"Large Language Models and Artificial Intelligence in Pre-Construction Decision-Making: Enhancing Feasibility, Design, Costing, and Bidding Strategies in Real Estate Development"

1. **Research Purpose**

Abstract: This study aims to investigate the potential of large language models (LLMs) and artificial intelligence (AI) in enhancing pre-construction decision-making in real estate development, with a focus on feasibility, design, costing, and bidding strategies. By comparing AI-driven strategies with traditional methods, the research seeks to develop guidelines for optimizing pre-construction processes and decision-making.

A. Background and Problem Statement

B. Research Objectives

C. Scope and Limitations

2. **Literature Review**

A. Pre-Construction Decision-Making Challenges

B. AI and LLMs in Real Estate Development

C. AI-driven Decision-making in Pre-Construction Processes

D. Cost Estimation and Bidding Strategies

**3. Theoretical Framework & Methodology**

A. AI and LLMs in Pre-Construction Decision-Making

B. Design Optimization Techniques

C. Models for Cost Estimation and Bidding

D. Data Collection and Pre-processing

E. Model Development, Training, and Validation

F. Case Studies

G. Evaluation Metrics and Performance Analysis

**4. Expected Results**

A. AI and LLM Performance in Pre-Construction Decision-Making

B. Design Optimization Outcomes

C. Improved Cost Estimation and Bidding Strategies

D. Model Evaluation and Comparison

**5. Potential Conclusions and Contributions**

A. Summary of Findings

B. Implications for Pre-Construction Decision-Making

C. Recommendations for Future Research

D. Limitations and Areas of Improvement

**6. Work Plan and Timeline**

A. Phase 1: Literature Review and Theoretical Framework Development

B. Phase 2: Data Collection and Pre-processing

C. Phase 3: Model Development, Training, and Validation

D. Phase 4: Design Optimization, Cost Estimation, and Bidding Analysis

E. Phase 5: Model Evaluation and Sensitivity Analysis

F. Phase 6: Results Analysis and Writing

**7. References**