EDTECH COMMUNITY

neuraLife

Product Explanation

Target Audience: School Students

Product: Personalized Assistance using a Graphic Pad (for Input and Visualization) and an AI Portable Mini Robot

Use Case: The product aims to provide personalized learning assistance to school students by leveraging cutting-edge AI integrated with hardware tools. The key functionalities include:

1. **Graphic Pad**:
    - **Input Section (Left)**: Students can write directly on this surface to practice sums, write homework, or provide prompts to the system.
    - **Display Section (Right)**: A screen that opens an application by default and displays responses generated by a Large Language Model (LLM).
2. **Portable AI Bot**:
    - Functions like a voice assistant.
    - Takes voice prompts from students.
    - Reads out LLM-generated responses.
    - Provides feedback on performance, strengths, and areas for improvement.
    - Shares guidance with parents about their child’s progress.

Problem Statement

School students often require personalized assistance in their studies to:

- Practice exercises and receive immediate corrections.
- Gain guidance tailored to their strengths and weaknesses.
- Receive performance insights for both students and parents.

Traditional systems lack portability and the ability to seamlessly integrate tactile and auditory interactions. This product aims to fill the gap by combining graphical input, visual feedback, and auditory assistance into one cohesive system.

Hardware Requirements

Graphic Pad Design:

1. **Input Section**:
    - Resistive or capacitive touch screen technology to enable smooth handwriting.
    - Embedded handwriting recognition system (compatible with LLM input).
2. **Display Section**:
    - 7-10 inch LCD or OLED screen for clear visualization.
    - A microcontroller or microprocessor (e.g., Raspberry Pi 4 or ESP32 with display driver support) to manage input-output processes.
3. **Processing Unit**:
    - Hardware capable of running lightweight AI models or interfacing with a cloud-based LLM (e.g., NVIDIA Jetson Nano or Intel NUC).
4. **Power Management**:
    - Rechargeable Lithium-ion battery with a 5V power supply.
    - Power management ICs to handle the power distribution.

Portable AI Bot:

1. **Microphone Array**:
    - Omnidirectional microphones with noise-cancellation support.
2. **Speaker**:
    - High-quality speaker for voice output.
3. **Processing Unit**:
    - ARM Cortex-based microcontroller or an SBC (Single Board Computer) like Raspberry Pi Zero.
    - Integrated support for voice recognition APIs.
4. **Connectivity**:
    - Wi-Fi or Bluetooth module for cloud connectivity.
5. **Power Source**:
    - Portable power supply with a capacity of around 5000 mAh.
6. **Chassis Design**:
    - Compact and lightweight body.
    - LED indicators for system status.

Suggested Hardware Tools

- **Development Boards**:
    - Raspberry Pi 4 (for graphic pad processing).
    - ESP32 (for touch input and integration).
    - NVIDIA Jetson Nano (for AI processing).
- **Peripherals**:
    - LCD/OLED screens.
    - Touchscreen digitizers.
    - Microphone and speaker modules.

- **Sensors:**
    - Ambient light sensor (for screen brightness adjustment).
    - Accelerometer and gyroscope (for bot stabilization).
- **Software Tools:**
    - TensorFlow Lite for on-device AI model inference.
    - PyTorch or ONNX for model compatibility with hardware.
    - OpenCV for handwriting recognition.

Expected Solution

1. **Graphic Pad:**
    - The left side of the graphic pad uses touch-sensitive technology to capture written inputs.
    - Inputs are processed locally or sent to a cloud-based LLM for response generation.
    - The generated responses are displayed on the right-side screen, providing real-time feedback to students.
2. **AI Portable Bot:**
    - The bot listens to student queries via its microphone array.
    - Prompts are processed using a cloud-connected LLM.
    - Responses are read aloud, offering an interactive and engaging learning experience.
    - The bot’s analytics provide detailed insights into student progress for parents.

This system integrates tactile, visual, and auditory channels to create a seamless, immersive educational experience, encouraging active learning and personalized assistance.
