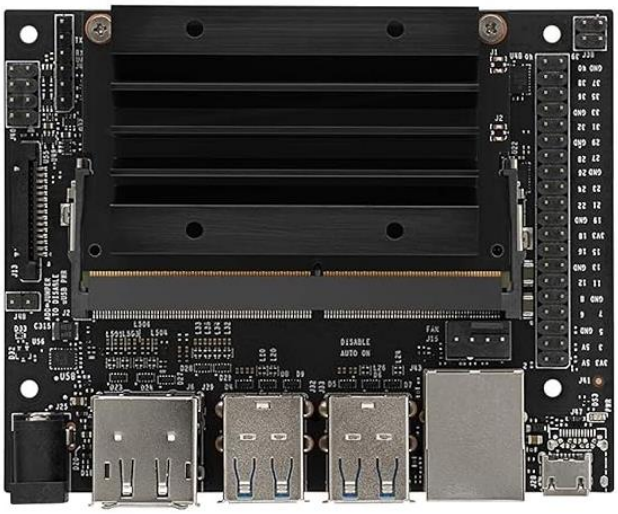
NATURAL LANGUAGE PROCESSING TRAINER

MODEL-NLP100



This trainer has been designed with a view to provide practical and experimental knowledge of Natural Language Processing (NLP) with Artificial Intelligence (AI) hardware and software programing.

SPECIFICATIONS

A. Microcontroller

1. A57 Microcontroller
2. CPU : Quad-core ARM A57 @ 1.43 GHz
3. OS : Linux
4. RAM : 4 GB 64-bit LPDDR4 25.6 GB/s
5. Ethernet Connectivity : Gigabit Ethernet
6. Wifi Connectivity : 802.11 b/g Wireless LAN Dual-Band 2.4/5.0 GHz, 3G
7. Bluetooth Connectivity : Bluetooth 5.0
8. USB Connectivity : USB 3.0 – 4 Nos. – Micro USB Port
9. Storage : microSD – 32 GB
10. Camera : 2 x MIPI CSI-2 DPHY lanes
11. Display : HDMI and Display port
12. Protocols : GPIO, I2C, I2S, SPI, UART
13. Power - 5V, 4A DC

B. Other Parts

1. Wifi Node : Wireless 2.4GHz Wifi Module – ESP32
2. LCD Display : 20 X 4
3. Display Monitor : 15 Inch LED
4. Storage : External SSD - 128GB
5. Camera : External Logitech – 270 – USB
6. Key Board : External Wireless
7. Mouse : External Wireless

C. Accessories:

1.	2 mm interconnection Sockets	: On Board
2.	2 mm Banana Jumper Cable	: 20 Nos
3.	2mm Banana Jack to Single pin jumpers	: 2 Nos
4.	USB to Micro USB Cable	: 2 Nos
5.	Ethernet Cable	: 1 No
6.	HDMI to HDMI Cable	: 1 No
7.	VGA 15 pin Male to HDMI Converter	: 1 No
8.	Power Supply Adaptor	: 5V, 4A DC
9.	SD Memory Card with Codes for All Experiments	: 32 GB - 2 No
10.	16 GB Pen Derive	: 1No
	with Software, Library, Drivers, Codes, Soft Copy of Manual & Mobile App	
11.	Printed Practical Manual	: 1 No
12.	E-Books for AI Subject	: 10 Nos
13.	Mp4 Video Class for AI Subjects	: 100 Nos
14.	Power Supply	: 230V AC, 50 Hz
15.	Operating Conditions	: 0-40 °C, 85% RH
16.	Mains Cord	: 1 No – On Board

EXPERIMENTS

A. Theory Experiments

1. To understand theory and working of Natural Language Processing
2. To understand Operating System for Natural Language Processing
3. To understand Protocols used for Natural Language Processing
4. To understand USB, HDMI, Display Port Interface of Natural Language Processing
5. To understand Ethernet Cable Interface for Natural Language Processing
6. To understand micro SD Card Interface for Natural Language Processing
7. To understand that how to connect 20 x 4 LCD Display to Natural Language Processing

