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FACULTY OF CONSTRUCTION AND ENVIRONMENT 建設及環境學院

DEPARTMENT OF BUILDING & REAL ESTATE 建築及房地產學系
INTERNATIONAL · COLLABORATIVE · CONSTRUCTION

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The Potential for Blockchain and Artificial Intelligence to Enhance the Transport Sector

Constructing Smart Cities

Sustainable Built Environment National Research Centre

Curtin University

Griffith UNIVERSITY

RMIT University

Core Partners

Collaborating Partners

Project Overview

Advances in Artificial Intelligence and the emergence of Blockchain Technology stand to provide significant benefits to transport agencies, travellers and associated businesses, especially for those that move early.

This project will be among the first to explore the potential for these revolutionary technologies to enhance the transport sector and allow well-informed early action.

Industry Need

To quickly identify valuable applications of new technologies in harnessing and using ever increasing volumes of data and begin to build strategic approaches to their application in the transport sector.

A key aspect will be to ensure that industry, government and researchers work together to identify early stage applications that provide reliable, fast, affordable and sustainable mobility solutions.

Applied Research Methodology

1. Develop a clear working understanding of the functionality of Artificial Intelligence and Blockchain Technologies.

2. Investigate what potential there is for Artificial Intelligence and Blockchain technology to be used in the transport sector.

The Potential for Blockchain and Artificial Intelligence to Enhance the Transport Sector

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Abstract

This paper outlines research that explores a range of digitally-driven opportunities and challenges in seeking to get cities moving and functioning better; with a focus on the application of Artificial Intelligence and Blockchain technologies. The paper identifies specific potential applications and outlines where such technology can provide tangible benefits for the transport sector and the associated policy and management structures. Specific benefits explored include cost savings (such as digital payment mechanisms, virtual toll collection and congestion charging, capital deferment through greater network utilisation); time savings (from improved transport network operation and management processes); improved operations (such as real-time pay-as-you-drive systems with network differential pricing ability); improved safety (from less collisions and reduced impacts); improved user experience (such as improved platforms and automated payments for parking and bookings); and improved freight and logistics (such as secure storage of time-stamped travel-related data). The paper presents a set of industry partner-preferred use cases such as congestion management, road user pricing, asset management, mobility-as-a-service and freight logistics. The paper outlines specific opportunities for Artificial Intelligence and Blockchain technology to provide value to transport agencies and service providers, either individually or in combination. The paper highlights risks and rewards for the transport sector, including a further review of early findings from the application of such technologies in transport sectors around the world. This research has been developed with funding and support provided by Australia's Sustainable Built Environment National Research Centre (SBEnrc) and its partners.

Applied Research Methodology

1. Develop a clear working understanding of the functionality of Artificial Intelligence and Blockchain Technologies.

2. Investigate what potential there is for Artificial Intelligence and Blockchain technology to be used in the transport sector.

3. Select a short list of use cases and identify risks and rewards for the transport sector to identify deep dive use cases. (Underway)

Preferred Use-Cases for Artificial Intelligence

1. Identification of Network Characteristics (*including vehicle data, engineering data, and hazards*).

2. Traffic Optimisation (*including management and Signalling, interruptions to flow, predictive congestion management, based on real time conditions*).

3. Vehicle Prioritisation (*including emergency vehicles and Mass Transit*).

4. Asset Management (*including vehicles, IoT devices, lights, communications infrastructure*).

Preferred Use-Cases for Blockchain Technology

1. Real Time Road User Pricing (*including charging for time of day and road type usage*).

2. Establishing Identification (*including digital drivers' licences and vehicle ownership*).

3. Enhanced Freight Tracking and Authenticity (including r*eal time location and confirmation of delivery*).

Key Criteria for Use Case Selection for Deep Dive

- Level of capitalisation, maturity and uptake of technology?

- Potential for quick wins with low expenditure to catalyse efforts?

- Level of difficulty and need for external support?

- Capital and operational expenditure requirements?

- Potential for early efforts to underpin future applications?

- Level of integration required across departments?

- Potential for multiple benefits for various users and departments?

- Prerequisites for data availability, format and intervals?

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4. *Undertake Deep Dive research and recommend strategic approaches to implementation by research partners.*

5. *Identify specific policies and mechanisms to support application.*

Project 1.63: The Potential for Blockchain and Artificial Intelligence to Enhance the Transport Sector

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https://sbenrc.com.au/research-programs/1-63/