TechTalk

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***Abstract*—Bu projede Python, OpenCV, Raspberry Pi ve kamera yardımıyla kullanıcının el hareketleriyle ileri, geri, durdurma ve başlatma işlemlerini adaptif şekilde yönetmesini sağlar. Bu şekilde hem çok düşük donanıma ve hem de düşük güç tüketimine ihtiyaç duyan program, Raspberry Pi üzerinde sorunsuz şekilde çalışabilmektedir. Bu vesileyle, herhangi bir sisteme adapte etme maliyeti gayet düşüktür.**

***Index Terms*—OpenCV, Python, Remote Control, Embedded System, Raspberry Pi, Computer Vision, Image Processing**

I. What is ChatBot

A chatbot is a software program that can chat with a human in written form. Chatbots typically aim to chat by understanding and responding in human language. Chatbots can be used for various purposes, but are commonly used in areas such as customer service, reservations, and information distribution. Chatbots are often used through a website or messaging application to answer people's questions or perform necessary tasks.

A. How do Chatbots work?

Chatbots are programmed and operate using various methods. A chatbot learns and understands a special language to be able to chat with a human in written form. This language is often designed as a more artificial language for chatbots to understand, although it can also be similar to human language. When a chatbot understands human language, it responds to questions made in that language. Chatbot responses are typically composed of pre-programmed answers or information retrieved from a database.

B. What is the relationship between Chatbots and Natural Language Processing?

Natural Language Processing (NLP) technology enables computer systems to input data using natural language and process it. This technology makes it possible for software tools such as chatbots to answer questions and perform tasks using natural language.

NLP technology uses methods that help understand the structure of language, linguistic features, and meaning of language. For example, thanks to NLP technology, chatbots can understand questions asked by people using words and sentences and learn to provide appropriate responses. NLP technology also makes language learning and usage more effective, enabling chatbots to communicate with humans more naturally.

NLP technology is used in many different areas besides chatbots. For example, NLP technology performs tasks such as translating texts into various languages, extracting meaning, and classification. As a result, people can use their natural language to search on search engines or use language learning applications on their mobile phones.

II. Types of Chatbot

- Rule-based chatbots: These chatbots follow a set of predefined rules to understand and respond to user queries. They have a limited ability to learn and improve their responses.
- AI-based chatbots: These chatbots use artificial intelligence and natural language processing (NLP) techniques to understand and respond to user queries. They can learn from user interactions and improve their responses over time.
- Hybrid chatbots: These chatbots combine rule-based and AI-based approaches to provide more accurate and effective responses to user queries.
- Task-specific chatbots: These chatbots are designed to perform specific tasks, such as booking appointments or providing customer support.
- Social media chatbots: These chatbots are integrated with social media platforms and are used for marketing, customer engagement, and other purposes.
- Voice assistants: These chatbots are designed to interact with users through voice commands and are commonly used in smart home devices and virtual assistants.

III. What is TechTalk

TechTalk is a chatbot project that can interact with people on topics related to computer science. This chatbot can answer questions and guide people on topics they may be curious about in the field of computer science.

The project is developed using natural language processing and deep learning techniques. The chatbot is trained on a pre-prepared dataset and uses a recurrent neural network (LSTM)

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to classify which category the user's message belongs to. Then, the chatbot uses pre-programmed responses or information retrieved from a database to provide an appropriate response.

The Chatbot about Computer Science project can assist students, researchers, professionals, and other interested individuals in gaining more knowledge on computer science topics. Additionally, this project offers learning opportunities on chatbot technology and deep learning.

IV. TechTalk Project

In our project, we have created a chatbot using deep learning techniques. The chatbot is trained on a dataset that contains categories (intents), the model, and the responses. We use a special type of recurrent neural network (LSTM) to classify the user's message into a category and then provide a response.

For our Retrieval Based Chatbot project, we used Python libraries such as NLTK, Keras, Numpy, Pickle, and Json with Python version 3.9.

To summarize our project:

- We created our dataset and prepared responses to the questions.
- We performed a series of cleaning, stemming (lemmatization), and tagging (tokenization) operations on the data set to prepare it for training.
- We modeled our training. For this, we created a three-layer artificial neural network using Sequential. We trained and tested our LSTM-based model using our training and test datasets.
- We saved our model to prepare for new queries.
- We received new queries through the interface and sent the estimated responses generated by the trained model to the screen.

V. Sonuç

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