

**KHAN INSTITUTE OF
COMPUTER SCIENCE AND
INFORMATION TECHNOLOGY
COMPUTER SCIENCE DEPARTMENT**

**Mobile App Development
Project Proposal**

Submitted By:

Muhammad Bilal
232201100

Submitted To:

Sir Uzair Hassan
Department of Computer Science

December 8, 2025

Table of Contents

Contents

| | |
|--|----------|
| 1. Project Title | 3 |
| 2. Project Description | 3 |
| 3. Project Objectives | 3 |
| 4. Core Features | 3 |
| 4.1 Splash Screen / Auto Login Check | 3 |
| 4.2 Phone Number Registration | 3 |
| 4.3 Profile Setup | 4 |
| 4.4 Contacts / Chat List | 4 |
| 4.5 Real-Time Chat Messaging | 4 |
| 4.6 Media / Document Sharing | 4 |
| 4.7 Chat Functionalities | 4 |
| 4.8 Logout / Re-login | 5 |
| 5. Special Feature: Built-in AI Chatbot | 5 |
| AI Capabilities | 5 |
| 6. Technologies Used | 5 |
| Frontend (Android) | 5 |
| Backend | 5 |
| AI Integration | 6 |
| 7. Tools / Libraries | 6 |

| | |
|------------------------------------|----------|
| 8. System Architecture | 6 |
| MVVM Flow | 6 |
| Real-Time Messaging Flow | 7 |
| 9. Project Workflow | 7 |
| 10. Expected Outcome | 7 |

1. Project Title

SmartChat – A WhatsApp Clone

2. Project Description

SmartChat is an advanced real-time messaging application inspired by WhatsApp. It enables phone-number-based authentication, messaging, media sharing, and real-time communication. A modern special feature includes an integrated AI chatbot that allows users to chat with an intelligent assistant inside the app.

3. Project Objectives

- Build a WhatsApp-like real-time messaging app.
- Implement OTP authentication via Firebase.
- Develop profile setup, chat UI, and media sharing features.
- Add AI chatbot for enhanced interaction.
- Use MVVM architecture with modern Android tools.
- Ensure clean, scalable, and easy-to-maintain code.

4. Core Features

4.1 Splash Screen Auto Login Check

- Auto-check if user is already authenticated.
- Navigate to Home screen if session is valid.

4.2 Phone Number Registration

- Country code selection.

- OTP sending and verification through Firebase.
- Error handling and validation.

4.3 Profile Setup

- Username, profile photo, about section.
- Stored in Firestore/Firebase Database.

4.4 Contacts Chat List

- Shows recent conversations.
- Last message preview.
- Online/offline indicators.

4.5 Real-Time Chat Messaging

- One-to-one messaging.
- Seen/delivered ticks.
- Instant updates via Firebase.

4.6 Media Document Sharing

- Images, videos, documents, audio messages.
- Camera support.

4.7 Chat Functionalities

- Delete messages.
- Typing and online indicators.
- Emojis and message search.

4.8 Logout Re-login

- Maintains secure session.

5. Special Feature: Built-in AI Chatbot

SmartChat includes an integrated AI-powered chatbot inside the app.

AI Capabilities

- Answer questions.
- Natural-language conversation.
- Provide information and learning assistance.
- Works like a normal chat window.

6. Technologies Used

Frontend (Android)

- Kotlin
- Jetpack Compose
- Material 3
- Navigation Compose
- StateFlow, Coroutines
- MVVM Architecture

Backend

- Firebase Authentication

- Firebase Firestore / Realtime Database
- Firebase Storage

AI Integration

- OpenAI API (LLM responses)
- Retrofit or Ktor Client

7. Tools Libraries

- Android Studio
- Hilt Dependency Injection
- Coil (Images)
- Lottie Animations
- Git / GitHub
- Firebase Console

8. System Architecture

MVVM Flow

- UI Layer – Jetpack Compose
- ViewModel – Business logic
- Repository – Data handling
- Firebase/API – Backend data

Real-Time Messaging Flow

1. User sends message.
2. Repository pushes to Firebase.
3. Firebase updates recipient instantly.
4. UI updates automatically through Flow/State.

9. Project Workflow

1. Design UI in Figma/Compose previews.
2. Implement navigation.
3. Build authentication module.
4. Setup profile system.
5. Chat list UI.
6. Real-time chat engine.
7. Media sharing.
8. AI chatbot integration.
9. Testing and debugging.

10. Expected Outcome

- Fully functional WhatsApp-like chat app.
- AI-integrated messaging.
- Stable real-time system.
- Professional academic project.