Digital Innovators
Séminaires d’innovation numérique

Blockchain and AI as data management tools for climate change challenges

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Webinaire zoom gratuit
http://pin.unige.ch

Accélérateur de Sciences et services numériques
UNIVERSITÉ DE GÉNÈVE
INTRODUCTION

PERSONAL INFORMATION
• COO / Chief Sustainability Officer at ImpactScope
• MBA in Sustainable Business and PhD in Computer Science
• ImpactScope uses Blockchain and AI to create sustainable impact, particularly concerning MRV tools

OBJECTIVE OF THE PRESENTATION
• Start-up experience on how Blockchain, with the support of AI, can be used to overcome global sustainability challenges and reach SDGs
WHAT ARE BLOCKCHAIN AND AI

**BLOCKCHAIN**

- Shared electronic register
- Used for different types of applications (mean of payment, property rights, traceability, notary registry, etc)
- Brings transparency, traceability, disintermediation and trust
- Deterministic outcomes based on Smart Contracts

**ARTIFICIAL INTELLIGENCE**

- Aims at replicating human intelligence
- Can interact with real-world assets
- Black box
WHY BLOCKCHAIN AND CAN BE COMPLEMENTARY

Blockchain is the trust machine
Every transaction made on a blockchain is permanent, transparent, and immutable

AI suffers from the black box problem
AI possesses unparalleled data processing capabilities but it suffers from the black box issue

BLOCKCHAIN CAN LAY THE FOUNDATIONS FOR A SUSTAINABLE AND FAIR AI
BLOCKCHAIN FOR SUSTAINABILITY: MAIN USE CASES

- Supply chain
- Tokenization
- Decentralized identity
- Infrastructure
- Financing
Leverage Blockchain to support climate actions

- Increasing focus on impact created instead of amounts invested
- Expanding market for dMRV (digital Reporting, Monitoring and Verification)

Unlock the power of trees

Measure, report, verify and fund reforestation projects with digital transparency

GET STARTED
Decentralized identity

- Significant difficulties in **personal identification** across different platforms
- Requirements for **AML and KYC**
- Increasing need to create a **decentralized identity repository** and connecting databases
- Need for **interoperability in Blockchain solutions**
- More than **1 billion people without proof of identity**
The energy cost of a single Bitcoin transaction could power 1.5 American homes for a day - Vice

- As of today, one Bitcoin transaction has a CO2 footprint of 748,743 VISA transactions or 56,305 hours of watching Youtube. - Digiconomist

### Power hungry

Some payment systems are energy intensive, but some specific design choices can be much more efficient alternatives.

<table>
<thead>
<tr>
<th>Crypto assets</th>
<th>with proof-of-work (e.g. Bitcoin)</th>
<th>without proof-of-work</th>
<th>with permissions</th>
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<tbody>
<tr>
<td>Credit cards</td>
<td>10000</td>
<td>100</td>
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| Source: IMF staff calculations based on academic and private-sector publications.
DEEP DIVE THE CO2 MARKET

- Increasing need to manage CO2
- Global carbon pricing nearing 100B USD in 2023
- Covering approximately 23% of all CO2 emitted
- Significant variability in market prices of CO2
- Lack of transparency
- Problem of double spending
- Possibility to extend it to other asset classes
<table>
<thead>
<tr>
<th>#</th>
<th>Project name</th>
<th>Website</th>
<th>Description</th>
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**European Carbon Offset Tokenization Association (ecota.io)**
THE MAIN CLASSES OF THE ECOTA ECOSYSTEM MAPPING

- Financing
- dMRV
- Tokenizing
- Retiring
- Trading
- Others

DEEP DIVE THE CO2 MARKET
Increase in the need to manage environmental assets

- Sustainability reporting
- CO2 offsetting and insetting
- Greenwashing regulation, EU taxonomy
- CBAM (Carbon Border Adjustment Mechanism)
- Focus on impact created
Report Sustainable AI, How can Blockchain help?

Written the Sustainability WG at the Crypto Valley Association

Aiming to propose key sustainability levers for AI development and discuss the role of Blockchain, with examples
ETHICAL USE OF AI
HOW? RESTART: Restrain able, Effective, Secure, Transparent, Accessible, Representative, Trusted
Public smart contracts, decentralized decision-making

GREEN AI
HOW? Optimized computation, reusable energy sources, carbon offsetting
Energy marketplaces, tracking energy usage and emissions, decentralized energy management

OPEN SOURCE
HOW? Pre-trained AI models, cloud-based platforms, open source tools, AI education, fairness & transparency
Decentralized & secured data ownership, transparent smart contracts, data marketplaces
# DEEP DIVE AI AND BLOCKCHAIN FOR SUSTAINABILITY

**RESTART applied to CO2 offsetting**

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Support of AI and blockchain</th>
</tr>
</thead>
</table>
| Restraintability | Ability to emit carbon credits limited to quality projects  
  AI supports the identification of suitable areas to maximize CO2 sequestration  
  Blockchain for audit trail of decision-making process |
| Effectiveness   | AI suggesting resource management strategy to minimize CO2 emissions  
  Smart contracts send red flags if required conditions are not met |
| Security        | AI identifying security breaches for unusual patterns  
  Smart contracts automatically enforce remediation  
  Blockchain infrastructure easing remediation |
| Transparency    | Blockchain visible to the public (e.g. reforestation) with data modified only by pre-determined stakeholders  
  AI support in reforestation process built with explainable AI principles |
| Accessibility   | Technological solutions used should not limit the use to experts |
| Representativity| Carbon offset products with a broad variety in geography and type of products  
  AI proposes ideal mix of projects to improve biodiversity |
| Trust           | Blockchain as the single source of truth  
  AI proposing tokenomics models leading to the desired behaviour |
Using AI and Blockchain to identify greenwashing

Sustainability claim #1:
In 2020 we announced our target of Net Zero in our operations by 2030.
Data source: Sustainability Report

Sustainability claim #2:
In 2019 we made €5 b available for green projects and last year we set a target for 70% of our lending to be green by 2030. We also became the first Irish bank to pledge to operate as carbon neutral by 2030.
Data source: Twitter
DEEP DIVE GWI

Introduction to the tool

GreenWashing Identifier (GWI)
An AI powered tool to detect potential greenwashing in the products of financial services companies.
What is greenwashing?

- **Inconsistency** is a discrepancy of certain information
- **Unsubstantiated claim**: a claim made without qualification or that is not supported with appropriate evidence
- **Omission**: the failure to disclose a meaningful piece of information
- **Exaggeration**: an overstatement of certain information
The architecture of the tool
DEEP DIVE GWI

The challenges and open issues

- Ambiguity of natural language and greenwashing
- Training the model
- Evaluation
- Categorization of gravity of greenwashing instances
Thank you!

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