



INTEGRATION OF NATURAL LANGUAGE PROCESSING WITH ARTIFICIAL INTELLIGENCE: A REVIEW PAPER

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ABSTRACT

In Today's World of IT there is only one constant which is moving forward and improving previous technologies and while doing so, our world came across Artificial Intelligence. With the help of Natural Language Processing (NLP) we can take the AI to next level for which one can dream of. Artificial Intelligence integrated with Natural language processing can help in achieving human's dream of building a humanoid android. These Humanoids can help humans in many different fields like research, reaching different planets, reach to the deepest points of the world, traversing to those places in universe where humans can't possibly go due to their limited age. These upper stated fields can be achieved by the humanoid androids. In this review paper we will analyse about AI and NLP and use them to move towards a brighter future of human race. We will also give in conclusion section the idea of the further study.

Keywords -Natural Language Processing(NLP), Artificial Intelligence, Robotics, Speech Recognition, Machine Translation, Virtual Assistant, Android, Humanoid

[1] INTRODUCTION

Natural Language Processing (NLP) is a branch of AI from a macro perspective. It mainly refers to the process of processing natural language communication between humans and computers by applying natural language processing technology to computers, and is one of the types of research on the dialogue process between humans and computers. The goal of NLP technology is to enable humans to interact with computer systems using natural language to obtain information and to efficiently process information in the process of human-computer interaction. Applications of NLP technology mainly focus on automatic phrase identification, corpus building, and grammatical research, and are therefore widely used in data mining, information retrieval, and machine translation.

[2] RELATED WORK

Speech Recognition:

Speech recognition is a sub-field of artificial intelligence (AI) that deals with the automatic recognition of spoken words. This is a complicated task as the computer must be able to understand the nuances of human speech such as accents, dialects and background noise. Natural Language Processing (NLP) is the branch of computer science that deals with the interaction between computer and human language. NLP techniques are often used in speech recognition systems to understand the meaning of spoken words. One of the most popular NLP techniques used in speech recognition is the so-called Hidden Markov Model (HMM). HMM is a statistical model that can be used to represent the probability of a sequence of events. For speech recognition, HMMs can be used to represent the likelihood of word sequences. HMMs are not the only NLP technology available for speech recognition. Other techniques include deep learning, a form of machine learning that uses artificial neural networks to learn from data. Speech recognition is a rapidly evolving field, with new technologies being developed all the time. As these technologies improve, speech recognition systems become more accurate and more widely used. Here are some examples of how speech recognition is being used today. Virtual assistants such as Amazon Alexa and Google Assistant use voice recognition to allow users to control devices and access information by voice.

Self-driving cars use voice recognition to hear the driver's commands.

Call centers can use voice recognition to transcribe customer calls and use them to improve customer service.

Speech recognition is a powerful technology with the potential to change the way we interact with computers. As technology continues to advance, expect to see even more innovative uses of speech recognition in the future.

