| Faculty of Engineering and Technology | | | |
|---|---|---|---|
| **Ramaiah University of Applied Sciences** | | | |
| Department | Artificial Intelligence and Machine Learning | Programme | B. Tech |
| Semester/Batch | 05 / 2023 | | |
| Course Code | AIC205A | Course Title | Machine Learning-2 |
| Course Leader | Mrs. Shaista Tarannum | | |

**Assignment**

| **Register No.** | | **Name of the Student: Group No:** | |
|---|---|---|---|

| **Sections** | | **Marking Scheme** | **Marks** | | |
|---|---|---|---|---|---|
| | | | **Max Marks** | **First Examiner Marks** | **Moderator** |
| | | | | | |
| | **Part – 1** | **TechA Deep Learning and Neural Network Certification (Infosys Springboard)** | **15** | | |
| | 1.1 | Completion of Infosys Springboard Certification | 9 | | |
| | 1.2 | Certification Exam Score 35–59 marks | 12 | | |
| | 1.3 | Certification Exam Score 60 and above | 15 | | |
| | **Part – 2** | **End-to-End Deep Learning Workflow (Manual and AI-Assisted)** | **15** | | |
| | | **Max Marks** | **30** | | |

**Course Marks Tabulation**

| **Component- CET B Assignment** | **First Examiner** | **Remarks** | **Second Examiner** | **Remarks** |
|---|---|---|---|---|
| 1 | | | | |
| 2 | | | | |
| **Total Marks** | | | | |

**Signature of First Examiner** **Signature of Second Examiner**

| Sections | Marking Scheme | Max Marks | Marks Scored |
|---|---|---|---|
| **Part – 1** | **TechA Deep Learning & Neural Network Certification (Infosys Springboard)** | **15** | |
| 1.1 | Completion of course (upload certificate). | 9 | |
| 1.2 | Certification score 35–59 marks. | 12 | |
| 1.3 | Certification score ≥ 60 marks. | 15 | |
| **Part – 2** | **End-to-End Deep Learning Workflow (Manual & AI-Assisted)** | **15** | |
| 2.1 | Manual Deep Learning Workflow – Build CNN using Python (TensorFlow/Keras). | 10 | |
| 2.2 | Conceptual understanding (libraries, ANN/CNN/RNN). | 3 | |
| 2.3 | Data preparation & preprocessing (load, normalize, augment). | 4 | |
| 2.4 | CNN development & evaluation (metrics, plots, interpretation). | 8 | |
| 2.5 | AI Tool Usage (ChatGPT, Bard, Copilot) – document prompts & outputs. | 2 | |
| 2.6 | Comparative analysis – manual vs. AI implementation. | 2 | |
| 2.7 | Reflection & ethical awareness (trust, integrity, screenshots). | 1 | |
| **Total Marks** | | **30** | |

**Please note:**

1. Documental evidence for all the components/parts of the assessment such as the reports, photographs, laboratory exam / tool tests are required to be attached to the assignment report in a proper order.
2. The First Examiner is required to mark the comments in RED ink and the Second Examiner's comments should be in GREEN ink.
3. The marks for all the questions of the assignment have to be written only in the **Component – CET B: Assignment** table.
4. If the variation between the marks awarded by the first examiner and the second examiner lies within +/- 3 marks, then the marks allotted by the first examiner is considered to be final. If the variation is more than +/- 3 marks then both the examiners should resolve the issue in consultation with the Chairman BoE.

