# NEUFOLOGY

## Projects Latest Titles 2025-26

## 1. Artificial Intelligence (AI) neufology

- **P-001-AI**
  - **Title:** XAI-Medical-Image-Analyzer
  - **Domain:** Explainable AI (XAI) for Medical Imaging
  - **Objective:** To develop and evaluate a deep learning model for classifying medical images (e.g., chest X-rays for pneumonia) and to provide a human-interpretable explanation for the model's predictions. The focus is on implementing and comparing multiple XAI techniques like LIME and SHAP to build trust with medical professionals.
- **P-002-AI**
  - **Title:** Privacy-Preserving-Federated-Learning
  - **Domain:** Federated Learning (FL) for Privacy
  - **Objective:** To design and implement a federated learning framework that trains a shared machine learning model across multiple distributed devices (e.g., IoT sensors) without the need to centralize the raw data. The project aims to enhance data privacy and reduce communication overhead.
- **P-003-AI**
  - **Title:** Generative-AI-for-Data-Augmentation
  - **Domain:** Generative AI for Machine Learning
  - **Objective:** To explore and implement Generative Adversarial Networks (GANs) or diffusion models to create high-quality synthetic data for data augmentation. This project addresses the challenge of data scarcity in specialized domains like medical imaging or rare event detection, aiming to improve the robustness and generalization of downstream models.
- **P-004-AI**
  - **Title:** AI-Driven-Fraud-Detection
  - **Domain:** Predictive Analytics & Finance
  - **Objective:** To build a real-time anomaly detection system using machine learning models to identify and flag fraudulent financial transactions. The project would involve working with imbalanced datasets and techniques like Isolation Forests or Autoencoders.
- **P-005-AI**
  - **Title:** Multilingual-Mental-Health-Chatbot
  - **Domain:** Natural Language Processing (NLP) & Healthcare
  - **Objective:** To design and develop an AI chatbot that provides emotional support and resources in multiple languages. The project would focus on using advanced

NLP models like Hugging Face Transformers to understand emotional tones and respond empathetically.

- **P-006-AI**
  - **Title:** AI-in-Climate-Change-Modeling
  - **Domain:** Environmental Science & Predictive Analytics
  - **Objective:** To apply machine learning models, such as LSTMs or other time-series models, to predict climate variables like temperature, precipitation, or sea level rise. This project would leverage large-scale climate datasets to improve the accuracy and efficiency of climate modeling compared to traditional methods.
- **P-007-AI**
  - **Title:** AI-Based-Resume-Screener
  - **Domain:** NLP & Human Resources
  - **Objective:** To develop an AI model that automates the resume screening process for HR teams. The system would use NLP techniques to extract key information and score resumes based on job description relevance.
- **P-008-AI**
  - **Title:** Smart-Traffic-Management-System
  - **Domain:** Smart Cities & Computer Vision
  - **Objective:** To use computer vision and deep learning to analyze traffic patterns from real-time video feeds. The objective is to predict traffic congestion and recommend optimal routes to reduce travel time and fuel consumption.
- **P-009-AI**
  - **Title:** Emotion-Recognition-from-Facial-Expressions
  - **Domain:** Computer Vision & Affective Computing
  - **Objective:** To train a Convolutional Neural Network (CNN) to recognize and classify human emotions from real-time video or still images. The project would involve using datasets like FER-2013 to achieve accurate emotion detection.
- **P-010-AI**
  - **Title:** AI-Powered-Drug-Discovery
  - **Domain:** Deep Learning & Bioinformatics
  - **Objective:** To develop a deep learning model, such as a Graph Neural Network (GNN), to predict the binding affinity of small molecules to a target protein. This project aims to accelerate the early stages of the drug discovery pipeline by simulating molecular interactions.
- **P-011-AI**
  - **Title:** Personalized-Recommendation-Engine
  - **Domain:** Machine Learning & E-commerce
  - **Objective:** To build a recommendation system that suggests products or content to users based on their past behavior, preferences, and interactions. The project would explore collaborative filtering and content-based filtering techniques.
- **P-012-AI**
  - **Title:** Automated-Essay-Scoring-with-NLP
  - **Domain:** NLP & Education

