**Speech Recognition:** is one of the most popular tasks in the field of artificial intelligence. It is the ability of a model to identify human speech and convert it into a textual or written format. This process is also known as speech-to-text, [automatic speech recognition](https://www.sciencedirect.com/topics/biochemistry-genetics-and-molecular-biology/automatic-speech-recognition), or computer-assisted transcription.

**Industry 1: Healthcare**

**Use of Speech Recognition:** In the healthcare sector, speech recognition works by using technology to convert spoken words into digital text, enabling various applications like patient documentation, remote consultations, and accessibility for individuals with mobility limitations.

it allows doctors and other healthcare providers to dictate medical reports, notes, and documents directly to a computer, smartphone or tablet instead of writing them out by hand.

**Benefits:**  It also allows for more complete and legible reports, enabling quicker access to information throughout the healthcare system, ultimately improving patient care.

**Challenges**:  challenges include maintaining accuracy with diverse accents and medical jargon, requiring ongoing data annotation and validation, and ensuring systems are accessible and user-friendly for all healthcare professionals.

Industry 2: **Education**

**Use of Speech Recognition:** Speech recognition technology in education helps students and teachers by facilitating language learning, providing accessibility for students with disabilities, and potentially enhancing feedback and instruction. It can be used for tasks like dictating notes, practicing pronunciation, and creating interactive learning experiences.

**Benefits:**

speech recognition shift the focus from the physical act of writing to that of expression and organization of thoughts and knowledge. enable students to generate written output that better represents their true oral language skills. increase written output and legibility.

**Challenges:** Student Speech Complexity, Children's speech can be characterized by disfluencies, rapid speech rates, and variations in pronunciation, making it difficult for systems to accurately transcribe.  Background Noise, Classroom environments often have noise from other students, teachers, and background activity, which can interfere with the accuracy of speech recognition.

Data Requirements, Training effective speech recognition systems requires large amounts of data, and gathering enough data for diverse student speech patterns can be a challenge.

Accuracy and Reliability, While speech recognition technology has advanced, it is still not perfect, and the accuracy can vary depending on the speaker, environment, and system.

**Industry 3: Automative**

**Use of Speech Recognition:** speech recognition technology enables drivers to interact with their vehicles using voice commands, facilitating tasks like making phone calls, playing music, and navigating. This is achieved through a combination of hardware, software, and AI/machine learning, where the system processes audio input, converts it to text, and then interprets the driver's intent to execute commands.

**Benefits:**   
With speech recognition technology, vehicles can provide real-time auditory prompts, guiding drivers through safety protocols without requiring manual input. It improving efficiency, safety, and convenience for both technicians and drivers.

-**Challenges:** Challenges include handling background noise, different accents and dialects, and ensuring accuracy in various real-world driving scenarios.

Case Study Phase

**Home Automation using Siri**

**How the Product Works:** Apple's HomeKit platform integrates with Siri, allowing users to control their smart home devices using voice commands. Users can say "Hey Siri, turn on the living room lights" or "Hey Siri, lock the front door." Siri's speech recognition technology interprets the voice command and sends the instruction to the corresponding smart device.

**Why Speech Recognition is Important**

Speech recognition is crucial for HomeKit because it:

- Enhances Convenience: Voice control allows users to control their smart home devices hands-free, making it easier to manage their home.

- Increases Accessibility: Speech recognition enables users with mobility or dexterity impairments to control their smart home devices more easily.

**Improvements**

To improve HomeKit's Siri integration, Apple could:

Expand Device Compatibility: Increase the number of compatible smart home devices, allowing users to control a wider range of products.

- Improve Multi-Device Control: Allow users to control multiple devices with a single command, such as "Hey Siri, goodnight" to lock doors and turn off lights.

- Enhance Scene Creation: Make it easier for users to create custom scenes and routines, allowing for more personalized automation.

- Improve Voice Command Feedback: Provide more feedback to users when they issue voice commands, such as confirming that a device has been turned on or off.

**New Idea:**

Speech Recognition for Banking service, which include bank payment, transactions

**Problem its solving :** Bank services are becoming stressful especially when an individual has an issue with banks, such as deduction in account balance or hackers using their details to get through their banks accounts using their obvious details such as names, date of birth, and even NIN. And the data the individual would provide or password can be in their native language or a language they understood better.Then costumer service can recognize the from their voice by using transcript for consumer identification by name or National ID , in case some hacker are behind and the bank can also have a code red word by their costumer to know if they are forced to use the app

**Who Would Use It**:

Every individual that who has a bank account and they make daily transactions. It can be in their native language, or a statement they only know about. Individual can also communicate their issues through phone, make transactions, or make payments using their native languages.

**Challenges:** one challenge would be that an individual might not be able to use the voice recognition in a public space to avoid recording by other end users. Another challenge would be ensuring the security and confidentiality of user data i.e the bank staff should not manipulate the voice.

By addressing the challenges and limitations of speech recognition technology, this application could provide a valuable resource for individuals who are being scammed and are cheated of their hard earned money.