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# Assignment

**Instructions to students:**

1. The assignment consists of **2 parts**:
    - **Part 1:** *TechA Deep Learning and Neural Network Certification (Infosys Springboard)*
    - **Part 2:** *End-to-End Deep Learning Workflow (Manual and AI-Assisted CNN Project)*
2. **Part 1** focuses on completing the **Infosys Springboard Certification** on *Deep Learning and Neural Networks*, which introduces the fundamentals of ANN, CNN, and frameworks like Keras and TensorFlow.
   **Marking Criteria for Part 1 (15 Marks):**
    - Completion of all course modules: **9 Marks**
    - Certification exam score **35–59 marks**: **12 Marks total**
    - Certification exam score **60 and above**: **Full 15 Marks**
3. **Part 2** requires students to implement a **Convolutional Neural Network (CNN)** model using a **Kaggle dataset**, demonstrating the deep learning workflow both manually and using AI tools.
    - **Part 2(a):** Must be implemented manually using Python (TensorFlow/Keras) **without AI assistance**.
    - **Part 2(b):** Must demonstrate the same workflow using **AI tools** such as ChatGPT, Bard (Gemini), GitHub Copilot, or similar platforms.
4. Each group/student must use **one assigned Kaggle dataset** from the provided list or any other **faculty-approved dataset** relevant to CNN-based deep learning tasks.
5. The **maximum marks** for the assignment are **30**.
    - **Part 1:** 15 Marks (Infosys Certification)
    - **Part 2:** 15 Marks (Manual + AI CNN Project)
6. The assignment must be **neatly word-processed** as per the prescribed format. Handwritten submissions will not be accepted.
7. The **maximum number of pages** for the report should be **10**, including screenshots, outputs, and references.
8. The following must be included in the final submission:
    - Infosys Springboard certificate (with score proof if available)
    - CNN model code and visual outputs (accuracy/loss plots, confusion matrix)
    - AI tool screenshots, prompts, and reflection answers
9. The **printed copy** of the assignment must be submitted to the course leader on or before the due date.
10. **Submission Date:** 20-12-2025
11. **Late submissions** after the due date will **not be accepted** under any circumstances.
12. All sources (datasets, research articles, AI-generated content, or code snippets) used in the assignment must be **properly cited and referenced** in the report.
13. **Marks will be awarded** only for sections and subsections **clearly labeled and addressed** as per the assignment structure.
14. Students are expected to maintain **academic integrity** and demonstrate **ethical use of AI tools** throughout the assignment process.

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## Preamble:

This assignment aims to strengthen students' understanding of Machine Learning, Deep Learning and Neural Networks through both guided certification and practical project implementation. Students will complete an online certification course on Infosys Springboard and develop a CNN-based image classification project using Kaggle datasets. The activity enhances theoretical knowledge and practical skills in model building, training, and evaluation using frameworks like TensorFlow and Keras.

## Overview (30 Marks)

This assignment is designed to provide students with both theoretical and practical experience in Deep Learning.
It consists of two integrated parts:

- **Part 1** focuses on completing the *TechA Deep Learning and Neural Network Certification* from Infosys Springboard, which introduces foundational concepts such as Artificial Neural Networks (ANN), Convolutional Neural Networks (CNN), and Keras/TensorFlow.
- **Part 2** requires students to apply this knowledge by designing a CNN-based image classification model manually and optionally with AI tool support, encouraging critical reflection on the responsible use of AI in learning.

## Part 1 – TechA Deep Learning and Neural Network Certification (15 Marks)

Students are required to complete the **TechA Deep Learning and Neural Network Certification** available on **Infosys Springboard**.
This certification introduces essential concepts and tools such as ANN, CNN, data augmentation, Keras, TensorFlow, R, and Python.

**Certification Link:**
https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_013823396111933440557_shared/overview#iss=https:/infyspringboard.onwingspan.com/auth/realms/infyspringboard&iss=https://infyspringboard.onwingspan.com/auth/realms/infyspringboard

***Steps to Complete:***

1. Enroll in the course using the link above.
2. Complete all pre-content modules:
    - *Deep Learning Neural Network with R* (3h 26m)
    - *Deep Learning Architecture for Building Artificial Neural Networks* (2h 42m)
    - *Deep Learning with Keras* (2h 21m)
3. On completion, take the certification exam, **download the certificate** from the Infosys Springboard portal.
4. Submit the **certificate screenshot or PDF** as proof to earn 15 marks.

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# Part 2 – End-to-End Deep Learning Workflow (Manual and AI-Assisted CNN Project) (15 Marks)

This part of the assignment will strengthen your understanding of CNNs through hands-on data preprocessing, model construction, evaluation, and visualization.
You will also critically analyze the usefulness, reliability, and ethical implications of using AI tools in coding.