    - **Objective:** To create a machine learning model that automatically evaluates and scores essays based on criteria like grammar, coherence, and content. The project would involve training the model on a large dataset of graded essays.
- **P-013-AI**
    - **Title:** Predictive-Maintenance-for-IoT-Devices
    - **Domain:** IoT & Predictive Analytics
    - **Objective:** To develop a model that uses time-series data from IoT sensors to predict when equipment or machinery will fail. The goal is to enable proactive maintenance, reducing downtime and operational costs.
- **P-014-AI**
    - **Title:** Generative-AI-for-Code-Documentation
    - **Domain:** Generative AI & Software Engineering
    - **Objective:** To fine-tune a large language model (LLM) to automatically generate comprehensive and accurate documentation for code snippets. This project aims to streamline the development process and improve code maintainability.
- **P-015-AI**
    - **Title:** Satellite-Image-Analysis-for-Agriculture
    - **Domain:** Computer Vision & Smart Agriculture
    - **Objective:** To use deep learning models to analyze satellite or drone imagery to monitor crop health, predict yields, and detect plant diseases. The project would leverage computer vision to provide actionable insights for farmers.
- **P-016-AI**
    - **Title:** Secure-IoT-Data-with-Blockchain-AI
    - **Domain:** Blockchain, IoT & Cybersecurity
    - **Objective:** To implement a secure data exchange framework for IoT devices by combining blockchain for data integrity and AI for anomaly detection. This project would focus on using smart contracts for device authentication and machine learning for identifying security threats.
- **P-017-AI**
    - **Title:** DeepFake-Voice-Forger-Detector
    - **Domain:** Audio Deep Learning & Cybersecurity
    - **Objective:** To create a deep neural network model capable of distinguishing between genuine human voices and AI-generated "deepfake" voices. The project would involve training the model on a dataset of real and synthesized speech to identify subtle, tell-tale artifacts.
- **P-018-AI**
    - **Title:** DR-Early-Stage-Detection-with-CNN-RNN
    - **Domain:** Computer Vision & Healthcare
    - **Objective:** To develop a hybrid deep learning model combining Convolutional Neural Networks (CNNs) and Recurrent Neural Networks (RNNs) for the early detection and classification of diabetic retinopathy from retinal fundus images. The CNN would extract spatial features, while the RNN would analyze sequences of image patches for a more robust diagnosis.
- **P-019-AI**

    - **Title:** Cyberbullying-Detection-with-NLP
    - **Domain:** Natural Language Processing (NLP)
    - **Objective:** To build an effective machine learning model that automatically detects and classifies instances of cyberbullying in social media text. The project would involve feature engineering using NLP techniques and training various classifiers to achieve high accuracy.
- **P-020-AI**
    - **Title:** Stock-Price-Prediction-with-Time-Series-Analysis
    - **Domain:** Predictive Analytics & Finance
    - **Objective:** To develop a machine learning model that forecasts future stock prices using a combination of historical market data, sentiment analysis from news articles, and time-series analysis techniques. The project would focus on optimizing the model's predictive performance and demonstrating its real-world applicability.
- **P-021-AI**
    - **Title:** Advancing Fake News Detection: Hybrid Deep Learning With FastText and Explainable AI
    - **Domain:** Deep Learning & Explainable AI
    - **Objective:** To create a fake news detection system using XLNet, FastText, and CNNs for accuracy, combined with Explainable AI techniques like SHAP to ensure transparency and reliability in misinformation identification.
- **P-022-AI**
    - **Title:** Machine Learning Based Approaches and Comparisons for Estimating Missing Meteorological Data
    - **Domain:** Machine Learning & Nuclear Energy Applications
    - **Objective:** To develop and compare machine learning models for accurately estimating missing meteorological parameters, specifically Snowpack Depth, which is crucial for nuclear energy applications. The project aims to identify the most effective predictive model among Linear Regression, Random Forest, and XGBoost Regressor.
- **P-023-AI**
    - **Title:** Explainable Deep Learning Network With Transformer and Custom CNN for Bean Leaf Disease Classification
    - **Domain:** Deep Learning & Smart Agriculture
    - **Objective:** To develop an efficient and accurate deep learning system for the classification of bean leaf diseases to support smart agriculture practices. This project uses CNN architectures like DenseNet and MobileNet to accurately classify bean plant health into healthy, angular leaf spot, and bean rust categories.
- **P-024-AI**
    - **Title:** Weapon Detection with Audio Alert using EfficientDet
    - **Domain:** Deep Learning & Public Safety

