

IntelleX – Intelligent Digital Assistant

IntelleX is an AI-powered digital assistant that seamlessly integrates voice commands and hand gestures to control system functions.

Designed for enhanced accessibility and user convenience, it enables intuitive interaction with applications, media, and system settings.

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Defining the Problem

Limited Input Methods

Current assistants mainly rely on voice or typed commands.

Accessibility Gaps

People with speech or physical impairments face barriers.

Hands-Free Demands

Multitasking requires touchless, intuitive controls.

Need for Innovation

A more natural, accessible interface is essential.



Project Objectives



Voice Command Recognition

Accurate understanding of spoken instructions.



Hand Gesture Interpretation

Seamless control via intuitive gestures.



Seamless Desktop Integration

Perform system tasks smartly and efficiently.



Focus on Accessibility

Enhanced ease of use for diverse users.

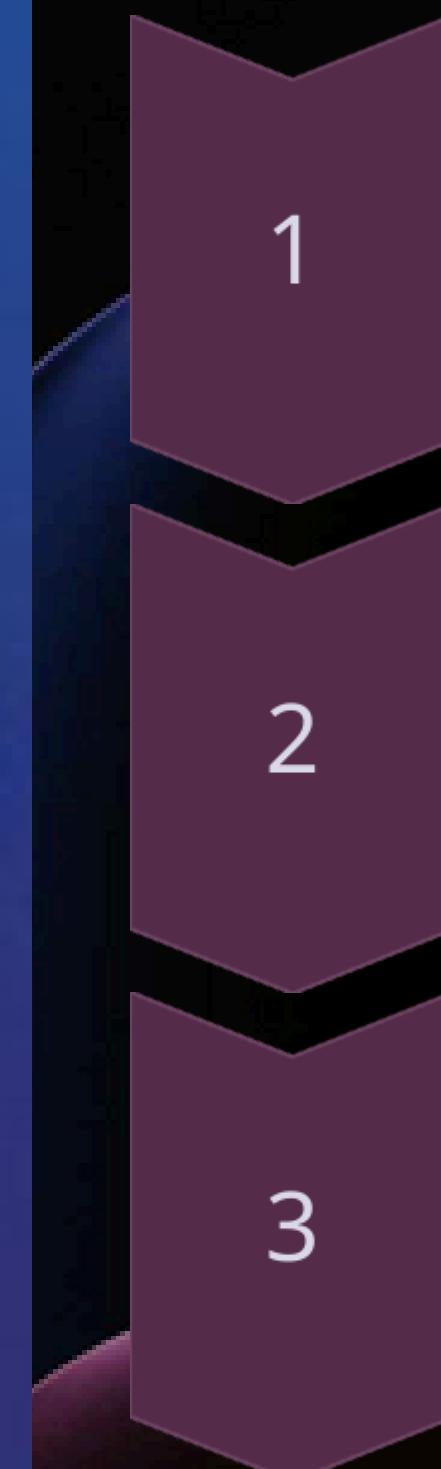


Core Features Overview

- Voice Control :- Enables users to operate the system using natural voice commands for hands-free control.
- Hand Gesture Recognition :- Detects and interprets predefined hand gestures to perform actions like opening apps or controlling volume
- Application Launcher :- Quickly opens installed applications through voice or gesture input, streamlining user workflow
- Volume & Brightness Adjustment :- Adjusts system sound and screen brightness dynamically via voice or hand gestures
- Screen Lock/Unlock :- Secures the system by allowing lock/unlock actions using trusted voice commands or gestures
- Music Player Control :- Controls music playback functions like play, pause, next, or previous through simple commands
- Camera Access & Screenshots :- Opens the camera and captures screenshots on command for quick visual tasks
- Internet Tasks (Weather, Wikipedia, Speed Test) :- Fetches real-time info like weather updates, Wikipedia searches, and internet speed diagnostics



System Architecture



Input Layer

- Microphone for voice
- Webcam for gestures

Processing Layer

- NLP for voice commands
- Computer Vision for gestures

Output Layer

- Execute system tasks
- Audio feedback via TTS

Technology Stack

Frontend

HTML, CSS, JavaScript for dashboard UI

Backend

Python with Flask framework

APIs

- Weather
- Wikipedia
- Jokes
- Email
- Internet Speed

Libraries

- SpeechRecognition, pyttsx3, webbrowser
- OpenCV, MediaPipe, cvzone
- smtplib, os, datetime, pyautogui, speedtest