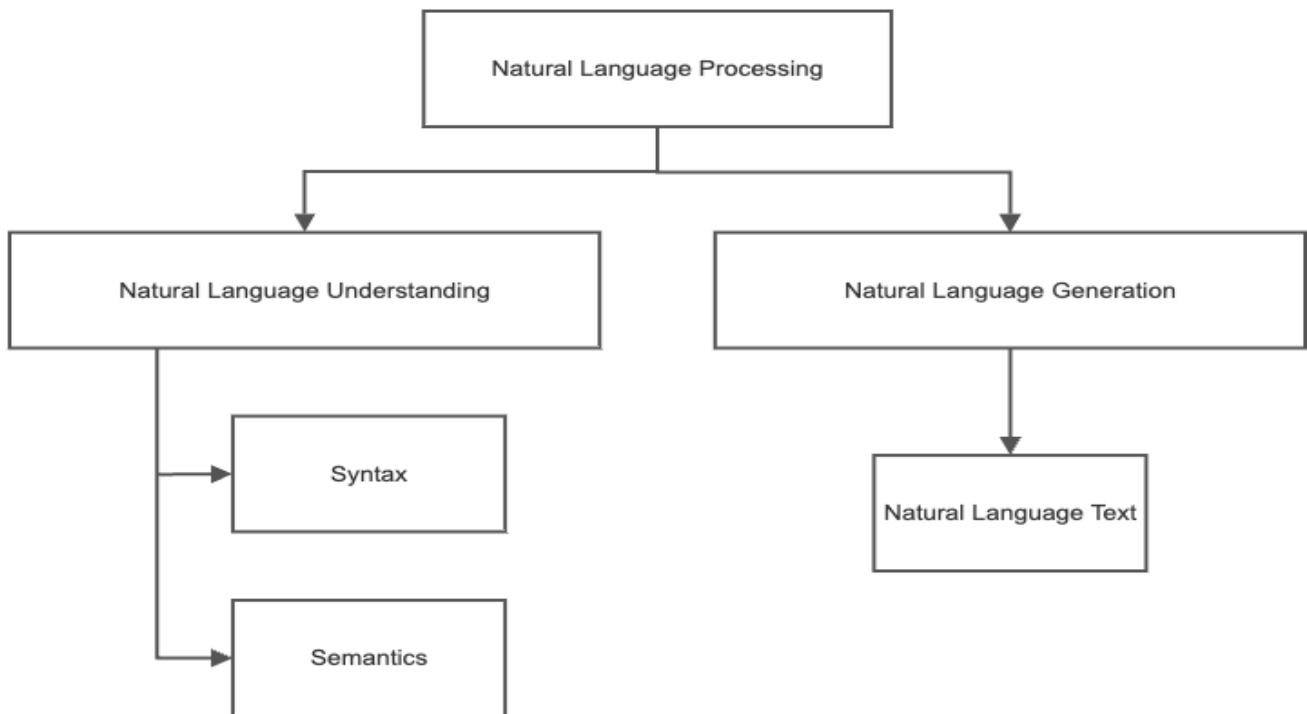
[3] Integration of AI and NLP in robotics:

The integration of NLP-AI (natural language processing) into robotics is a rapidly growing field that has the potential to revolutionize the way we interact with machines. By combining the power of NLP with the physics of robots, we can create machines that not only understand and respond to natural language commands, but also learn and adapt to their environment.

There are many ways to integrate NLP AI with robotics. A common approach is to use NLP to generate natural language commands for robots. This can be done using various techniques such as speech recognition, text-to-speech, and machine translation. When a natural language command is given to a robot, the robot can use NLP skills to understand the command and perform the desired action.

Another way to integrate NLP AI with robotics is to use NLP to create virtual assistants for robots. These virtual assistants provide robots with real-time information and instructions, allowing them to interact more naturally with humans. Virtual assistants can also be used to train robots and improve their performance.

The integration of NLP AI and robotics offers a wide range of potential applications. For example, NLP-controlled robots could potentially be used for customer service, house



cleaning, and even surgery. As NLP AI technology evolves, expect even more innovative applications of his NLP-powered robots in the future.

3.1 Benefits of integrating NLP and AI in robotics:

- **Improved human-robot interaction:** NLP AI helps create robots that are more natural and intuitive to operate. This makes the robot easier to use and safer.
- **Improve productivity:** NLP AI helps robots perform tasks more efficiently and accurately.
- **New applications:** NLP AI enables robots to perform new tasks that were previously impossible. This could open up new markets and opportunities for robotics.

3.2. Challenges in integrating NLP and AI in robotics:

- **Data collection and labelling:** Training and performance improvement of NLP AI requires a large amount of data. Collecting this data can be difficult and expensive, and tagging can be time-consuming.
- **Complexity:** NLP AI is a complex technology and can be difficult to integrate with robotics.
- **Safe:** NLP AI can be used to generate natural language commands for robots. Therefore, it is important to ensure that NLP AI is secure and cannot be used to maliciously control robots.

Despite its challenges, the integration of NLP-AI and robotics is a promising area with the potential to revolutionize the way we interact with machines. As NLP AI technology evolves, we can expect even more innovative applications of NLP-powered robots in the future.

