Vidya Pratishthan's Kamalnayan Bajaj Institute of Engineering and Technology, Baramati
(An Autonomous Institute)

Faculty of Science and Technology

Board of Studies
Department of Artificial Intelligence and Data Science

Syllabus

Double Minor Course Structure

(Pattern 2023)

(w.e.f. AY: 2024-25)

Vidya Pratishthan's
Kamalnayan Bajaj Institute of Engineering and Technology, Baramati
Faculty of Science and Technology
Board of Studies: Department of Artificial Intelligence and Data Science
Syllabus Double Minor (Artificial Intelligence and Data Science)

		Double Minor in Artificial Intelligence and Data Science														
Course Code	**Sem**	**Course Name**	**Teaching Scheme (Hours/Week)**			**Examination Scheme and Marks**							**Credits**			
			TH	**PR**	**TUT**	**Activity**	**ISE**	**ESE**	**TW**	**PR**	**OR**	**Total**	**TH**	**PR**	**TUT**	**Total**
AI23261	III	Artificial Intelligence and Data Science	2	2	-	10	20	50	20	20		120	2	1	-	3
AI23271	IV	Data Operation and Interpretation	2	2	-	20	20	50	20	20		130	2	1	-	3
AI23361	V	Machine Learning: Concepts, Techniques, and Applications	3	2	-	20	20	70	20	20		150	3	1	-	4
AI23371	VI	Deep Learning: Foundations, Architectures, and Application	3	2	-	20	20	70	20	20	-	150	3	1	-	4
AI23461	VII	Artificial Intelligence and Data Science Advanced Applications and Trends	3	2	-	20	20	70	20	20	-	150	3	1	-	4
	Total		**13**	**10**	**-**	**90**	**100**	**310**	**100**	**100**	**-**	**700**	**13**	**05**	**-**	**18**

Dept. Academic Coordinator
Mr. P. N. Shendage

Head of Department
Dr. C. S. Kulkarni

Dean Academic
Dr. S. M. Bhosle

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Dr. R. S. Bichkar

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AI23261 - Artificial Intelligence and Data Science

Teaching Scheme: **Theory: - 2 Hours/Week** **Practical: 2 Hour/Week**	**Credits** **03**	**Examination Scheme:** **Activity: - 10 Marks** **In-Sem:- 20 Marks** **End-Sem:- 50 Marks** **Term Work: 20 Marks** **Practical: 20 Marks**

Prerequisites: Basic python programming

Course Objectives:

- To provide a comprehensive introduction to the concepts and applications of Artificial Intelligence (AI) and Data Science.
- To equip students with the foundational knowledge of machine learning algorithms and data handling techniques.
- To develop practical skills in using AI and Data Science tools and libraries.
- To foster the ability to apply AI and Data Science methods to solve real-world engineering problems.

Course Outcomes (COs): The students will be able to:

CO1: Understand the fundamental principles and applications of AI and Data Science.
CO2: Collect, preprocess, and visualize data effectively.
CO3: Implement basic machine learning algorithms for regression, classification, and clustering tasks.
CO4: Apply neural networks for simple AI tasks and understand their structure and function.

Course Contents

Unit I: Introduction to Artificial Intelligence and Data Science (06 Hours)

Basics of AI and Data Science: Definition and history of AI, Key concepts and applications of AI, Introduction to Data Science and its importance.
Fundamentals of Machine Learning: Types of machine learning: supervised, unsupervised, and reinforcement learning, Basic concepts: features, labels, training, and testing data, Overview of common algorithms: linear regression, classification, clustering.
Tools and Technologies: Introduction to Python for AI and Data Science, Overview of popular libraries: NumPy, pandas, matplotlib, scikit-learn, Setting up the development environment.

Unit II: Data Handling and Pre-processing (06 Hours)

Data Collection and Cleaning: Sources of data: databases, web scraping, APIs, Data cleaning techniques: handling missing values, outliers, duplicates.
Data Manipulation: Data types and structures, Basic operations with pandas: filtering, grouping, merging.
Data Visualization: Importance of data visualization, Visualization tools and techniques: matplotlib, seaborn, Creating basic plots: bar charts, histograms, scatter plots.

