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**First Question: What Is Natural Language?**

The term "natural language" describes the means of communication that people have naturally evolved to exchange meaning and engage with one another. It includes a set of grammatical, syntax, and contextual guidelines and is comprised of spoken, written, and signed languages that are utilized in daily communication. In contrast to artificial languages like computer languages, natural languages develop naturally throughout time.

From my understanding, natural languages are difficult for machines to understand since they are dynamic, context-sensitive, and confusing. Natural language processing (NLP) is severely limited by these characteristics. For example, various words may have the same meaning (a synonym) or a single word may have multiple meanings depending on the situation (overlapping). Processing natural languages is made more difficult by the possibility that they are grammatical, literal, and culturally oriented.

Natural languages are also very unclear, which complicates interpretation. For example, machines that are attempting to determine the context may become confused by synonyms, which are words that sound the same but have different meanings. Because computers lack this deeper understanding, it is more difficult for them to effectively process and comprehend language without significant data and context. Human speakers often rely on tone, body language, and shared experiences to understand these nuances.

Moreover, as society and culture change, so do natural languages. Over time, new terms, expressions, and meanings appear, making NLP even more challenging. Something simple to understand in one generation or area may be unclear or unimportant in another. Because of this variety, machines find it difficult to adapt to linguistic changes and need ongoing training and upgrades to maintain an accurate and current understanding of the language being spoken.

**Second Question: Natural Language Processing (NLP):**

A Definition of Natural Language Processing (NLP)  
Computers can now understand, translate, and process human languages thanks to a collection of instruments and techniques known as natural language processing (NLP), which makes use of artificial intelligence (AI), especially deep learning. As we covered in class, natural language processing (NLP) enables machines to understand and use human communication, including spoken, written, and signed language, to engage with people in ways that were previously limited to human-to-human interactions. NLP helps close the gap between human and machine communication by teaching computers to understand the patterns, structures, and meanings of human language.

NLP is essentially an interdisciplinary field that integrates AI, linguistics, and computer science to enable machines to understand and process language. Converting unstructured linguistic data—like texts, chats, or even posts on social media—into computer-understandable organized representations is one of its main purposes. By analyzing language into its constituent words, phrases, syntax, and context, enables machines to carry out tasks like text generation, sentiment analysis, and language translation.

**Understanding NLP's Most Important Property**  
According to what I understand, one of NLP's most important characteristics is its ability to handle the complex nature of human language and transform it into information that computers can understand. Language is a tool for conveying ideas, feelings, and abstract thinking in addition to being a straightforward form of communication, as was discussed in class. It is difficult for machines to fully understand human language since it is full of context, subtle meanings, and nuances. For example, humans frequently use tone, cultural references, or even informal expressions to express meaning, and machines may find it difficult to understand these components.

By using innovative artificial intelligence techniques particularly deep learning models, which enable machines to learn from huge amounts of language data NLP addresses this complexity. By identifying linguistic patterns, these models help the computer make more accurate predictions and interpretations of meaning. For example, NLP systems utilize context to determine the intended meaning of ambiguous keywords, such as synonyms (words with many meanings), when they are encountered by machines. For example, a word like "bank" can refer to both a financial organization and the side of a river, but the machine can determine which definition is true based on the context.

**A diagram of a language processing

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**NLP Tools and Techniques**NLP utilizes a variety of tools and methods, such as part-of-speech tagging, stemming, and tokenization. Tokenization is the process of dividing a sentence into smaller parts, like words or phrases, to make it easier for the machine to process.

Furthermore, machines are better able to understand the grammatical structure of expressions thanks to part-of-speech tagging. Accurate language interpretation depends on NLP models understanding how various sentence components interact, which is achieved by assigning each word a grammatical role (such as noun, verb, or adjective). Machines can now identify and classify proper names, locations, or organizations inside a text.

**Real-World Applications of NLP**  
Many of the tools we use daily employ natural language processing. NLP is used by virtual assistants such as Siri, Google Assistant, and Alexa to understand voice instructions and deliver insightful answers. After processing spoken language and determining its meaning, these systems carry out the appropriate action, such as playing music or sending out reminders. Language translation is another typical use of natural language processing. NLP is used by programs like Google Translate to translate text between languages while maintaining the original message's context and content.

NLP is also essential to customer care chatbots, which use AI to communicate with people, respond to inquiries, and fix problems instantly. These programs have been trained to read natural language input, identify human intent, and deliver relevant information or answers. NLP-based chatbots provide quicker and more effective customer service by simulating human speech, frequently eliminating the need for human participation.

**NLP's challenges**  
Bias in NLP systems is another issue. NLP models are vulnerable to biases found in the vast amounts of human language data that they are trained on. Biased language or biased opinions in a dataset could be reflected and reinforced in the output of the final NLP system, causing ethical questions. One important area of continued research and development is making sure NLP models are accurate and fair.

