# Project Design Phase-II
# Technology Stack (Architecture & Stack)

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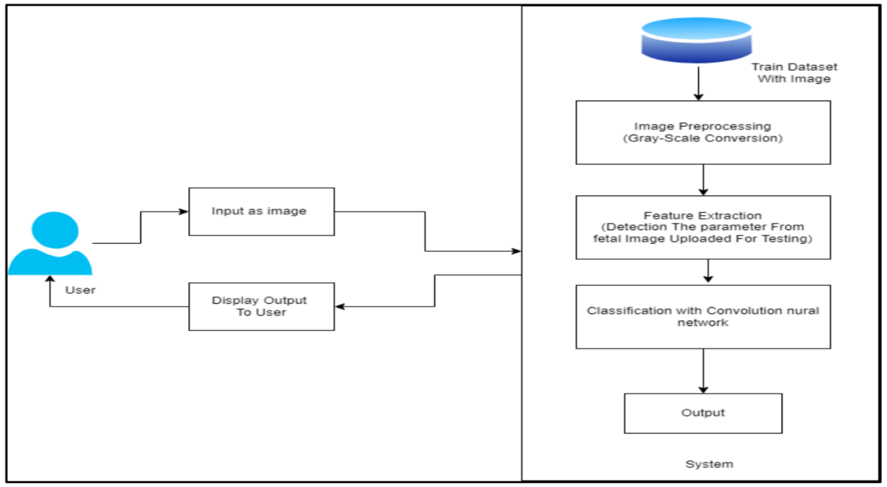
| Date | 01 November 2023 |
| Team ID | Team-593148 |
| Project Name | Fake/Real Logo detection using Deep Learning |
| Maximum Marks | 4 Marks |

**Technical Architecture:**

The Deliverable shall include the architectural diagram as below and the information as per the table1.

## Fake/Real Logo Detection Using Deep Learning

**Reference:** https://www.irjmets.com/uploadedfiles/paper//issue_5_may_2023/40937/final/fin_irjmets1685567608.pdf



Train Dataset With Image
Image Preprocessing (Gray-Scale Conversion)
Feature Extraction (Detection The parameter From fetal Image Uploaded For Testing)
Classification with Convolution nural network
Output
System
Input as image
Display Output To User
User

Guidelines:

1. Include all the processes (As an application logic / Technology Block)
2. Provide infrastructural demarcation (Local / Cloud)
3. Indicate external interfaces (third party API's etc.)
4. Indicate Data Storage components / services
5. Indicate interface to machine learning models (if applicable)

**Table-1 : Components & Technologies:**

| S.No | Component | Description | Technology |
|---|---|---|---|
| 1. | Deep learning Framework | Popular deep learning framework that provide a wide range of tools for building and training deep neural networks | TensorFlow / PyTorch |
| 2. | Neural Network Architecture | Commonly used architecture for image classification tasks | VGG16 / ResNet / EfficientNet |
| 3. | Data Preprocessing | Useful for image preprocessing tasks, such as resizing, normalization, and data augmentation. | OpenCV |
| 4. | Data Augmentation | This tool can help you generate augmented training data, which is crucial for improving the model’s generalization | Keras ImageDataGenerator |
| 5. | Transfer Learning | Utilize pretrained models on large image datasets like ImageNet to benefit from learned features. You can fine-tune these models on your logo dataset. | Pertain Models like ImageNet |
| 6. | Model Training | Use GPU-accelerated environments for faster training times, especially if you're working with large datasets and complex models. | NVIDIA CUDA |
| 7. | Hyperparameter Tuning | TensorFlow's or PyTorch's built-in tools for hyperparameter tuning. | TensorFlow or PyTorch |
| 8. | Deployment | For building a web application to deploy the model.<br><br>For serving the trained model in a production environment | Flask / Django<br><br>TensorFlow Serving / ONNX Runtime |

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|---|---|---|---|
| 9. | Frontend | For buildings the user interface | HTML / CSS / JavaScript |
| 10. | Database | To store and manage user data or other relevant information | MySQL / postgreSQL / MongoDB |
| 11. | Containerization | For containerizing the application, making it easier to deploy and manage across different environments. | Docker |
| 12. | Version Control | For version control of your codebase | Git |
| 13. | Continuous Integration / Continuous Deployment | Automate the testing and deployment the processes | Jenkins / GitLab CI / GitHub Actions |
| 14. | Monitoring and Logging | Tools for monitoring the application's performance | Prometheus / Grafana |
| 15. | Authentication and Authorization | Implement user authentication to secure access to your application | OAuth / JWT |

**References:**

1) Alireza Alaei and Mathieu Delalandre. 2014. A complete logo detection/recognition system for document images. In Proceedings of the 11th IAPR International Workshop on Document Analysis Systems. 324–328.

2) Marisa Bernabeu, Antonio Javier Gallego, and A. Pertusa. 2022. Multi-label logo recognition and retrieval based on weighted fusion of neural features. Retrieved from https://arXiv:2205.05419

3) Simone Bianco, Marco Buzzelli, Davide Mazzini, and Raimondo Schettini. 2017. Deep learning for logo recognition. Neurocomputing 245 (2017), 23–30.

4) Alexey Bochkovskiy, Chien Yao Wang, and H. Liao. 2020. YOLOv4: Optimal speed and accuracy of object detection. Retrieved from https://arXiv:2004.10934

5) Raluca Boia, Corneliu Florea, and Laura Florea. 2015. Elliptical ASIFT agglomeration in class prototype for logo detection. In Proceedings of the British Machine Vision Conference. 115.1–115.12.