Unit III: Core Machine Learning Concepts (06 Hours)

Supervised Learning: Regression algorithms: linear regression, polynomial regression, Classification algorithms: logistic regression, decision trees, k-nearest neighbors, Model evaluation metrics: accuracy, precision, recall, F1-score.
Unsupervised Learning: Clustering algorithms: k-means, hierarchical clustering, Dimensionality reduction: PCA, t-SNE, Applications and use cases.
Model Training and Evaluation: Splitting data: training, validation, and test sets, Cross-validation techniques, Avoiding overfitting and underfitting.

Unit IV: Advanced Topics and Applications (06 Hours)

Introduction to Neural Networks: Basics of neural networks and deep learning, Structure of neural networks: neurons, layers, activation functions, Overview of frameworks: TensorFlow, Keras.

AI in Real-World Applications: AI in healthcare, finance, and manufacturing, Ethical considerations and challenges in AI, Case studies of successful AI implementations.

Text Books:

1. Stuart Russell and Peter Norvig, "Artificial Intelligence – A Modern Approach", Fourth Edition, Pearson Education, 2021.
2. Jake VanderPlas, "Python Data Science Handbook", O'Reilly Media, Inc.,2016.
3. Aurélien Géron, "Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow", Third Edition, O'Reilly Media, Inc.,2022.

Reference Books:

1. Dan W. Patterson, "Introduction to AI and ES", Pearson Education,2007
2. Kevin Night, Elaine Rich, and Nair B., "Artificial Intelligence", McGraw Hill, 2008
3. Patrick H. Winston, "Artificial Intelligence", Third Edition, Pearson Education, 2006
4. Deepak Khemani, "Artificial Intelligence", Tata McGraw Hill Education, 2013.

E-Resources:

1. https://nptel.ac.in/courses/106/102/106102220/
2. https://nptel.ac.in/courses/106/105/106105077/
3. https://nptel.ac.in/courses/106/105/106105078/
4. https://nptel.ac.in/courses/106/105/106105079/

List of Assignments

1. Python Basics:
   a. Write a Python program to perform basic arithmetic operations.
   b. Create a program to manipulate strings and lists.
   c. Implement a simple calculator using functions.
2. Data Collection and Cleaning:
   a. Collect a dataset from an online source (e.g., Kaggle, UCI Machine Learning Repository).
   b. Identify and handle missing values in the dataset.
   c. Remove duplicates and handle outliers.
3. Data Exploration and Visualization:
   a. Load the cleaned dataset using pandas.
   b. Perform basic statistical analysis (mean, median, mode).
   c. Create visualizations using matplotlib and seaborn (e.g., histograms, bar plots, scatter plots).
4. Linear Regression:
   a. Implement linear regression from scratch using numpy.
   b. Use scikit-learn to fit a linear regression model to a given dataset.
   c. Visualize the regression line and interpret the results.

5. Neural Networks with Keras:
    a. Create a simple neural network for a classification problem using Keras.
    b. Train and evaluate the model.
    c. Visualize the training history (loss and accuracy plots).

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AI23271- Data operation and Interpretation

Teaching Scheme: **Theory: 2 Hours/Week** **Practical: 2 Hour/Week**	**Credits** **03**	**Examination Scheme:PR:20** **Activity:10 Marks** **ISE: 20 Marks** **ESE: 50 Marks** **Term Work: 20 Marks**

Prerequisites: Python Programming

Course Objectives:.

- To introduce the foundational concepts of data science.
- To learn data manipulation and preprocessing techniques.
- To develop proficiency in data visualization.
- To explore predictive data models and their evaluation.

Course Outcomes (COs): The students will be able to learn:

CO1: Perform data manipulation using Pandas.
CO2: Understand and apply data preprocessing techniques.
CO3: Create insightful visualizations using Matplotlib and Seaborn.
CO4: Implement Predictive data models and evaluate their performance.

Course Contents

Unit I: Foundations of Data Science and Pandas Basics (06 Hours)
Introduction to Data Science : Data, Definition and significance of Data Science. Overview of the Data Science lifecycle. **Pandas library:** Data Structures: Series and DataFrames. Basic Operations: Data Exporting, Data Loading and Inspection **,** Data Selection and Filtering,

Unit II: Data Preparation and Statistical Foundations (06 Hour)
Statistical Measures: Mean, median, mode, variance, and standard deviation. Correlation and its significance in data relationships, Skewness, Kurtosis and Outliers.
Data Preprocessing: Handling missing values, scaling, encoding and feature extraction, Data merging, reshaping, and transformation.

