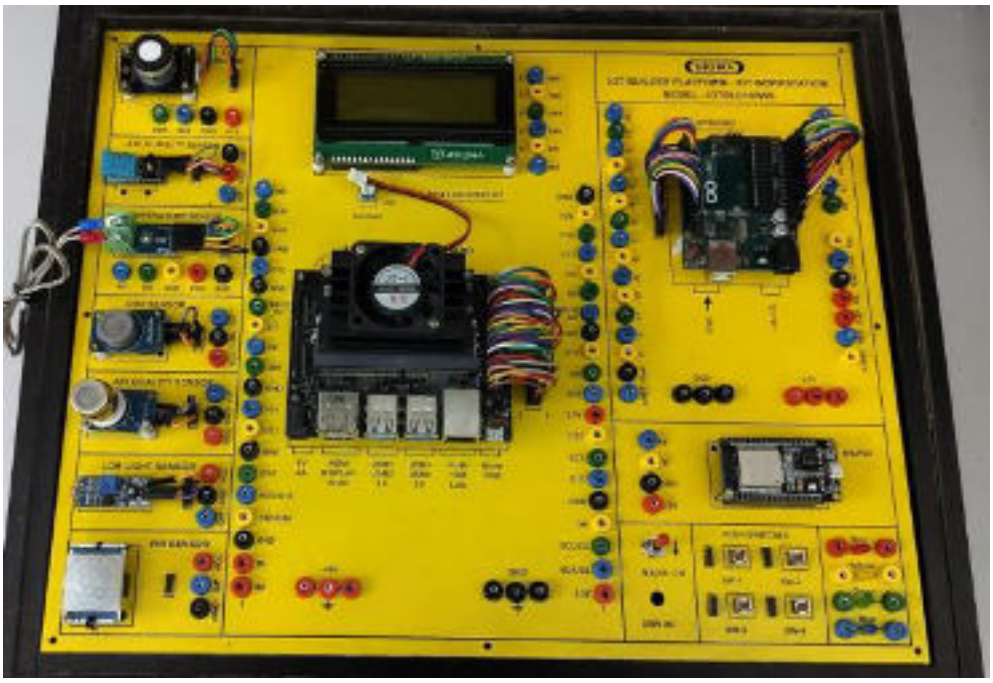
AI BUILDER

MODEL- AIBLD100



A. Main Specs

1. Following Parts and Modules are assembled on Single PCB of size - 18 Inch x 15 Inch.
2. The complete circuit diagram is screen printed on component side of the PCB with circuit and Parts at the same place.
3. The PCB with components on front side is fitted in elegant wooden box having lock and key arrangement.
4. Modules and Parts should be removable without desodlering for easy repair / replacement
5. The acrylic cover is fitted on PCB to safeguard main parts.

B. AI Work Station :

1. A57 Microcontroller
2. GPU : 128-Core - Maxwell
3. CPU : Quad-core ARM A57 @ 1.43 GHz
4. OS : Linux
5. RAM : 4 GB 64-bit LPDDR4 25.6 GB/s
6. Ethernet Connectivity : Gigabit Ethernet
7. Wifi Connectivity : 802.11 b/g Wireless LAN Dual-Band 2.4/5.0 GHz, 3G
8. Bluetooth Connectivity : Bluetooth 5.0
9. USB Connectivity : USB 3.0 – 4 Nos. – Micro USB Port
10. Extension interfaces : GPIO, I2C, SPI, UART
11. Power Supply : 5V, 4A DC
12. Arduino Uno Micro Controller : for sending Sensors data

C. Sensors

1. Temperature Sensor – MAX6375
2. Air Humidity Sensor - DHT22
3. Co2 Sensor
4. O2 Sensor
5. Air Quality Sensor - PM2.5 and PM10
6. Ambient Light Sensor - LDR
7. PIR Sensor

D. Other Parts

1. IoT Node : Wireless 2.4GHz Wifi Module – ESP32
2. LCD Display : 20 X 4
3. LED : 4 Nos.
4. Push Switches : 4 Nos.
5. Display Monitor : 15 Inch LED
6. Storage : External SSD - 128GB
7. Camera : External Logitech – 270 – USB
8. Key Board : External Wireless
9. Mouse : External Wireless
10. 2 mm interconnection Sockets

E. 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

1. Artificial Intelligence – AI - Experiments

1. Introduction to Artificial Intelligence - What is Artificial Intelligence
2. To understand theory of Block diagram and its internal Structure of AI
3. To understand History of Artificial Intelligence
4. To understand Fundamentals of Artificial Intelligence
5. To understand theory of Basic of AI and its architecture
6. To understand AI Programming Language – C, C++, Python and R
7. To understand AI Protocols
8. To understand Glossary of Technical words
9. To understand AI 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