## *Recommended Kaggle Datasets:*

| No. | Dataset Title | Kaggle Link |
|---|---|---|
| 1 | MNIST Handwritten Digits | https://www.kaggle.com/datasets/oddrationale/mnist-in-csv |
| 2 | CIFAR-10 Image Classification | https://www.kaggle.com/datasets/krishbhatt/cifar10-cnn-classification |
| 3 | Cats vs Dogs | https://www.kaggle.com/datasets/tongpython/cat-and-dog |
| 4 | Plant Disease Recognition | https://www.kaggle.com/datasets/emmarex/plantdisease |
| 5 | Brain Tumor MRI Dataset | https://www.kaggle.com/datasets/navoneel/brain-mri-images-for-brain-tumor-detection |
| 6 | Fashion MNIST | https://www.kaggle.com/datasets/zalando-research/fashionmnist |
| 7 | Traffic Sign Recognition | https://www.kaggle.com/datasets/serraldo/traffic-signs-classification |
| 8 | Chest X-Ray Pneumonia | https://www.kaggle.com/datasets/paultimothymooney/chest-xray-pneumonia |
| 9 | Fruit and Vegetable Image Recognition | https://www.kaggle.com/datasets/moltean/fruits |
| 10 | Dog Breed Identification | https://www.kaggle.com/datasets/jessicali9530/stanford-dogs-dataset |
| 11 | Human Emotion Detection from Images | https://www.kaggle.com/datasets/msambare/fer2013 |
| 12 | Leaf Disease Detection | https://www.kaggle.com/datasets/abdallahalidev/plantvillage-dataset |
| 13 | Waste Classification | https://www.kaggle.com/datasets/techsash/waste-classification-data |
| 14 | Rice Leaf Disease Dataset | https://www.kaggle.com/datasets/vbookshelf/rice-leaf-diseases |

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| Part / Section | Task Description | Marks |
|---|---|---|
| **2.1 Manual Deep Learning Workflow** | **Objective: Apply concepts learned from the TechA certification to build a CNN model manually using Python (TensorFlow/Keras).** | **10** |
| **2.2 Conceptual Understanding** | List essential Python libraries used in Deep Learning (TensorFlow, Keras, NumPy, Matplotlib, OpenCV, etc.) and explain the purpose of each in one line. Briefly describe different neural network types (ANN, CNN, RNN) and where each is used. | **3** |
| **2.3 Data Preparation and Preprocessing** | a) Define the problem to be solved using the selected Kaggle dataset (e.g., classification or detection).<br>b) Explain dataset structure, features, and labels.<br>c) Write Python code to:<br>d) Load and explore the dataset<br>e) Preprocess the data (resizing, normalization, augmentation). | **4** |
| **2.4 CNN Model Development and Evaluation** | a) Build a CNN architecture manually using Keras/TensorFlow.<br>b) Train and evaluate the model using metrics such as Accuracy, Precision, Recall, and F1-Score.<br>c) Create at least three visualizations including one evaluation plot (e.g., confusion matrix or accuracy/loss curve).<br>d) Interpret results: identify if the model overfits, underfits, or generalizes well.<br>e) Submit complete code, graphs, and model summary. | **8** |
| **Deep Learning Workflow Using AI Tools** | **Objective: Use AI tools to assist in designing, coding, and analyzing your CNN model. Compare the process and outputs to your manual implementation.** | **5** |
| **2.5 AI Tool Usage** | Use one or more AI tools (ChatGPT, Bard/Gemini, GitHub Copilot, etc.) to generate or optimize your CNN code.<br>a) Clearly mention the AI tool used.<br>b) Document prompts/inputs and generated outputs/code suggestions (include screenshots). | **2** |
| **2.6 Comparative Analysis** | Compare AI-assisted and manual implementations:<br>a) Differences in code structure, performance, or efficiency.<br>b) Advantages and drawbacks of using AI tools. | **2** |

| Part / Section | Task Description | Marks |
|---|---|---|
| | c) Did AI help in debugging or improving your understanding? | |
| **2.7 Reflection & Ethical Awareness** | Answer briefly in 5–6 lines:<br>a) How was the experience different from doing it manually? 2.<br>b) Do you trust AI-generated code completely? Why or why not?<br>c) Mention any ethical or academic integrity concerns about AI-assisted work. *(Attach screenshots of AI conversations and model outputs.)* | **1** |
| **Total Marks** | | **15** |

## Submission Details

- **Submission Date:** 20-12-2025
- **Total Marks:** 30
- **Include:**
  - Infosys Springboard certification screenshot (Part 1 evidence)
  - CNN model code, evaluation plots, and model summary
  - AI tool usage documentation and reflection answers
- **Late submissions will not be accepted.**
- The report must be **word-processed**, **neatly formatted**, and limited to **10 pages**.
- Ensure proper **citations and dataset references** are included.