Workflow

Input

User issues voice command or gesture

Processing

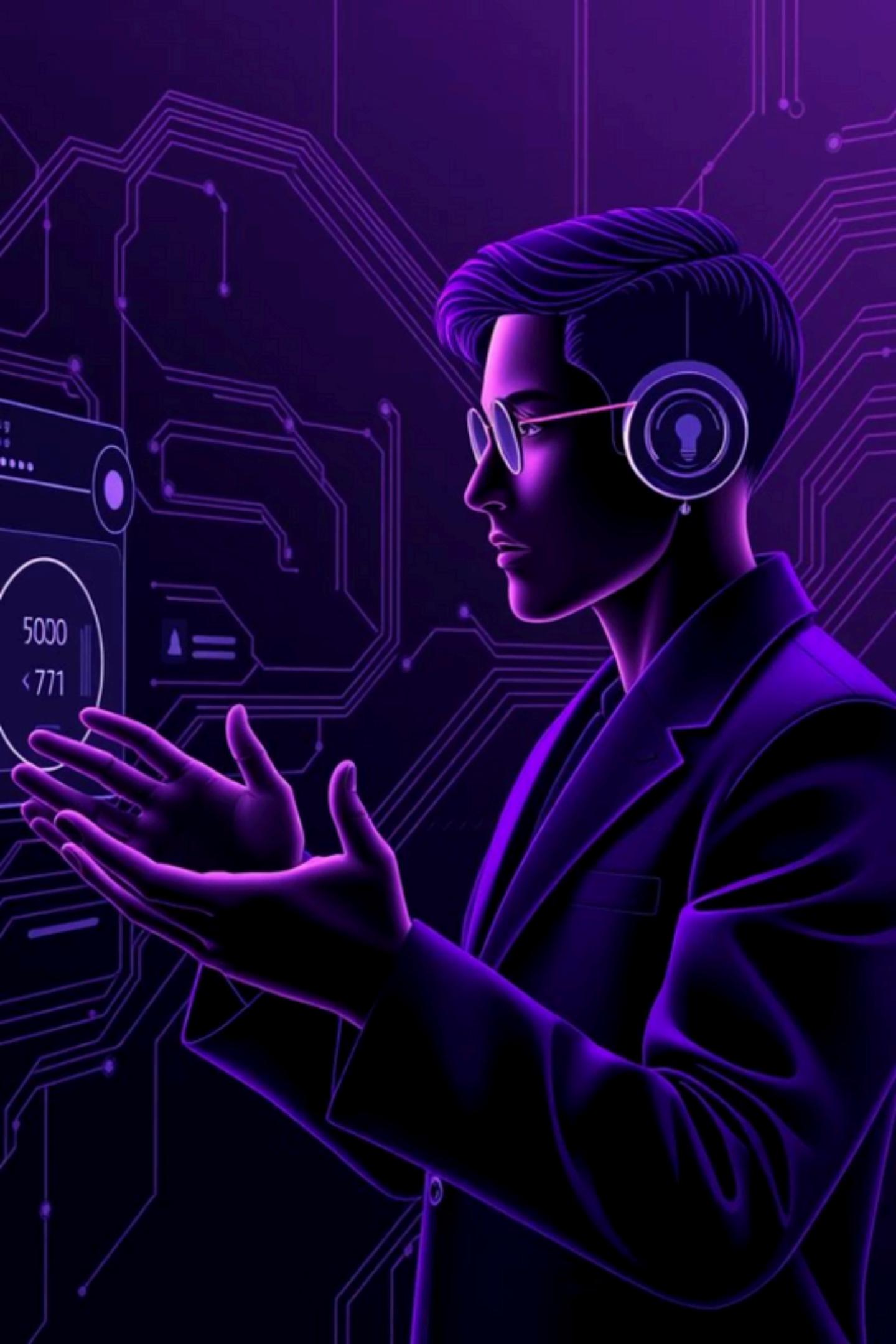
NLP for voice, OpenCV + MediaPipe for gestures

Execution

System performs requested action

Response

Feedback provided via speech output





Use Cases



Accessibility

Enabling differently-abled users to control devices effortlessly.



Smart Automation

Home and office systems managed hands-free.



Education & Productivity

Assistants improving learning and work efficiency.



Multitasking

Seamless control during busy activities like cooking or driving.