Unit III: Visualizing Data Trends and Relationships with Python (06 Hour)
Importance of Visualization in data science, Plot types: Line, bar, histogram, scatter.
Libraries: Matplotlib and Seaborn, Visualizing relationships and trends in data. Advanced plots using Seaborn: Heatmaps, pair plots, violin plots. correlation matrics.

Unit IV: Predictive Data Analytics (6 Hours)
Analytics Types: Predictive, Descriptive and Prescriptive ,Types: Supervised (classification, regression) and unsupervised learning. Algorithms: Simple Linear Regression, Logistic regression, Multiple linear Regression. K-Nearest neighbor. Metrics: Accuracy, precision, recall, F1-score.

Text Books:

1. **"Introduction to Machine Learning with Python: A Guide for Data Scientists"** by Andreas C. Müller and Sarah Guido (1st Edition, 2016, O'Reilly Media, ISBN-13: 978-1449369415).
2. Wes McKinney, "Python for Data Analysis",O'REILLY, ISBN:978-1-449-31979-3, 1st edition, October 2012.

3. Rachel Schutt & O'neil, "Doing Data Science", O'REILLY, ISBN:978-1-449-35865-5, 1st edition, October 2013.

4. **"Machine Learning: A Probabilistic Perspective"** by Kevin P. Murphy (1st Edition, 2012, The MIT Press, ISBN-13: 978-0262018029

Reference Books:

1. Wes McKinney - *Python for Data Analysis* Publisher: O'Reilly MediaISBN: 978-1491957660
2. Joel Grus - *Data Science from Scratch: First Principles with Python* Publisher: O'Reilly Media ISBN: 978-1492041139
3. **David Spiegelhalter** - *The Art of Statistics: How to Learn from Data* ,Publisher: Basic Books ISBN: 978-1541618510
4. **Andy Kirk** - *Data Visualization: A Handbook for Data-Driven Design* ,Publisher: SAGE ISBN: 978-1473960543
5. **Ben Jones** - *Communicating Data with Tableau* , Publisher: O'Reilly MediaISBN: 978-1449372026
6. **irag Shah** - *A Hands-On Introduction to Data Science* ,Publisher: Cambridge University Press ISBN: 978-1108472449

E-Resources:

1. **https://onlinecourses.nptel.ac.in/noc21_cs69/preview**
2. **https://www.coursera.org/learn/machine-learning**
3. **https://www.datacamp.com/courses/data-visualization-with-python**

List of Assignments

1. Find an open-source dataset (e.g., from Kaggle), and provide its description and source URL. Load the dataset into a pandas DataFrame, then check for missing values, display basic statistics using describe(), and provide variable descriptions and data types. verifying dimensions and ensure proper data preprocessing.
2. Analyze the Iris dataset by computing the mean and standard deviation for sepal length, sepal width, petal length, and petal width. Based on these statistics, determine the best measurement for identifying the Iris species.
3. Create various plots (line, bar, scatter, histogram) using **Matplotlib** and **Seaborn**. Perform visualize distributions, relationships, and correlations.
4. Implement a simple machine learning model (e.g., K-Nearest Neighbour) and evaluate its performance using different Metrics.
5. Demonstrate the Simple Linear Regression model and evaluate the performance on any dataset.

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AI23361- Machine Learning: Concepts, Techniques, and Applications

Teaching Scheme: **Theory: 3 Hours/Week** **Practical: 2 Hour/Week**	**Credits** **04**	**Examination Scheme:PR:20** **Activity:20 Marks** **ISE: 20 Marks** **ESE: 70 Marks** **Term Work: 20 Marks**

Prerequisites: Python Programming

Course Objectives:.

- To understand and analyze various machine learning models, their principles, and real-world applications
- To design and implement machine learning models that predict outcomes using linear, non-linear, and logistic regression techniques.
- To develop and evaluate classification models for solving binary and multiclass classification problems.
- To apply and evaluate clustering algorithms for effective segmentation and analysis of unlabeled data.
- To explore ensemble learning techniques for enhancing the performance of machine learning models.
- To understand the fundamentals of reinforcement learning and apply its algorithms to real-world applications.

Course Outcomes (COs): The students will be able to learn:

CO1: Explain and differentiate various machine learning models based on their characteristics and applications

CO2: Develop and implement predictive models using linear, non-linear, and logistic regression techniques.