3.3. Components of Natural Language Processing:

[4] NEXT GENERATION OF ANDROID:

Advances in natural language processing (NLP) and artificial intelligence (AI) will make the next generation of Android robots more human than ever. These robots can not only understand and respond to natural language, but also learn and adapt to their environment.

One of his major advances in NLP for Android robots is the development of large-scale language models such as GPT-3 and LaMDA. These models have been trained on huge datasets of text and code, and can generate human-quality text, translate languages, and answer comprehensive and informative questions.

Another major advance in AI for Android robots is the development of deep reinforcement learning. This type of learning allows robots to learn from their own experiences without the need for human intervention. This will enable robots to learn complex tasks such as playing games and navigating crowded environments.

Combining NLP and AI will enable the next generation of Android robots to do things that were previously impossible. For example, you can talk to people, learn new skills, or help with everyday household chores.

Some of the potential applications for next-generation Android robots are listed below.

- **Education:** Android robots could be used as teaching assistants in schools. They can help students with their homework, give one-on-one tutoring, and conduct experiments.
- **Health-care:** Android robots may be used to accompany and care for the elderly and people with disabilities. It may also be used to perform surgery and other medical procedures.
- **Customer Service:** Android robots may be used to answer customer questions, provide support, and fulfill orders.
- **Manufacturing:** Android robots may be used to perform hazardous or repetitive tasks in factories. It can also be used for product assembly and product packaging.
- **Agriculture:** Android robots may be used for planting, harvesting and milking cows. It could also be used to monitor crops and livestock for diseases and pests.

The next generation of Android robots is still in its early stages of development, but has the potential to revolutionize many industries. Here are some of the challenges to overcome to create the next generation of Android robots.

- **Robots:** Developing more sophisticated robots that can move naturally and interact with the world is a big challenge.
- **Tree:** Developing smarter AI that can learn and adapt to its environment is also a big challenge.
- **Cost:** The cost of developing and manufacturing next-generation Android robots is still very high.

Despite these challenges, the development of next-generation Android robots is an exciting field with the potential to usher in a new era of human-robot interaction.

4.1 SAMPLE PROGRAM

Here, we can observe that we have imported “speech_recognition” and “transformer” libraries, with the help of those we are instructing our system to recognize our speech. We have prepared our model with the help of a pretrained and analyzed data. We can improve our model by using better and bigger data-base. With the help of our model and the question proposed by user our model will provide us with a response which will then be provided to user the output.

Code: (Made with help of BARD.AI with concept of NLP)

```
import speech_recognition as sr
import transformers
recognizer = sr.Recognizer()

model = transformers.AutoModelForSequenceClassification.from_pretrained("bert-
base-uncased")

def get_user_input():
    with sr.Microphone() as source:
        recognizer.adjust_for_ambient_noise(source)
        audio = recognizer.listen(source)

    try:
        user_input = recognizer.recognize_google(audio)
    except sr.UnknownValueError:
        print("I didn't understand that.")
        return None

    return user_input

def generate_response(user_input):
    user_input_tensor = model.tokenizer(user_input, return_tensors="pt")

    response_tensor = model(user_input_tensor)
    response = response_tensor.logits.argmax(axis=-1).item()

    response_string = model.tokenizer.decode(response)

    return response_string

while True:
    user_input = get_user_input()

    if user_input is None:
        break

    response = generate_response(user_input)
```

print(response)

[5] CONCLUSION AND SCOPE OF FUTURE DEVELOPMENT

In this paper, we analyzed that all the evidence and future of AI tells us that this is the generation of artificial intelligence. We can see that with the help of text and speech recognition and high end development of AI with NLP will not only help us but will change our world. AI and NLP will be able to make humanoid Android and nevertheless with the help of those Android human race will reach new heights. These Humanoid androids will help humans in many different fields, from medical to astrophysics, from mathematics to geology. All in all, it will help in many fields, humanoid android can go to those places where humans possibly can not visit like different planets far-far away or on gas giants to gain important information for researches. These humanoid androids can also visit deepest and darkest points on earth to help us access and study about our home planet earth. So, with the help of androids which have things like high level AI integrated with advanced NLP in its arsenal human race will reach to a different level than can ever be thought of.

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