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Utilizarea Inteligenței Artificiale în tehnologia blockchain

Using Artificial Intelligence in blockchain technology.

Teză de master

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ADNOTARE

**La proiectul de licență: „Utilizarea Inteligenței Artificiale în tehnologia blockchain”,
elaborat de Cheleş Ivan, Chișinău, 2024.**

Cuvinte cheie: Inteligență Artificială, Blockchain, Integrarea Inteligenței Artificiale și Blockchain, Tehnici de Criptare, Considerații Regulatorii și Etice, Securitate Digitală, Analiză de Date, Sănătate, Lanțuri de Aprovizionare.

Tehnologii utilizate: Studiul acoperă în profunzime aspectele tehnologice ale integrării Inteligenței Artificiale și Blockchain, incluzând discuții detaliate despre tehnici de criptare, cum ar fi criptarea simetrică și asimetrică, funcții hash, probe cu zero-cunoaștere, criptare homomorfică, calcul multi-partid securizat (SMPC) și semnături digitale, limbajele de programare Solidity și Python.

Raportul conține: Introducere, cinci capitole, numeroase figuri și o bibliografie cuprinzătoare.

Capitolul 1: Oferă o explorare aprofundată a domeniului, incluzând o prezentare generală a tehnologiei blockchain, o introducere în Inteligență Artificială, un examen preliminar al Inteligenței Artificiale în Blockchain, provocările în integrarea acestor tehnologii, sinergiile potențiale, tendințele de convergență, golurile din cercetarea curentă și o concluzie a cercetării în domeniul respectiv.

Capitolul 2: Se concentrează pe diferite cazuri de utilizare Inteligenței Artificiale și Blockchain în domenii precum securitatea, lanțurile de aprovizionare, autentificarea, analiza datelor, serviciile financiare, sănătatea și aspectele de încredere și transparență.

Capitolul 3: Abordează considerațiile regulatorii și etice, acoperind peisajul regulator, confidențialitatea și protecția datelor, provocările conformității, Inteligență Artificială etică și Blockchain, inovație responsabilă, protecția consumatorului, transparența și perspectivele viitoare regulatorii și etice în Inteligență Artificială și Blockchain.

Capitolul 4: Discută diferite tehnici de criptare esențiale pentru integrarea Inteligenței Artificiale și Blockchain, oferind o înțelegere atât a metodelor criptografice fundamentale, cât și a celor avansate.

Capitolul 5: Prezintă un caz practic de utilizare, ilustrând aplicarea integrării Inteligenței Artificiale și Blockchain într-un scenariu din lumea reală.

ANNOTATION

For the thesis on the topic: "The use of Artificial Intelligence in blockchain technology."

developed by student Cheleş Ivan, Chisinau 2024

Keywords: Artificial Intelligence, Blockchain, Artificial Intelligence and Blockchain Integration, Encryption Techniques, Regulatory and Ethical Considerations, Digital Security, Data Analytics, Healthcare, Supply Chains.

Technologies used: The study extensively covers the technological aspects of Artificial Intelligence and Blockchain integration, including detailed discussions on encryption techniques like symmetric and asymmetric encryption, hash functions, zero-knowledge proofs, homomorphic encryption, secure multi-party computation (SMPC), and digital signatures, Solidity, Python programming languages.

The report contains an Introduction, five chapters, numerous figures, and a comprehensive bibliography.

Chapter 1: Provides an in-depth exploration of the subject area, including an overview of blockchain technology, an introduction to Artificial Intelligence, a preliminary examination of Artificial Intelligence in Blockchain, challenges in integrating these technologies, potential synergies, convergence trends, gaps in current research, and a conclusion of the subject area research.

Chapter 2: Focuses on various Artificial Intelligence and Blockchain use cases in fields like security, supply chains, authentication, data analytics, financial services, healthcare, and aspects of trust and transparency.

Chapter 3: Delves into regulatory and ethical considerations, covering the regulatory landscape, data privacy and protection, compliance challenges, ethical Artificial Intelligence and Blockchain, responsible innovation, consumer protection, transparency, and future regulatory and ethical prospects in Artificial Intelligence and Blockchain.

Chapter 4: Discusses various encryption techniques pivotal to Artificial Intelligence and Blockchain integration, providing an understanding of both foundational and advanced cryptographic methods.

Chapter 5: Presents a practical use case, illustrating the application of Artificial Intelligence and Blockchain integration in a real-world scenario.

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Introduction

In the era of rapid technological advancement, two distinct yet transformative innovations have emerged: Artificial Intelligence (Artificial Intelligence) and blockchain technology. Individually, they represent paradigm shifts in their respective spheres: Artificial Intelligence revolutionizes how machines process and interpret data, while blockchain offers an immutable, decentralized ledger system that promises transparency and security. The confluence of these technologies — the integration of Artificial Intelligence into blockchain traffic — presents an avenue of untapped potential and novel applications. This master's degree dissertation seeks to explore this convergence, highlighting its implications, challenges, and opportunities.

Blockchain, at its core, is a distributed ledger system that records transactions across multiple computers in a way that ensures each transaction is secure, transparent, and immutable. This disruptive technology has found applications beyond its initial use-case in cryptocurrency, ranging from supply chain management to digital identity verification. Yet, with growing usage, the amount of data transactions and traffic on blockchain networks has increased manifold. Processing, analyzing, and extracting meaningful insights from this burgeoning data have become paramount. This is where the capabilities of Artificial Intelligence come into the picture.

Artificial Intelligence, with its prowess in data analytics, machine learning, and predictive modeling, holds the potential to transform how blockchain networks operate, are monitored, and are optimized. From predicting fraudulent transactions to optimizing network throughput, the applications are numerous and varied. However, with great potential comes equally challenging hurdles. Integrating Artificial Intelligence into blockchain traffic requires addressing concerns related to privacy, computational overhead, and ensuring that the decentralized ethos of blockchain is not compromised.

This dissertation aims to provide a comprehensive overview of the current landscape of Artificial Intelligence applications in blockchain traffic, delving into specific use-cases, potential benefits, and associated challenges. Through rigorous analysis and research, this work hopes to pave the way for future research endeavors in this domain and provide a roadmap for industries aiming to leverage the synergistic capabilities of Artificial Intelligence and blockchain.

The following chapters will methodically break down various aspects of this intersection, beginning with a detailed background on both Artificial Intelligence and blockchain, followed by a deep dive into their integration, and culminating in a discussion on future prospects and potential areas of development.

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