Task- 6: Machine Learning

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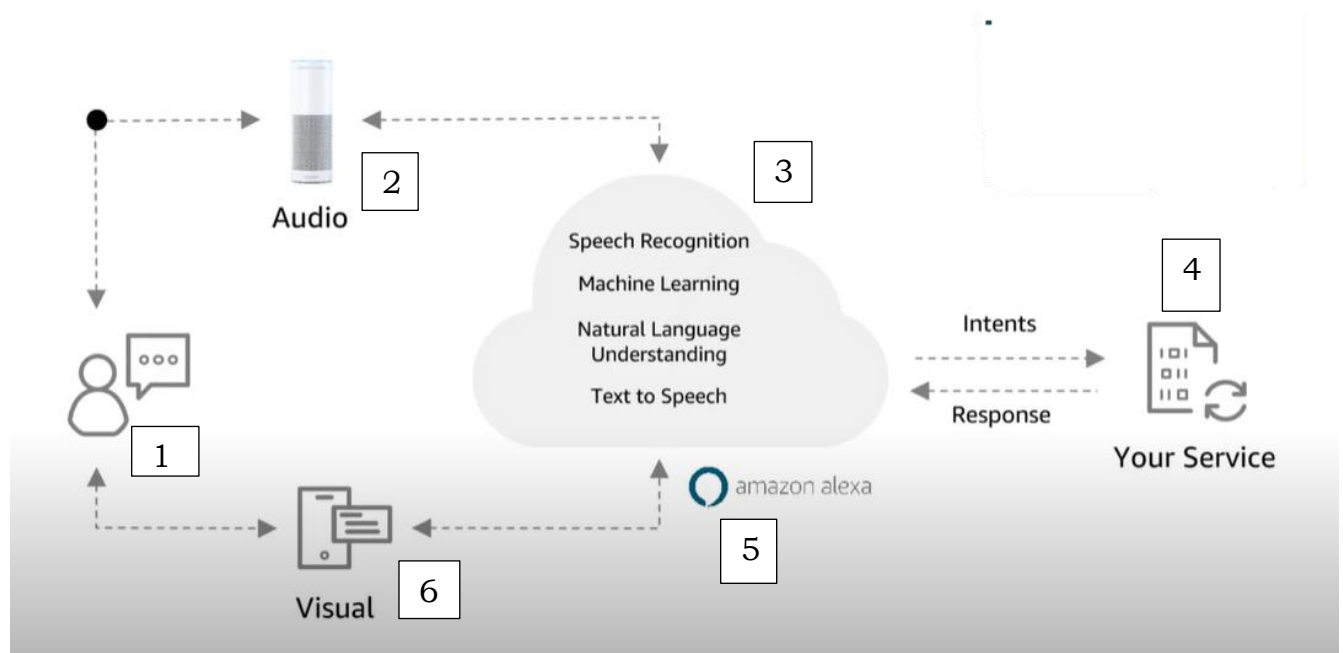
Question:

Write a short note on working of Alexa. (Data processing, Algorithm used, Final output, pros and cons).

Alexa:

A technology developed by Amazon known as Alexa is a virtual AI assistant. It can perform tasks like letting us know about weather, traffic outside our streets, answers to questions such as: Which is the tallest building on earth, or even set alarms to wake up early. It can also act as a home automation system. Alexa is also a good example of natural language processing as it can speak in Hindi, English, French, German, Spanish, Portuguese, Italian and Japanese.

Working of Alexa:

Step 1: A person speaks.

Step 2: The audio records and sends to the cloud.