    - **Objective:** To develop an automated, real-time weapon detection system that identifies weapons and triggers an audio alert to warn authorities or nearby personnel. It uses the EfficientDet deep learning model.
- **P-025-AI**
    - **Title:** Improving Sleep Disorder Diagnosis Through Optimized Machine Learning Approaches
    - **Domain:** Machine Learning & Healthcare
    - **Objective:** To develop and compare machine learning models to accurately classify Sleep Apnea, Insomnia, and healthy individuals, and deploy them in a web application for accessible, efficient sleep disorder diagnosis.
- **P-026-AI**
    - **Title:** Developing a Transparent Anemia Prediction Model Empowered With Explainable Artificial Intelligence
    - **Domain:** Deep Learning & Healthcare
    - **Objective:** To develop an accurate and interpretable machine learning model for anemia prediction using medical and demographic data. By integrating explainable AI techniques such as LIME and SHAP, the model aims to support clinical decision-making with transparent insights.

## 2. Deep Learning (DL) neufology

- **P-001-DL** - **Advancing Fake News Detection:** This project uses a hybrid deep learning approach with XLNet, FastText, and CNNs, combined with Explainable AI (XAI) techniques like SHAP, to detect fake news and provide transparent explanations.

- **P-002-DL** - **EffNet SVM: A Hybrid Model for Diabetic Retinopathy Classification:** The objective is to develop a computer-aided diagnosis system for diabetic retinopathy using a hybrid model that combines EfficientNetV2 Small for feature extraction with a Support Vector Machine (SVM) classifier.

- **P-003-DL** - **An Explainable Deep Learning Network With Transformer and Custom CNN for Bean Leaf Disease Classification:** This project focuses on creating an efficient deep learning system for classifying bean leaf diseases using advanced computer vision techniques, specifically DenseNet and MobileNet CNN architectures, to automate disease detection in agriculture.

- **P-004-DL** - **Weapon Detection with Audio Alert using EfficientDet:** The goal is to develop a real-time, automated weapon detection system using the EfficientDet deep learning model to identify weapons and trigger an audio alert.

- **P-005-DL** - **COCO object detection:** This project aims to design and implement a real-time object detection system that is accurate, fast, and user-friendly, using the YOLOV8 and YOLOv9 models for applications in video surveillance, smart traffic management, and public safety.

- **P-006-DL** - **Developing a Transparent Anemia Prediction Model Empowered With Explainable Artificial Intelligence:** The objective is to develop an accurate and interpretable deep learning model for anemia prediction, integrating XAI techniques like LIME and SHAP to support clinical decision-making.

- **P-007-DL** - **A Novel Image Segmentation Technique for Improving Plant Disease Classification With Deep Learning Models:** This project focuses on developing a deep learning-based system to segment leaf regions in images for plant disease detection using models like UNet++, DeepLabV3, and Swin Transformer, deployed via a Flask web application.

- **P-008-DL** - **Capsule Endoscopy Classification using Inceptionv3:** The project involves developing an AI-powered web application using a custom InceptionV3 model to classify Wireless Capsule Endoscopy (WCE) images into categories like Normal, Ulcer, and AVM.

- **P-009-DL** - **Detecting Human Life During Fire:** This project aims to create a real-time detection system using YOLOv8 and YOLOV9 to identify humans, fire, and smoke in emergency situations.

