

Development of A Smart Online Bidding Application Using Kotlin and Firebase

Tugas Akhir

**Diajukan untuk Memenuhi Salah Satu Persyaratan
Mencapai Derajat Sarjana Komputer**



ARI MULIANANDA SIREGAR

210711072

PROGRAM STUDI INFORMATIKA

FAKULTAS TEKNOLOGI INDUSTRI

UNIVERSITAS ATMA JAYA YOGYAKARTA

2025

HALAMAN PENGESAHAN

Tugas Akhir Berjudul

DEVELOPMENT OF A SMART ONLINE BIDDING APPLICATION USING KOTLIN AND FIREBASE

yang disusun oleh

Ari Muliananda Siregar

210711072

dinyatakan telah memenuhi syarat pada tanggal 23 Juli 2025

Dosen Pembimbing 1	: Th. Adi Purnomo Sidhi, S.T., M.T.	Keterangan Telah Menyetujui
Tim Penguji		
Penguji 1	: Th. Adi Purnomo Sidhi, S.T., M.T.	Telah Menyetujui
Penguji 2	: Martinus Maslim, S.T., M.T.	Telah Menyetujui
Penguji 3	: Stephanie Pamela Adithama, S.T., M.T.	Telah Menyetujui

Yogyakarta, 23 Juli 2025

Universitas Atma Jaya Yogyakarta

Teknologi Industri

Dekan

ttd.

Dr. Ir. Parama Kartika Dewa SP., S.T., M.T.

Dokumen ini merupakan dokumen resmi UAJY yang tidak memerlukan tanda tangan karena dihasilkan secara elektronik oleh Sistem Bimbingan UAJY. UAJY bertanggung jawab penuh atas informasi yang tertera di dalam dokumen ini

Table of Contents

Abstract.....	6
Introduction.....	7
1.1 Background of the Problem	7
1.2 Research Objectives	7
1.3 Problem Statement.....	8
1.4 Scope and Delimitation of the Research	9
1.5 Research Methodology.....	9
1.6 Research Contribution	10
Literature Review	11
2.1 Introduction	11
2.2 Previous Studies	11
2.3 Theoretical Framework.....	14
2.3.1 Online Bidding Systems	14
2.3.2 Artificial Intelligence in Chatbots	15
2.3.3 Customer Experience and Service Automation Theory	15
2.3.4 Trust in Online Systems Theory.....	15
2.3.5 Frameworks and Supporting Technologies	15
2.4 Conceptual Framework	16
2.4.1. System Components	16
2.4.2. Key Processes in the Conceptual Framework	17
2.4.3. Interactions and Relationships	17
2.4.4. Expected Outcomes	18
2.5 Summary	18
System Design	20
3.1 System Overview	20
3.2 System Requirements Analysis.....	21
3.2.1 Functional Requirements for User Application and Admin Application	21
3.2.2 Non-Functional Requirements	22
3.3 Business Process Design.....	23
3.3.1 User.....	24
3.3.2 Admin	26
3.4 AI Chatbot Design	27
3.4.1 Purpose of the Chatbot	28
3.4.2 How Gemini AI is Used	28
3.4.3 System Flow in Chatbot Feature	28
3.4.4 Tools and Technologies	28
3.4.5 How and Why the Chatbot Knows Product Information	29
3.4.6 How Gemini AI Is Integrated	29
3.4.7 Limitations	29

3.5 Winner Determination Mechanism	30
3.6 System Modeling	30
3.7 Database Design.....	33
3.8 User Interface Design (UI/UX)	35
3.8.1 User.....	35
3.8.2 Admin	37
3.9 Tools and Technologies Used	38
3.9.1 Programming Languages.....	38
3.9.2 Frameworks and Libraries	38
3.9.3 Database Systems.....	39
3.9.4 Development and Design Tools	40
3.10 Summary.....	40
<i>Implementation</i>	<i>41</i>
4.1 Overview	41
4.2 Auction Process.....	41
4.2.1 Auction Process Flow	41
4.3 Development Environment	42
4.4 Application Structure	43
4.4.1 User.....	43
4.4.2 Admin	44
4.5 Feature Implementation.....	45
4.5.1 User.....	45
4.5.2 Admin	46
4.6 Interface Screenshots	48
4.6.1 User.....	48
4.6.2 Admin	50
4.7 Snippet Code Implementation	51
4.7.1 User.....	52
4.7.2 Admin	60
4.8 Summary	64
<i>System Testing and Deployment</i>	<i>66</i>
5.1 System Testing.....	66
5.1.1 Functional Testing	66
5.1.2 UI/UX Testing.....	67
5.1.3 Integration Testing	69
5.2 Deployment Process	71
5.2.1 Build and Packaging.....	71
5.2.2 Configuration	72
5.2.3 Distribution	72
5.2.4 Device Compatibility	72
5.3 Summary	73

Conclusion	74
6.1 Conclusion.....	74
6.2 Limitations	75
6.3 Suggestions.....	75
References:	76

Abstract

Online bids are rapidly gaining popularity, revolutionizing buying and selling through dynamic e-commerce platforms. [1] projects that the online bid market will reach \$68 billion by 2025, emphasizing the need for improved accessibility and support systems to enhance the bidding experience. The increasing demand for dynamic and efficient bidding platforms has created challenges in providing personalized user support. To address this problem, this research develops a bidding application that integrates artificial intelligent chatbot assistance. The application is built using Kotlin for development, Firebase as a scalable database, and Gemini AI's pre-trained chatbot model for interactive user support without additional model training. The implementation involves Firebase to manage real-time data storage and retrieval and Gemini AI to deliver chatbot functionalities like an assistant. Drawing insights from studies on real-time capabilities [2][3], Firebase's role in live applications [6], Kotlin's effectiveness in mobile app development [5], and the use of pre-trained AI models in user interactions [4], the system was evaluated through stress testing and user feedback. Results indicate that the proposed solution enhances user engagement, system responsiveness, and operational efficiency, offering a scalable approach to improving bidding platforms.