Project Title: Blockchain and Its Applications

**Introduction**

In recent years, the world of blockchain technology has witnessed rapid advancements of digital currency and growing interest, with the potential to reshape our financial systems and redefine the way we transact. Central bank digital currencies (CBDCs) are a significant part of this digital revolution.

CBDCs are essentially digital versions of a country's official currency, issued and regulated by the central bank. According to key finding from Atlantic Council, there are 130 countries, representing 98 percent of global GDP, are exploring a CBDC. 19 of the G20 countries are now in the advanced stage of CBDC development and 11 countries have fully launched their CBDC. They aim to provide a secure and efficient way for people to make digital transactions, similar to using physical cash. [1] However, some countries, like the United States, may prefer stablecoins over CBDCs.[2]

In fact, stablecoins have also prominence in this landscape. These are cryptocurrencies that are typically pegged to a stable asset, such as a traditional currency or a commodity. [3]The key advantage of stablecoins is their ability to minimize the price volatility commonly associated with cryptocurrencies, making them more suitable for everyday transactions.

Other than stablecoins, the concept of purpose-bound money is emerging, whereby digital currencies are designated for specific purposes or industries. For instance, Monetary Authority of Singapore created purpose-bound money to develop innovative services, like digitalise voucher, leading to more efficient and affordable services with better user experiences. [4]These innovations are collectively transforming the way we think about money and financial transactions.

Despite the high potential of CBDCs, there is a notable research gap in understanding how to build user-friendly CBDC wallet DApps that not only facilitate transactions but also offer additional features such as purpose-bound money management and integration with other DApps like e-commerce platforms.[5] This study aims to bridge this gap by providing insights into the development and usability of CBDC DApps, thus contributing to the broader conversation on the practical implementation of CBDCs in real-world scenarios.

To address the research gap identified in the previous section, this project focuses on the development of e-commerce DApp which enables CBDC wallet on the Ethereum blockchain. This DApp will include features such as the ability to buy or sell stablecoins, purpose-bound money management for rewards and discount distribution through smart contracts. By the end of this study, we aim to provide a functional CBDC wallet DApp prototype and insights into the challenges and opportunities of creating user-friendly, versatile CBDC wallets.

**Progress Planning/Strategies**

* 1st -8th week:
  + Research, such as literature review on current situation for research gap
  + Study fundamental knowledge of blockchain, smart contract and Ethereum
  + Start learning tools for DApp development, such as Solidity, Truffle and etc.
* 9th week onwards:
  + Design infrastructure of DApp by planning integration of features
  + Develop and test in local environment
  + Develop nice UI for user experience

**Current Progress**

* Read and studied white papers or articles published by institutions below:
  1. “Project Orchid.” Schemes and Initiatives. Singapore: Monetary Authority of Singapore, October 31, 2022. <https://www.mas.gov.sg/schemes-and-initiatives/project-orchid>.
  2. “Purpose Bound Money (PBM) Technical Whitepaper.” Information Papers. Singapore: Monetary Authority of Singapore, June 21, 2023. <https://www.mas.gov.sg/-/media/mas-media-library/development/fintech/pbm/pbm-technical-whitepaper.pdf>.
  3. Bansal, Rajesh, and Somya Singh. “China’s Digital Yuan: An Alternative to the Dollar-Dominated Financial System,” 40. 1779 Massachusetts Avenue NW Washington, DC 20036: Carnegie Endowment for International Peace, 2021.
  4. Atlantic Council. “Central Bank Digital Currency Tracker.” Accessed September 13, 2023. <https://www.atlanticcouncil.org/cbdctracker/>.
  5. Karam, Ayman Abi. “Central Bank Digital Currency (CBDC) and Blockchain Enable the Future of Payments.” *IBM Blog* (blog), August 17, 2023. <https://www.ibm.com/blog/central-bank-digital-currency-cbdc-and-blockchain-enable-the-future-of-payments/>.
  6. “Project Dunbar - International Settlements Using Multi-CBDCs.” Research & Publication. BIS, Innovation Hub in partnership with the Reserve Bank of Australia, Central Bank of Malaysia, Monetary Authority of Singapore, and South African Reserve Bank, March 22, 2022. <https://www.bis.org/publ/othp47.htm>.
  7. Chan, Elgin. “Renminbi Internationalisation: China’s Central Bank Digital Currency,” 2023. <https://dr.ntu.edu.sg/handle/10356/165508>
* Enrolled in course provided by [University of Basel](https://cryptolectures.teachable.com/courses/), [Alchemy University](https://university.alchemy.com/overview/ethereum) and [Crptozombies.io](https://cryptozombies.io/en/course) and done some of the courses
* Read through documentations, such as Solidity, Truffle Suite and fews of Github projects