- **P-010-DL** - **Enhancing Phishing Detection:** This study proposes an advanced phishing detection framework that combines feature selection with deep learning models,

including Graph Convolutional Network (GCN), Tab Transformer, Autoencoder, Feedforward Neural Network (FNN), and Deep Neural Network (DNN).

- **P-011-DL** - **Improving Cardiovascular Disease Prediction With Deep Learning and Correlation Aware SMOTE:** The project introduces a comprehensive cardiovascular disease prediction system developed using a Flask-based web application seamlessly integrated with multiple machine learning models.
- **P-012-DL** - **Migration of Deep Learning Models Across Ultrasound Scanners:** The primary objective of this project is to evaluate and enhance the migration performance of deep learning models across heterogeneous ultrasound scanners for the task of breast ultrasound image classification.

## 3. Machine Learning (ML) neufology

- **P-001-ML**
  - **Title:** Machine Learning Based Approaches and Comparisons for Estimating Missing Meteorological Data and Determining the Optimum Data Set in Nuclear Energy Applications
  - **Domain:** ML
  - **Objective:** To develop and compare machine learning based models for accurately estimating missing meteorological parameters, specifically Snowpack Depth, which is crucial for nuclear energy applications. The study aims to identify the most effective predictive model among Linear Regression, Random Forest, and XGBoost Regressor, and apply Explainable AI (XAI) techniques to enhance interpretability and optimize the input feature set.
- **P-002-ML**
  - **Title:** Advanced Fraud Detection Leveraging KSMOTEENN and Stacking Ensemble to Tackle Data Imbalance and Extract Insights
  - **Domain:** ML
  - **Objective:** Develop an AI powered fraud detection system using CNN and LSTM models to accurately classify financial transactions, handle data imbalance, and provide explainable predictions through LIME for transparent decision making.
- **P-003-ML**
  - **Title:** Improving Sleep Disorder Diagnosis Through Optimized Machine Learning Approaches
  - **Domain:** ML
  - **Objective:** Develop and compare machine learning models to accurately classify Sleep Apnea, Insomnia, and Healthy individuals, and deploy them in a Flask web application for accessible, efficient sleep disorder diagnosis.
- **P-004-ML**

    - **Title:** Machine Learning in Hospitality Interpretable Forecasting of Booking Cancellations
    - **Domain:** ML
    - **Objective:** To develop a machine learning model to predict hotel booking cancellations using historical data.
- **P-005-ML**
    - **Title:** Addressing Adversarial Attacks in IoT Using Deep Learning Models AI
    - **Domain:** ML
    - **Objective:** To develop and evaluate four classification models- CNN, GRU, Random Forest, and Stacking Classifier-for detecting 11 types of adversarial attacks in IoT networks..
- **P-006-ML**
    - **Title:** Enhancing Defect Classification in Solar Panels with Electroluminescence Imaging and Advanced Machine Learning Strategies
    - **Domain:** ML
    - **Objective:** The objective of this project is to design and implement an automated system for detecting and classifying defects in solar panels using Electroluminescence (EL) imaging combined with advanced deep learning algorithms. The project aims to leverage the capabilities of YOLOV8 and YOLOV9 object detection models to accurately identify common faults such as microcracks, broken finger lines, and inactive regions in solar cells.
- **P-007-ML**
    - **Title:** Predicting the Classification of Heart Failure Patients Using Optimized Machine Learning Algorithms
    - **Domain:** ML
    - **Objective:** The primary objective of this project is to develop an accurate and efficient machine learning based system for predicting the classification of heart failure patients based on their risk of mortality. The system aims to analyze critical clinical parameters to identify high risk individuals, enabling early diagnosis and timely medical intervention. Specifically, the project utilizes two predictive models: a Decision Tree Classifier for baseline comparison and a Long Short Term Memory (LSTM) neural network optimized using Particle Swarm Optimization (PSO) to enhance prediction performance.
- **P-008-ML**
    - **Title:** Intrusion Detection and Prevention System IDPS Model for IIoT Environments Using Hybridized Framework
    - **Domain:** ML
    - **Objective:** The objective of this study is to design and implement a highly accurate and scalable Intrusion Detection and Prevention System (IDPS) tailored for Industrial Internet of Things (IIoT) environments. By utilizing a hybrid machine learning approach that integrates XGBoost with a Stacking Classifier framework, the proposed system aims to enhance intrusion detection accuracy, minimize response time, and address the limitations of existing deep learning models such as CNNs, which often suffer from overfitting and poor generalization. Validated

