Initial Plan: A Distributed approach to a food ordering platform using blockchain technology

Abstract

Blockchain was invented by the mysterious Satoshi Nakamoto for use in the peer to peer payment system bitcoin. a blockchain can be thought of as a distributed ledger of transactions shared across all nodes in the blockchains network. The idea of a smart contract was first proposed by Nick Szabo, Nick described the goal of smart contracts as a "highly evolved" form of contract law and practice which could be performed over the internet. Due to a smart contract being stored and run on a blockchain, the operations and clauses in a smart contract can be executed in a way that offers complete trust and transparency for the agents involved.

Project Description

for my final year project, I have chosen to do my project using a blockchain with a more specific focus on smart contracts. I have considered many use cases for this project such as a blockchain based travel insurance provider, a distributed ride-sharing application or a platform to trade tokenised computational resources. However, I have settled on building a proof of concept for a distributed food ordering application.

Using this blockchain based platform, restaurants should be able to market their food products to customers. Independent delivery workers can then offer to deliver food from the restaurant to the customer in exchange for a fee. I hope the project would not only provide a benefit to customers and businesses by offering a decentralised model, with better assurances regarding mistakes made on orders, automatic organisation and management of delivery workers with regards to hiring and payment. But also significantly reduce the fees associated with current more centralised models such as Just Eat, which charges a sign-up fee of £699(+vat), along with 14% (+VAT) +50p commission on every order, for this price just eat still leaves the organisation of delivery to the restaurant. Within the broader aspects of blockchain technology, I hope to provide a good example of delivery tracking, and the use of an escrow service that could be adapted to other applications outside of food delivery.

Project Aims and objectives

in this section, I aim to outline the primary and secondary aims of my project, note that these aims may be subject to change if during development I uncover issues with my approach.

Primary Aims: these are the minimum aims I must achieve to achieve the basic functionality of my system.

- Restaurants should be able to specify food items on the blockchain, users can then purchase these food items and riders can offer to deliver the orders in exchange for a fee. Records of the status of an order should be stored on the blockchain and viewable by authorised agents.
- Private customer information such as name, address and contact details should be encrypted and stored on the blockchain, only agents with permission to specified data resources should be able to access them. For example, delivery workers should be given temporary access to a customer address while an order is in progress, upon settlement of the order, access to the customer's address should be revoked.
- Disclaimers, terms and conditions should be presented to agents, so they understand what is happening with their data and who else has access to it.
- Have a solution that motivates agents to cooperate with the system and deters agents against malicious practices. This will most likely be achieved via deposits placed by the agents to motivate compliance.
- Ensure that fair, and correct collateral is paid out in the case of an incorrect or malicious action taken by any of the parties.
- Produce a basic UI that acts as an interface to the smart contracts for each of the agents involved, (customer, restaurant, deliverer)

Secondary Aims: these are the aims that would add additional value to the system but shouldn't affect the core functionality if missed.

- Produce a rating system for the restaurants and delivery workers and have this stored on the blockchain.
 - Due to reviews not needing to be stored on the blockchain, another approach may be considered where reviews are stored in a centralised way with a blockchain storing review hashes to ensure review integrity.
- Produce an application for mobile users that enables interfacing with the smart contracts.
 - due to the large size of a blockchain ledger, it would be impractical to use a mobile device as a full node, therefore I will consider routing traffic from mobile phones through another node.
- Communicate with local businesses, and food delivery workers such as those who work for Deliveroo to learn about how current systems work but also what features a restaurant or delivery worker may desire.
- Develop additional functionality into the delivery workers smart contract to ensure their deliveries in case of accidental cargo damage/misplacement.
- Consider ways to handle delivery confirmation if one or more of the agent's devices become unavailable.
- Allow customers to transfer ownership of an order to another agent.
- Incorporate maps into the design to allow for searching for restaurants by location and also route information for delivery workers

Work Plan

Week 2	Decide on a blockchain to use.
	 Setup a blockchain node on my own computer.
	Create a simple "hello world" smart contract on the blockchain, complete
	further tutorials and practice to become familiar with the environment,
	language and common blockchain coding practices.
Week 3	Produce a detailed plan of the architecture of the system, including the
	Agents involved, the smart contracts used and any other potential data
	stores that may be employed.
	\circ This should include information on the storage of data that may not
	be essential for complete storage on the blockchain, (data hashes
	could still be stored to ensure data integrity).
	 Arrange a meeting with supervisor to discuss planned architecture.
	Begin development on my smart-contract based backend.
	Complete initial versions of the smart-contracts to be used in the backend
	of my system.
	Begin extensive testing on the smart contracts.
Week 5	 Finish the main testing and debugging of my smart contracts.
	 Try to arrange a meeting with one or more local restaurants that use a
	service such as just eat/Deliveroo to acquire information that may be
	helpful in the design of the user interface.
	Decide on the languages/frameworks I will use to produce a user interface.
Week 6	Complete basic user interface design, development and testing.
Week 7	 Arrange meeting with supervisor to demonstrate the current system.
	 Research and attempt to set up a system that allows mobile devices to
	interface with a blockchain.
Week 8	 Start development on a mobile application to interface with my smart
	contract based back end.
Week 9	 Finish development and testing of a front end for mobile devices.
	 Start developing additional secondary aims such as
	 a restaurant and delivery worker rating system
	 an insurance system for the delivery worker's deliveries
	 methods of handling cases where an agent's device becomes unavailable
	 the integration of maps, so customers can purchase from
	restaurants based on location and routes can be displayed for
	delivery workers
Week 12	hand in project

Here I set out a list of goals to be completed by the end of the specified week.