CO3: Apply and evaluate classification techniques for solving binary and multiclass classification problems.

CO4: Implement and analyze clustering techniques for handling and segmenting unlabeled datasets.

CO5: Utilize ensemble learning methods to enhance model performance through the combination of multiple machine learning algorithms.

CO6: Apply reinforcement learning techniques to solve real-world decision-making problems.

Course Contents

Unit I Introduction to Machine Learning(06 Hour)

Introduction: Machine Learning, Definitions and Real-life applications, Comparison of Machine Learning with Traditional Programming, ML vs AI vs Data Science. **Learning Paradigms**: Learning Tasks- Descriptive and Predictive Tasks, Supervised, Unsupervised, Semi-supervised and Reinforcement Learnings.

Unit II: Regression (06 Hour)

Introduction: Regression, Need of Regression, Compare Regression and Correlation, Bias-Variance tradeoff, Overfitting and Under fitting. **Regression Techniques** : Support Vector Regression, Ridge Regression, Lasso Regression, Elastic Net Regression

Unit III: Classification (06 Hour)

Introduction: Need of Classification, Types of Classification (Binary and Multiclass), Binary-vs-Multiclass Classification, Balanced and Imbalanced Classification Problems , **Algorithms:** Logistic Regression for Multiclass , Decision Tree Classifier, Linear Support Vector Machines (SVM) – Introduction, Soft Margin SVM, **Kernel functions**: Radial Basis Kernel, Gaussian, Polynomial, Sigmoid

Unit IV: Evaluation Metrics (6 Hours)

Evaluation Metrics for Regression: Mean Squared Error (MSE), Mean Absolute Error (MAE), Root Mean Squared Error (RMSE), R-squared ,Adjusted R-squared**, Classification Performance Evaluation**: Confusion Matrix, Accuracy, Precision, Recall

Unit V: Unsupervised Machine learning algorithms (6 Hours)

Clustering, Need of Clustering, Types of Clustering, Hierarchical clustering algorithm, K-Means clustering algorithm, Advantages and disadvantages of K-Means clustering algorithm, Elbow method.

Unit VI: Reinforcement Learning (6 Hours)

Reinforcement Learning, Need for Reinforcement Learning, Supervised vs Unsupervised vs Reinforcement Learning, Types of Reinforcement, Elements of Reinforcement Learning, Real time applications of Reinforcement learning.

Text Books:

1. **Goodfellow, I., Bengio, Y., & Courville, A.** (2016). Deep Learning. MIT Press. ISBN: 978-0262035613
2. **Raschka, S., & Mirjalili, V.** (2020). Python Machine Learning. Packt Publishing. ISBN: 978-1789955750
3. **Zhang, C., & Ma, Y.** (2021). Ensemble Machine Learning. Springer. ISBN: 978-3030985064

Reference Books:

1. Ian H Witten, Eibe Frank, Mark A Hall, "Data Mining, Practical Machine Learning Tools and Techniques", Elsevier, 3rd Edition
2. Jiawei Han, Micheline Kamber, and Jian Pie, "Data Mining: Concepts and Techniques", Elsevier Publishers Third Edition, ISBN: 9780123814791, 9780123814807
3. Shalev-Shwartz, Shai, and Shai Ben-David, "Understanding machine learning: From theory to algorithms", Cambridge university press, 2014
4. McKinney, "Python for Data Analysis O' Reilly media, ISBN : 978-1-449- 31979-3
5. Hastie, T., Tibshirani, R., & Friedman, J. (2017). The Elements of Statistical Learning. Springer. ISBN: 978-0387848570
6. Manning, C. D., Raghavan, P., & Schütze, H. (2008). Introduction to Information Retrieval. Cambridge University Press. ISBN: 978-0521865715

E-Resources:

4. **https://www.coursera.org/learn/machine-learning**
5. **https://www.edx.org/learn/machine-learning**
6. **https://www.kaggle.com/learn/intro-to-machine-learning**

List of Assignments

1. Use the diabetes data set from UCI and Pima Indians Diabetes data set for performing the following:

a. Univariate analysis: Frequency, Mean, Median, Mode, Variance, Standard Deviation, Skewness and Kurtosis
b. Bivariate analysis: Linear and logistic regression modeling
Dataset link: https://www.kaggle.com/datasets/uciml/pima-indians-diabetes-database

