**Medication Reminder and Query Agent**

**TEAM LEAD:**

**CH.NAVYA SRI [22B21A4302]**

**TEAM MATES:**

**P. VAISHNAVI [22B21A43A4]**

**I.DIVAKAR DURGA PRASAD [22B21A4339]**

**V.KRISHNA KOUSHIK [22B21A4336]**

**G.NAGARAJU [22B21A4351]**

***DEPARTMENT: CSE-AI***

***INSTITUTION: KAKINADA INSTITUTE OF ENGINEERING AND TECHNOLOGY***

***ACADEMIC YEAR: 2025-2026***

**Abstract**

This project aims to develop a Medication Reminder and Query Agent tailored to the Indian healthcare scenario. It will help patients, especially the elderly and those with chronic illnesses, manage medicines effectively. The system enables users to set reminders for medication schedules and provides intelligent responses to medicine-related queries. By integrating machine learning with natural language processing (NLP), the agent can recommend medicine usage, dosage instructions, and side effects. The solution addresses the growing need for affordable and accessible digital healthcare in India, improving medication adherence in both urban and rural settings.

**Introduction & Problem Statement**

In India, non-adherence to prescribed medication is a significant challenge. According to studies, a large proportion of patients—especially in rural and semi-urban areas—either forget their medicines, discontinue treatment midway, or misuse dosage instructions. Elderly citizens with multiple prescriptions find it difficult to manage their medicine schedules. Limited access to doctors and pharmacists further worsens the problem.

This project proposes a Medication Reminder and Query Agent that ensures timely medicine intake while serving as an intelligent digital assistant to answer queries in English and regional Indian languages, thereby improving healthcare outcomes.

**Background**

With the rise of chronic illnesses and the need for personalized healthcare, digital health assistants have become increasingly important. Several mobile applications currently provide either reminders or basic health information, but they often lack AI-driven query resolution and flexible reminder scheduling. Leveraging NLP and machine learning, this project bridges the gap between simple reminder apps and AI-based medical assistants.

**Importance**

Ensures medication adherence by providing timely reminders.

Reduces chances of missed doses and overdosing.

Provides accessible medical knowledge through AI-based query handling.

Supports elderly patients and individuals with multiple medications.

Contributes to preventive healthcare and better treatment outcomes.

**Problem Statement**

Patients frequently:

1. Forget to take medications on time.

2. Lack knowledge about their prescribed medicines.

3. Struggle with managing multiple medications.

The absence of a smart, integrated solution leads to poor health outcomes. A system that can remind, educate, and guide users about their medication is crucial.

**Proposed Methodology**

The project involves two key components:

1. Medication Reminder System – Allows users to schedule medicines with dosage and time. Notifications/alerts ensure adherence.

2. Query Agent – Uses NLP models trained on medical datasets to provide reliable answers about medicine usage, side effects, and dosage instructions.

**Steps:**

**Using pretrained steps used:-**

1. Data Collection – Gather drug-related information from trusted medical sources.

2. Preprocessing – Clean, tokenize, and structure the medical data.

3. Model Development – Train NLP-based models (e.g., BERT, GPT fine-tuning) for question answering.

4. Reminder System – Implement scheduling using Python/Flask/Django with database support.

5. Integration – Combine both modules into a web/mobile application

**Approach**

Front-end: User interface for setting reminders and asking queries.

Back-end: ML/NLP model + database storing reminders and medicine data.

Notification System: Alerts users via SMS, email, or push notifications.

Query System: Accepts natural language queries and provides contextual responses.

**Scratch Developing Model**

**1. Data Collection**

* Gather drug-related data from trusted sources (DrugBank, PubMed, FDA).
* Create custom dataset for medicine schedules & dosage patterns.

**2. Data Preprocessing**

* Clean and normalize medical terms (mg, ml, tab).
* Tokenize instructions into word units.
* Build custom medical vocabulary for the model.

**3. Model Development (From Scratch)**

* Design custom embeddings for medical terms.
* Build NLP architecture: RNN/LSTM/GRU or Transformer encoder-decoder.
* Define loss function with emphasis on dosage/side-effect accuracy.

**4. Model Training**

* Train on labeled Q&A pairs from medical datasets.
* Use GPU acceleration + regularization (dropout, weight decay).
* Optimize with validation/testing cycles.

**5. Evaluation**

* Metrics: Accuracy, F1-score, BLEU/ROUGE for answer quality.
* Expert validation with pharmacists/doctors for reliability.

**6. Medication Reminder System**

* Implement scheduling engine using Python/Flask/Django.
* Store reminders in database (SQL/NoSQL).
* Provide alerts via notifications/SMS/voice/text.

**7. Integration**

* Connect reminder module + query agent via APIs.
* Web/mobile interface for user interaction.
* Ensure security, privacy, and encrypted storage.

**8. Deployment**

* Package with Docker, deploy on cloud (AWS/GCP/Azure).
* Enable real-time monitoring and dataset/model updates.

**Datasets & Tools**

Datasets:

ICMR (Indian Council of Medical Research) guidelines

National Health Portal (NHP) India drug database

Drugs.com + MedlinePlus datasets (supplementary)

Custom-curated CSVs of Indian medicines and schedules

**Tools & Libraries:**

Programming Language: Python

Frameworks: Flask/Django (backend), React/Angular (frontend)

Database: MySQL / MongoDB

ML/NLP Libraries: Scikit-learn, TensorFlow, PyTorch, Hugging Face Transformers

Scheduler/Notifier: Cron jobs, Firebase Cloud Messaging (FCM)

APIs: Twilio (SMS reminders), email automation APIs

**Block Diagram / Flowchart**

Block Diagram Flow:

User Input → Reminder Module → Scheduler → Notification System (SMS/WhatsApp/App)

↓

Query Module → NLP Processing → Indian Medicine Database → Response

**Conclusion**

The Medication Reminder and Query Agent offers a dual solution by ensuring timely medication intake and providing reliable medical knowledge. This project has the potential to improve healthcare outcomes by reducing medication errors, empowering patients with knowledge, and supporting healthcare providers in monitoring adherence. Future improvements may include voice-enabled interaction, integration with wearable devices, and personalized AI-driven health recommendations.

**References**

1. Drugs.com – Comprehensive Drug Information

2. MedlinePlus – Trusted Health Information

3. UMLS – Unified Medical Language System

4. Hugging Face Transformers – https://huggingface.co/transformers

5. ICMR (Indian Council of Medical Research) – https://www.icmr.gov.in

6. National Health Portal India (NHP) – https://www.nhp.gov.in

7. World Health Organization (WHO) – Adherence to long-term therapies report