In conclusion, natural language processing is a significant area of artificial intelligence that makes it possible for machines to understand and communicate using human language. As was covered in class, natural language processing (NLP) uses artificial intelligence (AI) methods such as deep learning to handle complicated linguistic data and carry out tasks like speech recognition, translation, and conversational AI.

**Question 3: John Austin’s Speech Act Theory**

The Speech Act Theory of John Austin

In the landmark work How to Do Things with Words (1962), John Austin presented a theory that fundamentally changed our understanding of language. He maintained that speaking is an action in and of itself, not just a means of transmitting information. According to his Speech Act Theory, when someone speaks, they are simultaneously performing three acts: the locutionary, illocutionary, and perlocutionary acts. These components explore the speaker's intentions and the consequences of their words, going beyond the simple meaning of a sentence. Later, Austin's pupil John Searle expanded on his idea, emphasizing the intentionality of speaking acts.

A diagram of speech and speech acts

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**Locutionary Act: The Expression**The locutionary act, or the actual act of speaking, is the first layer of speech that Austin discusses. To make speech understandable within the linguistic system, this involves making sounds or saying words that comply to grammatical standards. This act, which communicates the essence of what is being stated, is the foundation of communication.

When someone says, "It is raining outside," for example, the locutionary act is making the sounds and words that comprise this statement. For the speech to be understood, it must follow the language's phonetic, grammatical, and semantic rules. The locutionary act, according to the class discussion, depicts the literal content but ignores the meaning or possible impact of the words.

**Illocutionary Act: The Intention Behind the Speech**   
The illocutionary act revolves around the speaker's intention, whereas the locutionary act concentrates on the actual physical utterance. The "real action" of speech takes place here. When someone speaks, they frequently do more than only state the facts; they may be requesting something, promising something, or issuing an order. According to Austin, understanding the goal of communication requires a comprehension of the illocutionary act. This feature of speech makes language an effective instrument for accomplishing goals in social interactions.

The locutionary act in a question like "Can you close the window?" is the listener's ability to do so, but the illocutionary act is the speaker's desire to ask that the window be closed. In this way, the illocutionary act—such as inquiring, advising, or warning—represents the action the speaker wishes to carry out. The illocutionary act is the basic unit of communication, according to John Searle, who expanded on Austin's thesis. This is because it discloses the speaker's intent, which is crucial in natural discussions.

**Perlocutionary Act: The Effect on the Listener**

The third element of speech is the perlocutionary act, which describes how the speaker's words impact the listener. The perlocutionary act is more focused on the actual result—the listener's reaction—than the illocutionary act, which is more focused on the speaker's intended goals. The perlocutionary result is frequently unexpected, even though a speaker has control over the locutionary and illocutionary acts.

"There's a fire!" is an example of a locutionary act, which is a warning about a fire, and an illocutionary act, which is a purpose to alert people. The perlocutionary act, however, can differ; some people may remain composed while others may panic and flee. This aspect of communication is especially complicated because, as Austin notes, the speaker frequently has little control over the perlocutionary repercussions.

A diagram of speech and action

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**The Role of Felicity Conditions**

To describe the circumstances under which a speaking act is successful, Austin developed the idea of felicity conditions. A speech act needs to fulfill specific requirements to have the desired effect. These include having the right social conditions for the speech to be approved (perlocutionary), making sure the goal fits the context (illocutionary), and using the right words (locutionary). The judge has the authority to impose a punishment in a courtroom, for instance, and the courtroom setting is suitable, therefore the illocutionary act is legal. However, since the felicity standards aren't met, the speech act would fail if the same declaration were made at a party.

The class lecture pdf highlighted that speech acts are not just about words they also rely on whether the environment is appropriate for the words to have the desired effect. This idea is related to understanding the limitations and nuances of language in various social and cultural conditions.

**The Contribution of John Searle: Intentionality**  
Austin's pupil John Searle developed the Speech Act Theory further, paying special attention to the intentionality of speech acts. The illocutionary act is the fundamental unit of communication, and the speaker's intention to accomplish a goal with their words is the most crucial component of speech, according to Searle. According to Searle, the listener must figure out the speaker's intention for a statement to have meaning. As was discussed in the lecture, Searle's work highlighted the importance of speech intention and the fact that language can't be fully understood through logic and syntax alone.

A diagram of a speech language

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**Conclusion**  
John Austin’s Speech Act Theory and John Searle’s contributions provide  
A thorough framework for comprehending how language functions as a tool for action rather than simply communication. They demonstrate how speech is a multi-layered process that involves the utterance, the speaker's intent, and the listener's response by breaking speech into locutionary, illocutionary, and perlocutionary acts. These theories, which describe how people use language to influence their social relationships and accomplish particular objectives, have had a significant influence on several disciplines, including linguistics, communication studies, and artificial intelligence. Gaining knowledge of these theories enhances our understanding of language's influence on human experience.