2. Predict House Prices using Regression
   a. Apply Linear, Ridge, and Lasso regression to predict house prices.
   Dataset: Boston Housing Dataset
3. Predict the price of the Uber ride from a given pickup point to the agreed drop-off location. Perform following tasks:
   a. Pre-process the dataset.
   b. Identify outliers.
   c. Check the correlation.
   d. Implement linear regression and ridge, Lasso regression models.
   e. Evaluate the models and compare their respective scores like R2, RMSE.
   Dataset link: https://www.kaggle.com/datasets/yasserh/uber-fares-dataset

4. Handwritten Digit Recognition
   a. Train a Logistic Regression model on MNIST for digit classification.
   Dataset: MNIST Handwritten Digits

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5. Implementing K-Means Clustering on the Iris Dataset and Determining the Optimal Number of Clusters using the Elbow Method.
6. Use the Wine Quality Dataset to predict wine quality based on physicochemical properties. https://archive.ics.uci.edu/dataset/186/wine+quality
7. Stock Price Prediction using Regression
   a. Use Support Vector Regression (SVR) to predict stock market trends.
   Dataset: Yahoo Finance Stock Data
8. Use the Student Performance Dataset to predict student performance based on their study habits, family background, etc.
https://archive.ics.uci.edu/dataset/320/student+performance
9. Use the **Air Quality Dataset** to predict air quality based on several environmental features. https://archive.ics.uci.edu/dataset/360/air+quality

10. Segmenting Customers using K-Means
    a. Apply K-Means Clustering to divide customers into groups.
    Dataset: Mall Customers Segmentation

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AI23371- Deep Learning: Foundations, Architectures, and Application

Teaching Scheme: **Theory: 3 Hours/Week** **Practical: 2 Hour/Week**	**Credits** **04**	**Examination Scheme:PR:20** **Activity:20 Marks** **ISE: 20 Marks** **ESE: 70 Marks** **Term Work: 20 Marks**

Prerequisites: Python Programming

Course Objectives:.

- To build a strong foundation in neural networks, including their architectures, working principles, and training mechanisms.
- To analyze the evolution of deep learning, its fundamental concepts, and real-world applications.
- To explore hyperparameter tuning techniques and optimization strategies for improving deep learning model performance.
- To design and implement convolutional neural networks (CNNs) for computer vision applications.
- To develop expertise in Recurrent Neural Networks (RNNs) for sequence modeling tasks such as language processing and time series forecasting.
- To investigate advanced recurrent architectures, including LSTMs and Bi-LSTMs, for handling long-term dependencies in sequential data.

Course Outcomes (COs): The students will be able to learn:

CO1: Explain the fundamentals of neural networks, including perceptrons, activation functions, and training mechanisms...

CO2: Compare and apply deep learning techniques for various real-world applications, understanding their strengths and challenges.

CO3: Optimize neural network performance through hyperparameter tuning, gradient-based learning, and advanced optimization techniques.

CO4: Implement and train convolutional neural networks (CNNs) for solving image classification and object detection problems.

CO5: Develop and apply recurrent neural networks (RNNs) and their variants (LSTMs, Bi-LSTMs) for sequence-based data processing.

CO6: Solve complex sequence modeling problems using advanced RNN architectures and backpropagation through time (BPTT).

Course Contents

Unit I Fundamentals of Neural Networks (06 Hours)

Biological Neuron, The Perceptron(AND,OR,NOT,XOR), Deep Forward Network, Multilayer Feed-Forward Networks, **Training Neural Networks:** Backpropagation and Forward Propagation, **Activation Functions** :Linear, Sigmoid, Tanh, Hard Tanh, Softmax, Rectified Linear, **Loss Functions:**Loss Function Notation, Loss Functions For Regression, Loss Functions For Classification.

Unit II Introduction To Deep Learning Foundations (06 Hours)

Machine Learning And Deep Learning, History Of Deep Learning, Advantage And Challenges Of Deep Learning. Learning Representations From Data , Understanding How Deep Learning Works In Three Figures(Input, Hidden Layer, Output), Common Architectural Principles Of Deep Network, Architecture Design, Applications Of Deep Learning

Unit III Hyperparameter Tuning of Neural Network (06 Hours)

Hyperparameters : Learning Rate, Regularization, Cost Functions, Error Back Propagation, Gradient-Based Learning, Implementing Gradient Descent, Vanishing And Exploding Gradient Descent, Optimization Algorithm(SGD)

Unit IV Convolutional Neural Network (CNN) (06 Hours)

CNN Architecture Overview, The Basic Structure Of A Convolutional Network- Padding, Strides, Typical Settings, The Relu Layer, Pooling, Fully Connected Layers, The Interleaving Between Layers, Training a Convolutional Network.