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# Student AI Usage Survey Form

**Post-Assignment Survey: Impact of AI Tools on Learning and Ethical Awareness in Higher Education**

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## Form Introduction

Dear Student,

This survey is part of a research study titled **"Impact of Generative AI Tools on Learning Behavior, Performance, and Ethical Awareness in Higher Education."**

The purpose is to understand how completing the **Infosys TechA Deep Learning and Neural Network Certification** and the **AI-assisted CNN project** has influenced your learning, confidence, and awareness of responsible AI usage.

Your responses will remain **anonymous** and will be used purely for academic research. Please answer all questions honestly.

1. **Have you completed the TechA Deep Learning and Neural Network Certification on Infosys Springboard?** *(Multiple choice)*
    - Yes
    - No
    - In progress

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## Section 2: AI Usage During the Assignment

6. **Which AI tools did you use during your CNN project?** *(Checkboxes)*
    - ChatGPT
    - Bard / Gemini
    - GitHub Copilot
    - Claude
    - None
    - Other (please specify)
7. **How often did you use AI tools while working on your CNN project?** *(Multiple choice)*
    - Daily
    - 2–3 times a week
    - Once a week
    - Rarely
    - Never
8. **For what purpose did you mainly use AI tools in this assignment?** *(Checkboxes)*
    - Understanding concepts
    - Code generation or debugging
    - Data preprocessing or visualization help
    - Writing reports or explanations
    - Getting feedback or corrections
    - Other (please specify)

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## Section 3: Learning Impact

9. **After using AI tools and completing this assignment, how has your understanding of Deep Learning changed?** *(Multiple choice)*
    - Improved significantly
    - Improved somewhat
    - No change
    - Decreased
10. **How confident are you now in building and evaluating a CNN model independently?** *(Linear scale: 1–5)*
    *(1 = Not confident at all, 5 = Very confident)*
11. **Which of the following skills do you think AI tools helped you improve the most?** *(Checkboxes)*

- Coding and debugging
- Data handling and visualization
- Concept understanding
- Report writing and documentation
- None

12. **Did the integration of AI tools make learning more engaging for you?** *(Multiple choice)*

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

13. **Did AI assistance help you perform better in the assignment (compared to manual work)?** *(Multiple choice)*

- Yes, significantly better
- Slightly better
- No difference
- Manual work was better

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## Section 4: Ethical Awareness and Perceptions

14. **Do you believe using AI tools without acknowledgment constitutes academic misconduct?** *(Multiple choice)*

- Yes
- No
- Not sure

15. **How aware are you of your institution's academic integrity policies regarding AI tool usage?** *(Multiple choice)*

- Fully aware
- Somewhat aware
- Not aware

16. **Did this assignment increase your awareness of responsible and ethical AI usage?** *(Multiple choice)*

- Yes, significantly
- Somewhat
- No change

17. **Which of the following concerns do you have about AI tools in education?** *(Checkboxes)*

- Over-reliance on AI
- Accuracy or bias in AI responses
- Academic dishonesty / plagiarism
- Data privacy
- Reduced creativity or effort
- None

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## 💬 Section 5: Reflection and Feedback

18. **In one sentence, describe how AI tools have changed your learning approach after this assignment.** *(Paragraph)*

19. **Would you recommend integrating AI tools into other subjects or courses? Why or why not?** *(Paragraph)*

20. **Rate your overall learning experience in this AI-integrated assignment.** *(Linear scale: 1–5)*

    *(1 = Poor, 5 = Excellent)*

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## 🌟 Optional Extension (for Novelty Measurement):

21. **Compare your learning experience with previous (non-AI) assignments.** *(Multiple choice)*

- Much better
- Slightly better
- About the same
- Worse

22. **Would you like formal workshops or training on responsible AI use in academics?** *(Multiple choice)*

- Yes
- No
- Maybe

DRIVE LINK FOR Assignment Presentation