Challenges & Solutions

Challenge

Noise in voice input

Solution

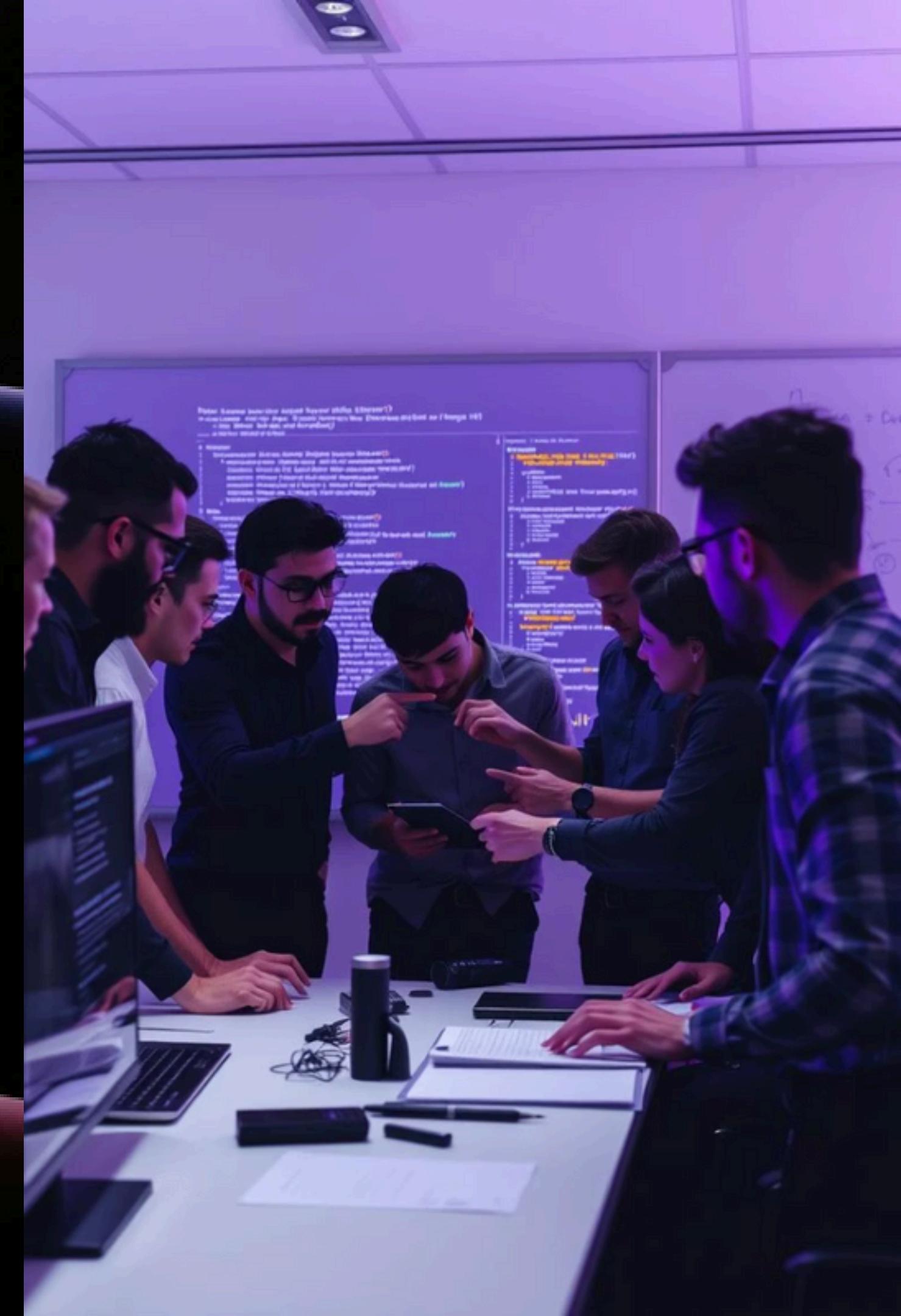
Implemented speech
preprocessing

Gesture misdetection

Used landmark tracking and
angle filtering

Action conflicts

Priority command handling
system



Future Scope



IoT Integration

Connect and control smart devices seamlessly.



Mobile App

Extend assistant capabilities to mobile platforms.



Multi-language Support

Serve diverse users globally with language options.



Advanced AI

Use LLMs for contextual and personalized interactions.



Face Recognition

Enable personalized profiles and security features.

The background features a dark, abstract design with three concentric, glowing arcs in shades of red, orange, and yellow. These arcs are set against a dark, textured background that resembles a microscopic view of a material's internal structure.

Thank You