Unit V Recurrent Neural Networks (6 Hours)

Recurrent Neural Networks Overview, Need for RNNs, RNNs And Traditional Feedforward Networks, Basic RNN Architecture, Working of an RNN, Applications of RNNs.

Unit VI Advanced Recurrent Neural Networks and Sequence Learning (06 Hours)

Vanishing Gradient And Exploding Gradient Problem, RNN Differs From Feedforward Neural Networks, Backpropagation Through Time (BPTT), Types Of Recurrent Neuralnetworks, Bidirectional Rnns, Long Short-Term Memory (LSTM), Bidirectional Long Short-Term Memory (Bi-LSTM)

Text Books:

1. Goodfellow, I., Bengio, Y., & Courville, A. (2016). Deep Learning. MIT Press. ISBN: 978-0262035613.
2. Patterson, J., & Gibson, A. (2017). Deep Learning. O'Reilly Media. ISBN: 978-1491925614.
3. Aggarwal, C. (2018). Neural Networks and Deep Learning. Springer. ISBN: 978-3319944623.
4. Buduma, N. (2017). Fundamentals of Deep Learning. SPD. ISBN: 978-9386551551.
5. Chollet, F. (2017). Deep Learning with Python. Manning Publications. ISBN: 978-1617294433.

Reference Books:

1. Sutton, R. S., & Barto, A. G. (2018). Reinforcement Learning: An Introduction. MIT Press. ISBN: 978-0262039246.
2. Weidman, S. (2019). Deep Learning from Scratch: Building with Python from First Principles. O'Reilly Media. ISBN: 978-1492047489.
3. Duval, F. (2020). Deep Learning for Beginners: Practical Guide with Python and TensorFlow. Independently Published. ISBN: 979-8618122373.
4. **Sutton, R. & Barto, A.** (2018). Reinforcement Learning: An Introduction (2nd Ed.). MIT Press. ISBN: 978-0262039246.

E-Resources:

7. http://csis.pace.edu/ctappert/cs855-18fall/DeepLearningPractitionersApproach.pdf
8. https://www.dkriesel.com/_media/science/neuronalenetze-en-zeta2-1col-dkrieselcom.pdf
9. **Deep Learning Specialization – Andrew Ng (Coursera)**
   https://www.coursera.org/specializations/deep-learning
10. **Practical Deep Learning for Coders (FastAI)**
    https://course.fast.ai/
11. **CS231n: Convolutional Neural Networks for Visual Recognition (Stanford University)**
    http://cs231n.stanford.edu/
12. **MIT Deep Learning Course**
    https://deeplearning.mit.edu/

List of Assignments

1. Perceptron Model Implementation**:** Develop a simple perceptron-based neural network to classify logical operations (AND, OR, XOR).
2. Train a Multi-Layer Perceptron (MLP) for Digit Recognition. Use an MLP model to classify handwritten digits. Dataset: MNIST Dataset**.**
3. Visualizing Activation Functions Implement different activation functions (Sigmoid, ReLU, Tanh) and plot their outputs. Dataset: Synthetic data**.**
4. Exploring Deep Learning Architectures Implement a simple feedforward network for classification tasks. Dataset: Fashion MNIST.
5. Compare Performance of Shallow vs. Deep Networks Train 3-layer vs. 10-layer neural networks and compare accuracy. Dataset: CIFAR-10.
6. Deep Learning for Image Classification Build a deep fully connected network for image classification. Dataset: Tiny ImageNet**.**
7. Implementing Regularization Techniques Compare L1 (Lasso) and L2 (Ridge) regularization on a neural network. Dataset: Diabetes Dataset.
8. Impact of Different Optimizers train a model using SGD, Adam, RMSProp and compare results.
9. Build a Basic CNN for Image Classification implement a CNN model for digit classification.
10. Sentiment Analysis using LSTM train a LSTM for IMDB movie review sentiment classification. Dataset: IMDB Dataset