**🧓 Elderly Care Companion Bot**

**🧠 Project Objective**

Build a Java-based chatbot that acts as a **virtual companion** for elderly users. It provides:

* Daily **medication and appointment reminders**
* **Conversational support** to reduce loneliness
* **Emergency monitoring** (e.g., if there's no response)
* Caregiver **notification system**
* Optional **voice interface** for hands-free use

**⚙️ System Architecture**

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| Java GUI (JavaFX) |

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| Reminder Engine (Scheduler)|

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| NLP + Dialogue Engine |

| (Simple intents + GPT API)|

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| Storage (SQLite DB) |

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| Emergency Notification |

| (SMS / Email / MQTT) |

**🧩 Key Features**

**1. ✅ Medication & Task Reminder**

* GUI or voice notifications for:
  + Medicine schedules
  + Doctor appointments
  + Hydration reminders
* **Java Timer / ScheduledExecutorService** for scheduling
* Uses **SQLite** to store recurring tasks and times

**2. 💬 Conversation Module**

* Basic chat functionality:
  + Greetings
  + Mood checking
  + Simple small talk
* **NLP Options**:
  + Basic: Rule-based patterns using regex or keyword match
  + Advanced: Connect to **OpenAI API** or use **Rasa NLU**
* Can integrate **Text-to-Speech (TTS)** using:
  + [FreeTTS (Java)](http://freetts.sourceforge.net/)
  + Or external services like **Google Cloud TTS**

**3. 🚨 Emergency Detection**

* Detect if user hasn’t interacted in a while
* Optional panic button in UI
* Sends alert to caregiver via:
  + **Email (JavaMail API)**
  + **SMS (Twilio API)**
  + **MQTT** (if integrated with IoT wearables)

**4. 📱 Optional: Voice Interface**

* **Speech-to-Text (STT)** with:
  + CMU Sphinx (offline, open-source)
  + Google Speech-to-Text API (better accuracy)
* **TTS** for replying

**5. 🧾 Daily Report to Caregiver**

* Summary of:
  + Medications taken/missed
  + Interaction logs
  + Any alerts triggered
* Auto-generate report as **PDF (using Apache PDFBox)** or email

**🖥️ UI Design (JavaFX)**

* Large buttons, simple layout
* Color-coded:
  + Green = All OK
  + Yellow = Reminder Pending
  + Red = Alert Triggered
* Components:
  + “How are you feeling today?” input
  + “Reminders” panel
  + “Talk to Me” button
  + “Alert Caregiver” button

**📦 Tech Stack**

| **Component** | **Technology** |
| --- | --- |
| Frontend UI | JavaFX |
| Local DB | SQLite (via JDBC) |
| Voice (TTS/STT) | FreeTTS / Google Speech API |
| NLP Engine | Basic rules or GPT-4 API |
| Emergency Messaging | JavaMail, Twilio SMS, or MQTT |
| Scheduling | ScheduledExecutorService |
| PDF Reporting | Apache PDFBox |

**🔐 Security & Privacy**

* Encrypt stored personal data (AES or simple obfuscation)
* Consent screen for storing personal info
* Rate-limit messages to avoid spam

**🧪 Future Extensions**

* Integrate with IoT fall detection devices
* Use camera + pose detection for inactivity monitoring
* Learn preferences over time