CS411 - Project Proposal

LandLedger:

Blockchain-Based Land Registration System

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TABLE OF CONTENTS

INTRODUCTION

Problem Statement

Land registration systems in Pakistan face numerous inefficiencies. Issues such as fraudulent ownership claims, disputes over property titles, loss of important paperwork, and delays in processing transactions are

rampant. These problems are exacerbated by reliance on outdated manual processes and centralized record-keeping systems that lack transparency, security, and accessibility.

Additionally, rural areas often suffer from a lack of access to proper land documentation, further complicating ownership verification and registration processes.

Project Objectives

1. Develop a blockchain-based land registration system tailored to Pakistan's needs to ensure secure, transparent, and immutable property records.
2. Eliminate fraudulent activities and ownership disputes through traceable and tamper-proof records.
3. Streamline ownership transfers for property buyers, sellers, and government officials.
4. Improve the accessibility of land records, especially for rural communities, while maintaining data integrity.

OVERVIEW

Solution Description

The proposed system is a decentralized platform leveraging blockchain to revolutionize Pakistan's land registration processes. By recording property transactions immutably on a blockchain, the system provides enhanced security, transparency, and efficiency.

Users—including property buyers, sellers, and local government officials—will access the platform via a user-friendly application to manage property transactions, verify ownership, and facilitate secure ownership transfers.

Relevance to Blockchain Technology

Key blockchain features leveraged:
- **Immutability:** Ensures that property records cannot be altered or tampered with, eliminating fraud.
- **Decentralization**: Reduces dependence on manual, centralized systems, increasing accessibility and transparency.
- **Smart Contracts:** Automates key processes, such as payments and ownership transfers, reducing delays and human errors.

TECHNICAL APPROACH

Methodology

- **Smart Contracts:** Design and implement smart contracts in Solidity to manage property records and transactions.
- **Blockchain Network:** Use Ethereum or a local blockchain network tailored for low-cost, high-speed transactions (e.g., Polygon or a government-endorsed platform).
- User Interface: Develop a React-based web interface to ensure ease of use for all stakeholders.
- **Integration:** Connect the front end to the blockchain via Metamask and Truffle Suite for seamless interaction.

Tools and Platforms

Frontend: JavaScript, React Framework, CSS
Backend: Ethereum Blockchain, Solidity
Additional Tools: Metamask browser extension, Truffle Suite

TIMELINE

Phase	Timeline	Milestones
Proposal Submission	20–26 November	Complete proposal, including problem statement, objectives, and technical overview.
Research & System Design	27–30 November	Define Pakistan-specific requirements, finalize system architecture, and draft smart contract designs.
Implementation	1–16 December	Develop and test smart contracts, build and integrate user interfaces, and connect the backend to the blockchain.
Testing & Documentation	17–18 December	Conduct comprehensive testing, fix bugs, and prepare documentation.
Final Presentation & Demo	19–21 December	Deploy the solution and prepare for final presentation and demonstration.