Step 3: The cloud has all the data of speech recognition, machine learning, Natural Language understanding and text to speech.
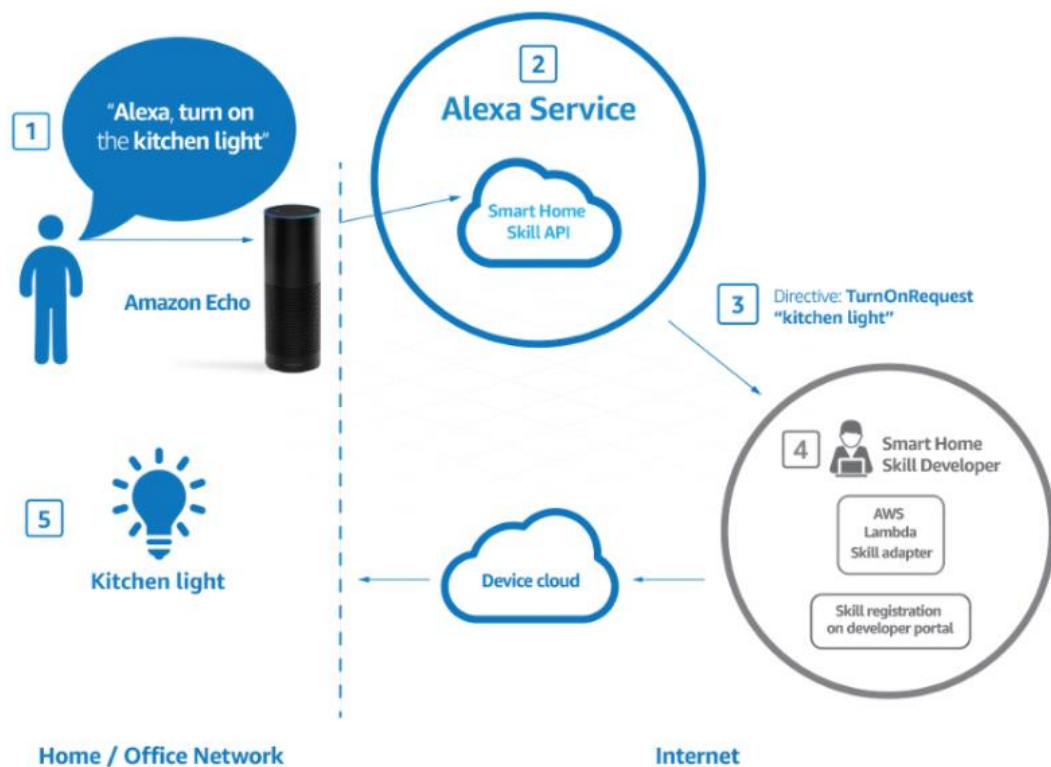
Step 4: The cloud sends an intent to the service. This is what the user wants.

Step 5: Service calls back, processes in Jason and sends Jason response back to the cloud.

Step 6: Hence the audio would play or the visual would display the output.
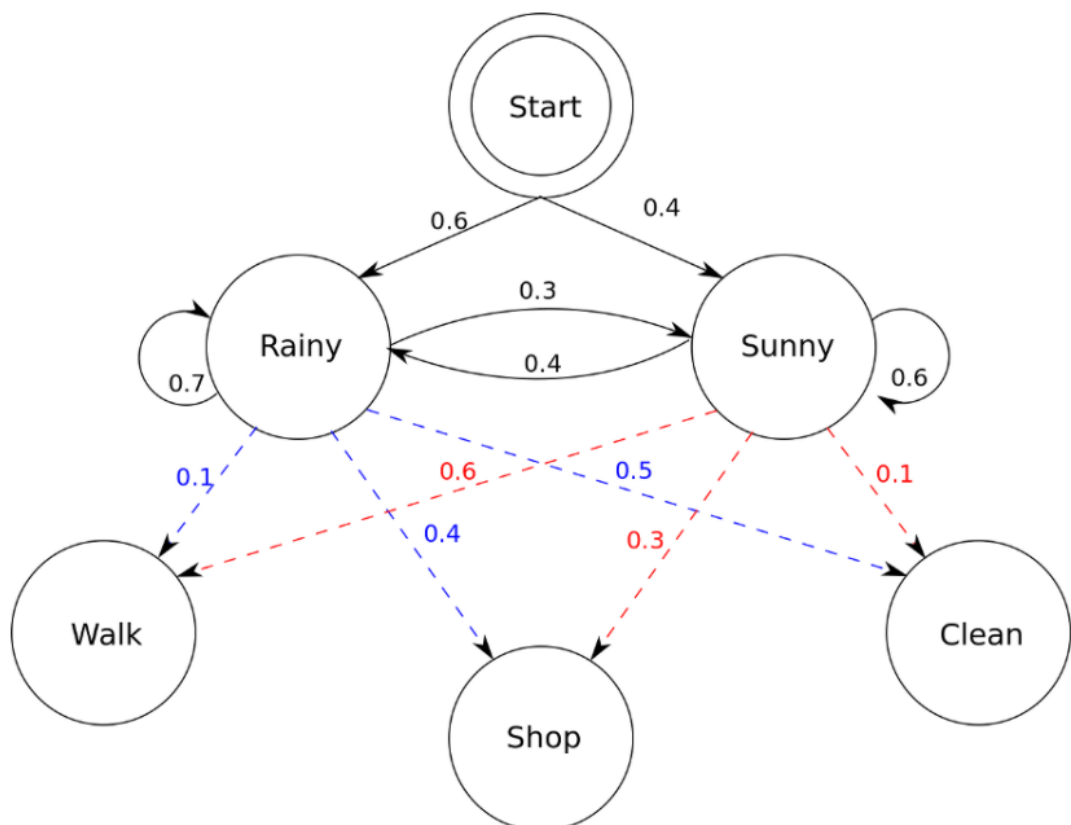
Data Processing:

- Alexa is built of Natural Language Processing, to procure speech into words and sounds.
- Alexa tends to identify the crucial information for example: if hears temperature it will open weather app.
- Another example for the process discussed above:

- It works on signal processing; it is able to identify ambient noise like Television or Radio playing in the background.
- The wake word detection. Such as Alexa.

Alexa, Ask Daily Horoscopes about Taurus

wake word | launch | Invocation name | utterance

- It converts speech to text then finds the source to cloud and finds it path back and converts from text to speech.
- In voice recognition this model it creates a comparison between the previous and current waveforms and against a dictionary of waveforms to figure out what is being said.
- **A hidden Markov model** is the one which observes sequence of emission and recovers from the observed data.
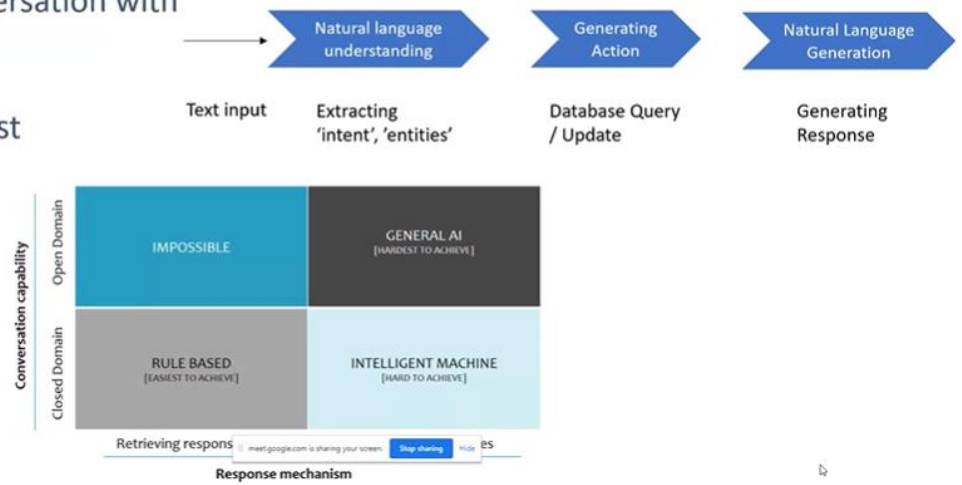