10. To understand algorithms used for applications in AI :
    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

11. To understand software used for AI :
    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

12. To understand Libraries for applications in AI :
    a. numpy
    b. pandas
    c. scikit-learn
    d. matplotlib
    e. seaborn
    f. pycuda
    g. cv2
    h. caffe
    i. torch
    j. pytorch
    k. TensorRt

13. To understand Mathematics used for AI :
    a. Linear Algebra – Linear Equations, Matrixs, Vectors
    b. Calculus – Differentiation, Integration, Gradient Descent,
    c. Statistics – Population, Parameter, Sample, Variable, Probability

14. To understand realtime image processing applications using Computer Vision – CV
15. To understand Minimax Algorithm in Artificial Intelligence
16. To understand Generative AI
17. To understand ChatGPT Applications
18. To understand Virtual Reality – VR and Augmented Reality AR

19. To understand OpenAI - Speech To Text converter
20. To understand LangChain
21. To understand Hill Climbing Algorithm in Artificial Intelligence
22. To demonstrate OpenAI
23. To demonstrate Virtual Reality – VR and Augmented Reality AR

2. Machine Learning - ML – Experiments

1. To understand theory of Supervised Learning
    a. Linear Regression
    b. Logistic Regression
    c. Gradient Descent
    d. Decision Tree
    e. Random Forest
    f. Bagging & Boosting
    g. K Nearest Neighbors – KNN
    h. Bayesian Linear Regression
    i. Non-Linear Regression
    j. Support Vector Machine

2. To understand theory of Unsupervised Learning
    a. K-Means
    b. Hierarchal Clustering

3. To install and understand Anaconda Dashboard
4. To demonstrate Machine Learning Framework Experiment using TensorFlow
5. To demonstrate Machine Learning Framework Experiment using PyTorch
6. To demonstrate Machine Learning Framework Experiment using Keras
7. To demonstrate Supervised Learning for
    a. Linear Regression
    b. Logistic Regression

8. To demonstrate Unsupervised Learning for
    a. Hierarchal Clustering
    b. K-Means

9. To understand theory of following Applications using OpenCV and Machine Learning
    a. Face Detection and Tracking
    b. Face Recognition
    c. Emotion Recognition
    d. Gesture Recognition
    e. Smile Detection
    f. Vehicle Detection
    g. Object Detection using Yolo algorithm
    h. Drowsiness Detection
    i. License Plate Detection
    j. Fingerprint Recognition
    k. Text identification
    l. Traffic Sign Recognition
    m. Motion Detection
    n. Character Recognition
    o. Edge Detection through Image processing
    p. Handwritten Digit Classification using CNN
    q. Leaf Disease Detection and Classification
    r. Pattern Recognition
    s. Fire Detection
    t. Weather Forecasting

10. To understand theory of Real Time Sensors Interface using Machine Learning
11. To understand theory of Reinforcement Learning
12. To understand theory of Ensemble Learning
13. To understand theory of Gaussian Mixture Model – GMM
14. To understand theory of Support Vector Machine - SMM
15. To understand theory of MLOps – Machine Learning Operations
16. To understand theory of DevOps - Developments and Operations
17. To understand theory of PCA - Principal Component Analysis
18. To understand theory of Cost Function
19. To understand theory of Text Classification Using Naive
20. To understand theory of Back propagation and Gradient Descent

3. Deep Learning - DL – Experiments

1. To understand theory of Neural Networks - Overview and Representation
2. To understand theory of Convolutional Neural Networks - CNN
3. To understand theory of Recurrent Neural Networks
4. To understand theory of Deep Neural Networks - DNNs
5. To understand theory of Multiple Neural Networks in parallel for applications
6. To understand theory of Preventive Maintenance
7. To understand theory of Activation Function
8. To understand theory of Loss Function
9. To understand theory of Real Time Image Processing Application using computer vision.
10. To understand theory of Real Time Speech Processing and Audio Segmentation
11. To demonstrate Neural Networks
12. To demonstrate Convolutional Neural Networks

4. Natural Language Processing – NLP – Experiments using Deep Learning

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 Machine Translation
11. To understand theory of Named Entity Recognition
12. To demonstrate AI Voice Assistance using NLP
13. To demonstrate AI Chatbot using NLP
14. To demonstrate Speech Recognition using NLP
15. To demonstrate Text Classification using NLP
16. To demonstrate Computer Vision
17. To demonstrate ChatGPT Applications

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