

Universiti Teknologi MARA

**Blockchain-Based e-Voting System for
Student Election in UiTM**

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ABSTRACT

Student Representative Council is an essential student organization in every university in Malaysia. It helps to emphasize student empowerment and represents the university's image nationally and globally. Universities need to elect the SRC based on student choices carefully, and the university needs a secured, organized process to do the election. Beforehand, SRC at UiTM Shah Alam was elected by a voting system fully own by BHEP UiTM. A centralized voting system like this will lead to any other third parties tempering the student's votes, affecting students' trustworthiness. New data-keeping technology named blockchain can resolve these issues. Blockchain technology is a popular and recognizable technology on how to store data securely. Implementing blockchain technology into an election system will enhance the voting system to be more secured and reliable. This work is using a blockchain network called Ethereum and a smart contract written in Solidity. The smart contract is the code that handles most of the voting system infrastructure, such as adding the candidates, the voter cast ballot to whom, and counting the total votes cast. This project accomplished an e-voting system prototype with fiction student data utilizing blockchain technology. The voting transaction was recorded into blocks and can be observed. Furthermore, each block is connected to the previous block with a hash value, and these key features enhance the voting reliability. This project also using a Web3js API to integrate the blockchain functions with the smart contract and the web application. This work can be extended in future studies by complimenting the smart contract with full-stack development.

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CHAPTER 1

INTRODUCTION

1.1 Background Study

Bitcoin and blockchain ideas were first suggested in 2008 by someone using the alias Satoshi Nakamoto, who explained how cryptology and a transparent distributed ledger could be incorporated into a digital currency application (Monti & Rasmussen, 2017). Blockchain technology is a way to store transactions and keep transaction data securely, and preventing from data tampering. The information created and stored in the form of a block, and each block will be related to each other, creating a chain. In any transaction, the chain is repeated, cryptographically signed, and publicly verifiable so that no one may tamper with the information written on the Blockchain. The blockchain structure is an appended-only data structure, so that new data blocks can be written to it but cannot be changed or removed. The blocks are chained to have the guarantee of immutability in such a way that each block has a hash that is a property of the previous block. (Hjálmarsson & Hreiðarsson, n.d.)

Blockchain technology is a distributed, immutable, incontrovertible, public ledger. This new technology has three main features(Hjálmarsson et al., 2018):

- i. **Immutability:** The previous version of the ledger must be referenced by every proposed “new block” to the ledger. This generates an immutable chain that is where the Blockchain derives its name from, which protects the credibility of previous entries from being abused.