- It uses parts of speech phonemes and other NLPs to classify the speech.
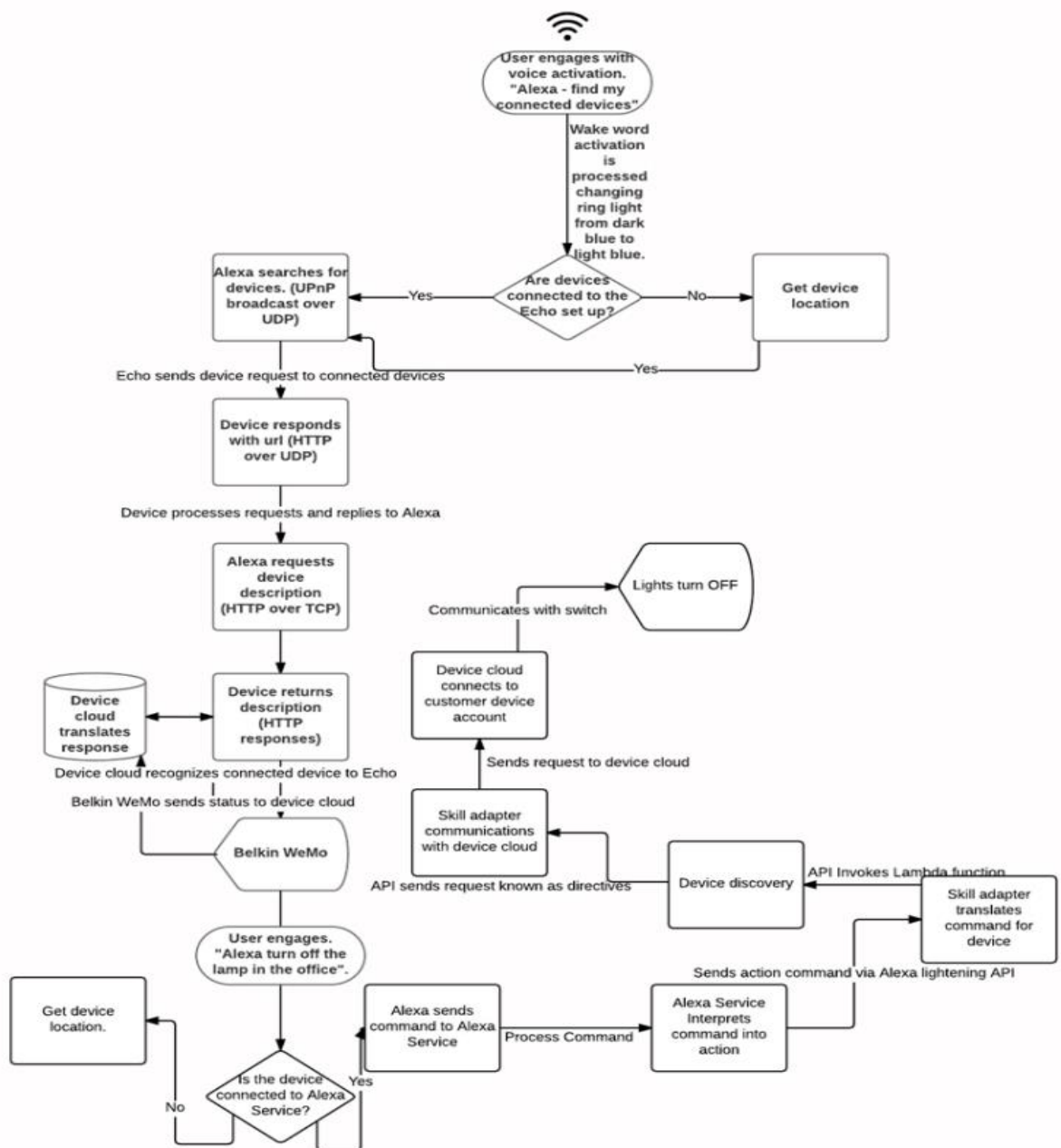
Advanced Use Cases
Dialog Systems

- Use cases for chat bots and using deep neural models.

Algorithm:

The flow chart below depicts how Alexa such as, sportify, iheartradio to play the desired song by the user. When the user says: "Alexa play my sleeptime playlist", It processes the request by accessing Amazon cloud services and various music apps to stream the requested "Sleeptime playlist" . The application in cloud is sent a request to play the song, if it is true Alexa plays it. If the result is false it responds with: "Sorry I could not play the requested song".

Advantage and disadvantage:

ADVANTAGE	DISADVANTAGE
Save money on your energy bills because of its home automation feature	You need to have unlimited internet data plan; as Echo Dot uses much internet.
You don't need to use your hands while making commands on Alexa enabled devices,	Confusion with Specific homophones words and not useful response from common question sometimes asked by Alexa users.
You can make calls to your family and friends (who have Echo supported devices) anytime.	Alexa's ordering function not working with add-on Items.
- Calendar Connection - Creating List - Alarms and Reminders	Security could be an issue. As alexa listens to everything we speak our details could be put out to the world