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VIT CHENNAI | 15

ECDS

VITAA

AI-Powered Personal Task Automation Agent

TEAM NAME: GHOST

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Problem Overview

- Modern users rely on multiple productivity tools such as **emails, calendars, reminders, and task managers**
- These tools operate in **isolated silos**, requiring users to manually coordinate between them
- Important tasks, deadlines, and meetings are often **hidden inside long and unstructured email conversations**
- Users must manually:
  - Read emails
  - Identify actionable tasks
  - Extract dates and times
  - Open calendar or reminder apps
  - Schedule events themselves
- This manual process results in:
  - Missed deadlines
  - Calendar conflicts and double bookings
  - Frequent context switching
  - Increased cognitive load and mental fatigue
- Existing systems lack:
  - Deep natural language understanding
  - Intelligent task prioritization
  - Automatic conflict detection and resolution

➡️ **Result:** Reduced productivity, higher error rates, and inefficient task management

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"LIMIT OF EXISTING SYSTEM"

- Most existing productivity tools rely on rule-based or keyword-based logic
- These systems fail to understand natural, flexible human language
- Users are required to manually enter tasks, deadlines, and meetings
- Important information such as implicit dates and priorities is often ignored
- Existing tools do not intelligently coordinate across emails, calendars, and reminders
- Scheduling systems typically:
  - Do not detect conflicts in advance
  - Allow double bookings without warnings
  - Require manual rescheduling
- Automation is mostly reactive, not proactive
- Lack of explainability:
  - Users do not understand why actions are taken
  - No conversational interface for clarification

➡️ Result: High user effort, poor reliability, missed follow-ups, and inefficient productivity workflows

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"PROPOSED SOLUTION"

- We propose an AI-powered personal task automation agent that acts as an intelligent digital assistant
- The system understands natural language instructions provided through:
  - Emails
  - Plain text messages
- Using NLP and Large Language Models (LLMs), the agent:
  - Identifies user intent (task, meeting, reminder)
  - Automatically extracts dates, times, and task types
- The intelligent agent:
  - Schedules calendar events and reminders automatically
  - Eliminates the need for manual data entry
- Built-in conflict detection ensures:
  - No double bookings
  - No missed deadlines
- When decisions are required, the system uses a conversational chatbot to involve the user

➡️ Outcome: Seamless, accurate, and low-effort task scheduling from unstructured input

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"SYSTEM OBJECTIVES"

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"HOW THE SYSTEM WORKS"

- User provides input via email or plain English text
- NLP & LLMs analyze the text to understand intent
- System extracts task type, date, and time
- Intelligent agent decides the required action
- Calendar is checked for conflicts
- Chatbot interacts with user only if a conflict exists
- Event or reminder is automatically scheduled
- User receives confirmation
- ➡️ Outcome: Fast, accurate, and conflict-free task automation

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"ROLE OF NLP AND LLMS"

- NLP processes raw text from emails and messages
- Extracts key entities such as:
  - Task type
  - Dates
  - Times
- LLMs provide contextual understanding
- Interpret flexible language like:
  - "tomorrow evening"
  - "next week"
- Enable accurate intent detection
- Convert unstructured text into structured actions
- ➡️ Result: Reliable natural language → automated scheduling

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"CONFLICT DETECTION AND RESOLUTION"

- System checks the calendar for:
  - Overlapping meetings
  - Duplicate reminders
- Detects scheduling conflicts before creating events
- Prevents double booking and missed commitments
- When a conflict is found:
  - Chatbot notifies the user
  - Explains the conflict clearly
- User can choose to:
  - Reschedule
  - Delete an existing event
  - Allow both events
- Selected action is applied instantly

➡️ Result: Conflict-free and user-controlled scheduling

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"SYSTEM ARCHITECTURE"

- Input Layer:
  Receives emails and natural language user inputs
- AI Layer:
  Processes text using NLP and Large Language Models (LLMs) for:
- Intent classification (task, meeting, reminder)
- Date and time extraction
- Decision Layer:
  Intelligent agent plans actions and sequences tasks
  Checks calendar availability and detects conflicts
- Conflict Resolution Layer:
  Manages overlapping events and duplicates
  Engages user via chatbot for decisions if conflicts arise
- Interaction Layer:
  Chatbot interface built with Flask for real-time user communication
- Execution Layer:
  Connects with external APIs:
- Gmail API for email access
- Google Calendar API for scheduling and reminders
- Storage Layer:
  Maintains task and user data using SQLite or Firebase

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"TECH STACK"

- Backend:
- Python with FastAPI or Flask for API and chatbot UI
- AI & Machine Learning:
- Large Language Models (LLaMA, Ollama, Groq) for NLP and intent extraction
- Scikit-learn for classification and entity extraction
- Rule-based reasoning for conflict detection and business logic
- Automation:
- n8n workflow automation platform with webhooks for event triggering
- APIs:
- Gmail API for email access and processing
- Google Calendar API for event creation and updates
- Database:
- SQLite or Firebase for storing tasks, user preferences, and logs
- Frontend:
- HTML, CSS, and JavaScript for chatbot interface and user interaction

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"USE CASE"

- Working Professionals
  - Automates meeting scheduling and reminders from emails
- Students
  - Manages assignment deadlines, exams, and study schedules
- Project Managers
  - Coordinates team meetings and project timelines
- Startups
  - Streamlines internal task and calendar management
- Enterprises
  - Automates high-volume email-based scheduling workflows

➡️ Impact: Improves productivity across personal, academic, and professional environments

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"USE CASE"

- Converts natural language instructions into real-world calendar actions
- Integrates and automates across multiple productivity tools seamlessly
- Uses conversational AI for transparent and user-controlled automation
- Employs human-in-the-loop AI to prevent errors and maintain trust
- Provides conflict-aware scheduling with intelligent resolution options
- Lightweight, scalable, and easily extendable architecture

➡️ Unique Selling Point: One AI agent that "thinks once" and automates everything effortlessly

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"FUTURE ENHANCEMENT"

- Voice-based task input
  - Schedule tasks using voice commands
- Priority-aware scheduling
  - Automatically prioritize important tasks
- Automatic free-slot detection
  - Suggest optimal meeting times
- Messaging app integration
  - Slack, WhatsApp, and Teams support
- Multi-user calendar synchronization
  - Team and shared calendar management
- Personalized habit learning
  - AI adapts to user productivity patterns

➡️ Vision: Evolve into a fully intelligent personal productivity assistant

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"CONCLUSION"

- Developed an AI-powered personal task automation agent
- Reduces manual effort by converting natural language to scheduled actions
- Prevents scheduling conflicts through intelligent detection and resolution
- Combines AI automation with human-in-the-loop decision-making for safety
- Improves productivity, reliability, and user experience
- Scalable and adaptable for real-world enterprise and personal use

➡️ Summary: A practical, explainable, and efficient AI assistant that transforms task management

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