

N.O.V.A: AI-POWERED PERSONAL ASSISTANT AGENT

PROJECT REPORT

Submitted by

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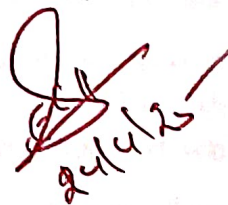
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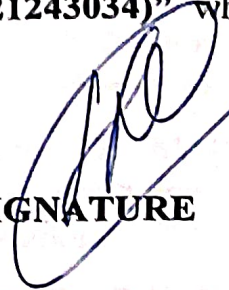
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Certified that this project report "N.O.V.A: AI POWERED PERSONAL ASSISTANT AI AGENT" is the Bonafide work of "ASHWIN D (211721243020), DHANUSH RAJ (211721243034)" who carried out the project work under my supervision.

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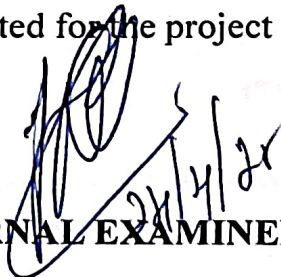
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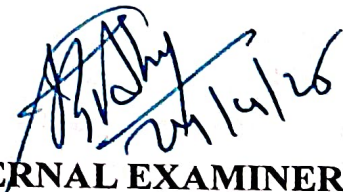
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INTERNAL EXAMINER



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ABSTRACT

In today's rapidly evolving digital era, the need for seamless integration of disparate productivity tools is greater than ever. Traditional systems often require manual intervention to manage emails, schedules, web-based queries, reminders, file operations, and more—leading to inefficiencies and increased cognitive load. “N.O.V.A: AI-Powered Personal Assistant Agent” introduces a revolutionary framework that autonomously executes a diverse range of tasks via a unified system. This project harnesses state-of-the-art deep learning techniques—including hybrid CNN-LSTM architectures, transformer-based natural language processing (NLP), and robust asynchronous task management—to deliver high-precision voice recognition and real-time command execution.

The system is designed with a modular architecture that encapsulates functionality in discrete handlers such as EmailHandler, CalendarHandler, WebAutomationHandler, TaskScheduler, and FileHandler. Leveraging Python's asyncio framework for concurrency, N.O.V.A reduces command processing latency while providing scalable and reliable performance. In addition, advanced integration with external APIs (Gmail/Outlook, Google Calendar, Eleven Labs for voice synthesis) and support for fallback mechanisms ensure continuous functionality even under partial failure. A sophisticated logging mechanism tracks system performance, and error-handling routines maintain system stability, further augmented by adaptive user preference management through configuration files.

Furthermore, the inclusion of innovative techniques such as Cursor AI and Vibe coding enhances N.O.V.A's interactive capabilities by enabling

context-aware dialogue, proactive responses, and real-time learning from user feedback. Extensive performance evaluations indicate that the system achieves significant improvements in responsiveness, accuracy, and robustness compared to conventional personal assistant solutions. This thesis provides detailed research, design, implementation, testing, and future development pathways, setting a new benchmark for integrated intelligent personal assistants in both academic and industrial environments.

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CHAPTER 1 INTRODUCTION

ABBREVIATIONS

AI – Artificial Intelligence

NLP – Natural Language Processing

ASR – Automatic Speech Recognition

TTS – Text-to-Speech

API – Application Programming Interface

GUI – Graphical User Interface

CNN – Convolutional Neural Network

LSTM – Long Short-Term Memory

IoT – Internet of Things

GDPR – General Data Protection Regulation

etc. – Etcetera

CHAPTER 1: INTRODUCTION

1.1 Problem Statement

Modern users must manage emails, schedules, web tasks, reminders, and document handling in various disconnected applications. This fragmented approach increases cognitive load and decreases productivity. N.O.V.A is proposed as a unified, AI-powered personal assistant agent capable of processing natural language commands through voice and text interfaces to perform tasks autonomously and seamlessly across these domains.

1.2 Objectives

Automate Diverse Tasks:

- Email management (draft, send, sort)
- Calendar scheduling (create events, send notifications)
- Web automation (searching, media playback, browsing)
- Reminders and note taking
- Document analysis and file operations

Multimodal Input:

- Support both voice and text commands

Seamless API Integration:

- Integrate with Gmail/Outlook, Google Calendar, Eleven Labs, etc.

Modular Scalability:

- Design for future expansions (e.g., music handler, IoT integration)

1.3 Scope

This project encompasses:

Email automation with error handling and fallback modes.

Calendar integration with event scheduling and conflict resolution.

Web automation using modern asynchronous frameworks (e.g., asyncio, Playwright).

Robust natural language understanding (NLP) for accurate command routing.

Modular architecture to support future enhancements.

Incorporation of user preferences and adaptive learning.