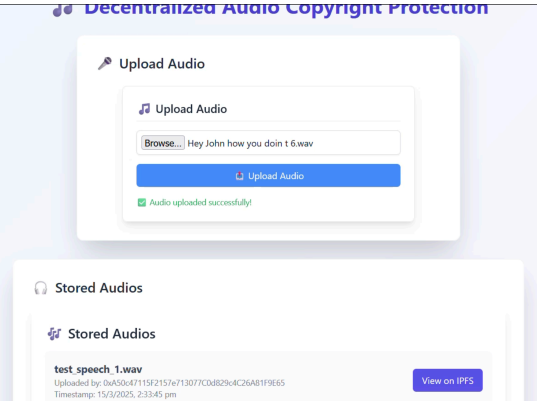
## Outcomes

- Developing a robust audio detection system using alternative perceptual hashing to identify copyright infringement.
- Implementation of the proposed framework and evaluate its effectiveness in preventing unauthorized audio copies

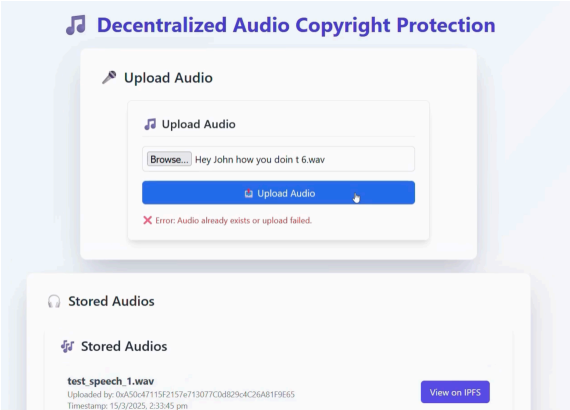
## System Design



## Output and Results



Original Audio uploaded



Pirated audio is rejected

## Performance between Panako 2.0+ OLAF and Chromaprint

Test Condition	Length (s)	Similarity(%)		Blockchain Decision
		Chromaprint	Panako + OLAF	
No Modification	15	95	98	Rejected
	30	99	100	Rejected
Recorded Version	15	42	47	Accepted
	30	55	60	Rejected
Noise Added	15	65	75	Rejected
	30	80	90	Rejected
Pitch Shift +2%	15	35	45	Accepted
	30	58	63	Rejected

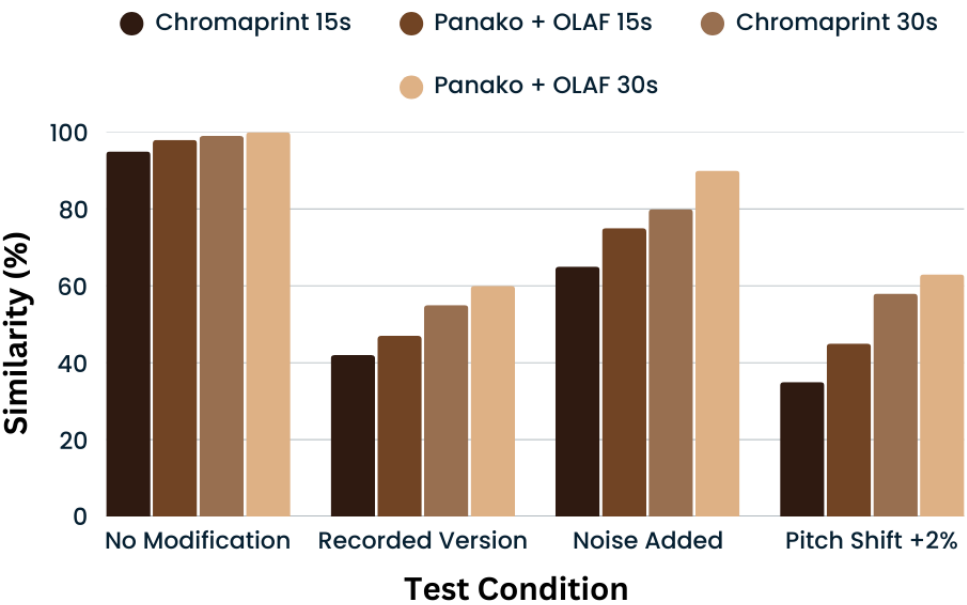
## Performance evaluation

- Fingerprint Size
- Granularity
- Search Speed and Scalability
- Accuracy

## Future Enhancement

- Optimizing perceptual hashing algorithms,
- Improving IPFS time complexity for efficient data retrieval
- Enhancing user control and transparency through advanced analytics
- Automated royalty payments.

## Audio Similarity Comparison across condition



## Application

- Music Industry Protection
- General Audio Content Security System

## Reference

Muhammad Rasyid Redha Ansori,et .al. “[HADES: Hash-based Audio Copy Detection System for Copyright Protection in Decentralized Music Sharing](#)”, IEEE Transaction on network and service management, Vol. 20, NO. 3, September 2023