8. To understand theory of Block diagram and its internal Structure of Natural Language Processing
9. To understand History of Natural Language Processing
10. To understand Fundamentals of Natural Language Processing
11. To understand theory of Basic of Natural Language Processing and its architecture
12. To understand Natural Language Processing Programming Language – C, C++, Python and R
13. To understand Libraries and Algorithms used for Natural Language Processing
14. To understand Natural Language Processing Protocols

15. To understand Natural Language Processing Applications in following Areas :
    a. Natural Language Processing – NLP
    b. Internet of Things – IOT
    c. Preventive Maintenance
    d. Cyber Security
    e. Agriculture and Food Industry
    f. Remote Healthcare Monitoring and Telemedicine
    g. Environment Monitoring and Forecast
    h. Warehouse and Logistics Monitoring
    i. Retail Analysis
    j. Intelligent Traffic Management
    k. Energy Monitoring and Control
    l. Home and Building Automation

16. To understand algorithms used for applications in Natural Language Processing :
    a. TensorFlow – To make AI Frame work
    b. Keras - For High Performance Numerical Computation
    c. PyTorch
    d. GoogleAI
    e. Amazon web services - AWS
    f. Caffe
    g. Anaconda Navigator
17. To understand software used for Natural Language Processing :
    a. Linux OS
    b. NVIDIA JetPack having Board support package - BSP
    c. NVIDIA CUDA
    d. cuDNN
    e. TensorRT
    f. Anaconda Navigator
    g. Jupyter Notebook
    h. Computer Vision
    i. GPU computing
    j. Multimedia Processing
18. To understand Libraries for applications in Natural Language Processing :
    a. numpy
    b. pandas
    c. scikit-learn
    d. matplotlib
    e. seaborn
    f. pycuda
    g. cv2
    h. caffe
    i. torch
    j. pytorch
    k. TensorRt
19. To understand Mathematics used for Natural Language Processing :
    a. Linear Algebra – Linear Equations, Matrixs, Vectors
    b. Calculus – Differentiation, Integration, Gradient Descent,
    c. Statistics – Population, Parameter, Sample, Variable, Probability

B. Practical Experiments

1. To understand theory of audio processing
2. To understand theory of AI Voice Assistance
3. To understand theory of AI Chatbot
4. To understand theory of Audio Fingerprinting
5. To understand theory of Music Recommendation
6. To understand theory of Speech Recognition
7. To understand theory of Sentiment Analysis
8. To understand theory of Dialog Flow – Chatbot
9. To understand theory of Text Classification
10. To understand theory of Language Translation using NLP
11. To understand theory of Named Entity Recognition - NER
12. To understand theory of Minutes LangChain
13. To implement Word Embedding using Keras
14. To implement Travel Agency Chat Bot using Flask
15. To understand Rasa Chatbot with Database and store data of Chatbot in Database
16. To implement Chat Bot using Weather API
17. To demonstrate Basic Chatbot Using Rasa NLU and Rasa Core
18. To demonstrate AI Voice Assistance using NLP
19. To demonstrate AI Chatbot using NLP
20. To build a Chatbot with GUI in Python with Tkinter
21. To demonstrate Speech Recognition using NLP
22. To demonstrate Text Classification using NLP
23. To demonstrate Chatbot with Mic input Speaker output using Python, Jarvis, and DialoGPT
24. To build an AI Voice Assisted using ChatGPT
25. To record and play Audio signal using PyAudio
26. To demonstrate Text to Speech (TTS) Conversion
27. To understand GPT-3, GPT-NeoX and GPT-NeoX-20B models
28. To understand Natural Language Processing Tokenization
29. To understand Natural Language Processing - Stemming And Lemmatization Intuition
30. To understand Natural Language Processing TF-IDF Intuition - Text Preprocessing
31. To build Resume Analyser Application using NLP and Python
32. To build Keywords Extraction app with Python
33. To build ruled based Chabot in Python from Scratch

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