

# EduPuls: Intelligent Telegram Assistant for Student Updates and Reminders

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**Abstract**— Educational institutions widely use messaging platforms such as Telegram or WhatsApp groups to communicate announcements to students. However, students often miss important information because of the large number of messages in these groups. This paper presents EduPlus, an AI-based academic communication assistant designed to automatically process institutional announcements and deliver simplified summaries to students. The system uses Natural Language Processing and Large Language Models to analyze messages, extract important information, and generate concise summaries. It also supports image notice processing, automated notification scheduling, and student query interaction through a mobile application. The architecture includes a bridge server, AI agent server, MongoDB database, notification scheduler, and Flutter-based mobile application. Experimental results show that EduPlus improves academic communication efficiency and helps students receive important information in a timely manner.

**Keywords**—Artificial Intelligence, NLP, Academic Communication, Notification System, Large Language Models, Mobile Application.

## I. INTRODUCTION

Educational institutions rely on digital communication platforms such as Telegram and WhatsApp groups to share academic announcements. These messages include exam schedules, fee notifications, event announcements, and important instructions. However, students often find it difficult to identify critical information due to the large volume of messages.

Artificial Intelligence and Natural Language Processing technologies can be used to automatically analyze and summarize such messages. Large Language Models (LLMs) provide advanced capabilities for understanding and generating human language, making them suitable for academic communication systems.

This paper proposes EduPlus, an AI-based academic assistant that automatically processes announcements, generates summaries, schedules reminders, and allows students to interact with an AI assistant through a mobile application.

## II. SYSTEM ARCHITECTURE

The EduPlus system consists of five major components:

1. Telegram Communication Layer
2. Bridge Server
3. AI Agent Server
4. MongoDB Database
5. Mobile Application and Notification System

The Bridge Server receives messages from Telegram groups through a webhook and forwards them to the AI Agent Server. The AI agent analyzes messages using a Large Language Model and generates simplified summaries. Important information such as deadlines and events are stored in MongoDB and scheduled for reminders.

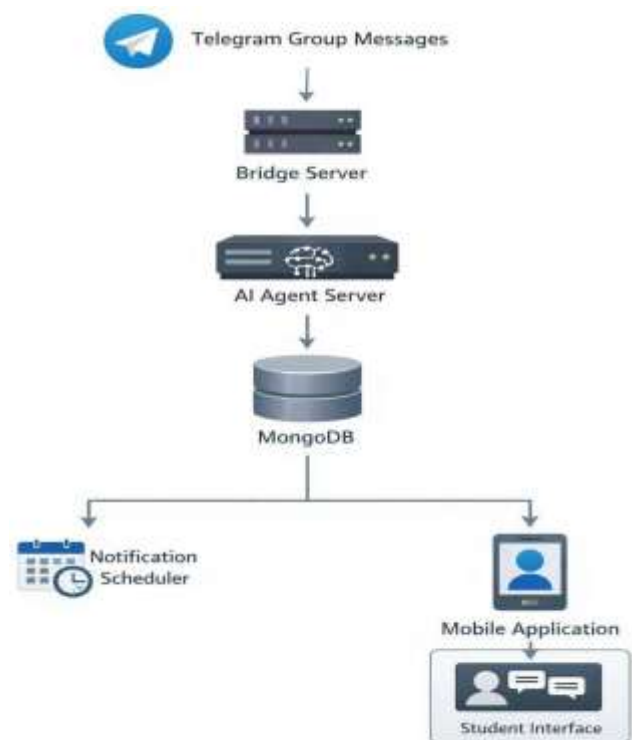


Figure 1: Overall system architecture of the EduPlus AI-based academic communication platform.

A Notification Scheduler monitors scheduled tasks and sends push notifications to students through Firebase Cloud Messaging. Students interact with the system through a Flutter-based mobile application that supports chat communication with the AI assistant.

### III. SYSTEM WORKFLOW

The workflow of the EduPlus system begins when a teacher posts an announcement in a Telegram group. The Bridge Server captures the message using a webhook mechanism and forwards it to the AI Agent Server. The AI agent processes the message using a Large Language Model to generate a concise summary.

If the message contains deadlines or important events, the system schedules notifications in the database. The notification scheduler continuously checks the database and sends reminders to students at scheduled times.

Students can also interact with the system through the mobile application by asking questions related to announcements. The AI agent analyzes the query using contextual information and generates an appropriate response.

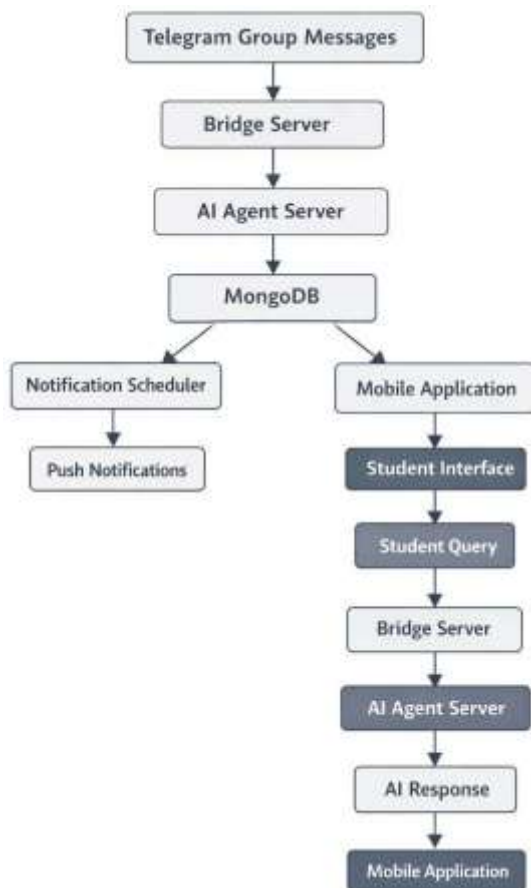


Figure 2: Workflow of message processing and student interaction in the EduPlus system.

The EduPlus system is implemented using modern backend, AI, and mobile development technologies.

The backend services are developed using Python and FastAPI, which provide high-performance APIs for message processing and communication between system components.

The AI agent uses LangChain with Large Language Models to analyze messages, generate summaries, and process student queries. MongoDB is used as the primary database to store messages, responses, user data, and scheduled notifications.

The mobile application is developed using the Flutter framework, enabling cross-platform compatibility. Real-time communication between the mobile app and the backend server is implemented using WebSocket technology. Push notifications are delivered using Firebase Cloud Messaging, ensuring that students receive important reminders even when the application is not active.

### V. RESULTS AND DISCUSSION

The EduPlus system was tested using real academic announcements and student queries. The system successfully processed messages from Telegram groups and generated concise summaries that clearly highlighted important details such as deadlines, exam schedules, and event information.

The mobile application displayed these summaries in a chat interface and allowed students to interact with the AI assistant. Push notifications were successfully delivered through Firebase Cloud Messaging, ensuring that students received timely reminders.

Experimental results show that the proposed system significantly improves academic communication efficiency and reduces the chances of students missing important announcements.

### VI. FUTURE WORK

Future improvements of the EduPlus system include:

- Supporting multiple departments and courses.
- Integration with Learning Management Systems.
- Voice-based student interaction.
- Advanced AI summarization models.
- Multi-language announcement support.

### ACKNOWLEDGMENT

We would like to thank Mrs. N. Madhavi, Assistant Professor, Department of Computer Science and Engineering, Bapatla Engineering College, for her valuable guidance and support throughout this work. We also acknowledge the Department of Computer Science and Engineering, Bapatla Engineering College, for providing the necessary facilities to complete this research.

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