using the NSL KDD dataset, this model demonstrates superior performance in detecting diverse attack patterns with high precision, recall, and F1 score. The ultimate goal is to provide a real time, reliable security mechanism capable of protecting critical IIoT infrastructures from evolving cyber threats while ensuring operational continuity.

- **P-009-ML**
  - **Title:** Aerial Image Classification in Post Flood Scenarios Using Robust Deep Learning and Explainable Artificial Intelligence
  - **Domain:** ML
  - **Objective:** The certain objectives this study intends to achieve by developing a robust deep learning system in post flood aerial image classification using MobileNet and DenseNet architectures are Classes: building, flooded, forest, mountains, sea, and street in aerial images. The study also aspires for the integrated use of Explainable Artificial Intelligence (XAI) techniques because Grad CAM provides visual explanations for model output predictions so that model transparency and trust could be achieved. This, with plenty of hope, will come in handy when it comes to effective assessment by disaster management professionals during and after flooding.
- **P-010-ML**
  - **Title:** Transfer Learning Based Ensemble Approach for Rainfall Class Amount Prediction
  - **Domain:** ML
  - **Objective:** The objective of this project is to accurately predict the occurrence of rainfall using meteorological data by leveraging a hybrid ensemble model. It aims to enhance forecasting reliability through a Voting Classifier combining Random Forest and MLP.
- **P-011-ML**
  - **Title:** Heart Sync Ensemble for Heart Disease Prediction Using Ensemble Learning with SMOTE
  - **Domain:** ML
  - **Objective:** The primary objective of this research is to develop HeartSync Ensemble, a predictive framework that accurately identifies the risk of heart disease using a blend of machine learning and deep learning techniques, to address class imbalance in heart disease datasets using the Synthetic Minority Oversampling Technique (SMOTE), thereby enhancing model fairness and recall.
- **P-012-ML**
  - **Title:** MPD A Meteorological and Pollution Dataset A Comprehensive Study of Machine and Deep Learning Methods for Air Pollution Forecasting
  - **Domain:** ML
  - **Objective:** To build a predictive model that classifies the air quality of Indian cities into three categories: Good, Moderate, and Poor based on pollutant concentration levels, using various supervised machine learning algorithms.

- **P-013-ML**
  - **Title:** Enhancing Medicare Fraud Detection Through Machine Learning Addressing Class Imbalance With SmoteEnn
  - **Domain:** ML
  - **Objective:** The objective of this project is to improve the efficiency and accuracy of detecting Medicare fraud by leveraging SMOTE ENN to balance datasets and employing advanced machine learning algorithms for robust fraud identification.
- **P-014-ML**
  - **Title:** Statistical Insights Into Machine Learning Models for Predicting Under Five Mortality
  - **Domain:** ML
  - **Objective:** The objective of this project is to predict under five mortality using machine learning models by applying feature selection, data balancing, and ensemble methods. It aims to identify key risk factors, enhance predictive accuracy, and provide insights to guide public health policies targeting child mortality reduction across different regions.
- **P-015-ML**
  - **Title:** Multiple disease of Kidney Heart
  - **Domain:** ML
  - **Objective:** The primary objective of this project is to design and implement a multiple disease detection framework that can accurately identify both kidney and heart diseases using machine learning and deep learning models.
- **P-016-ML**
  - **Title:** Artificial Flora Algorithm Based Feature Selection With Support Vector Machine for Cardiovascular Disease Classification
  - **Domain:** ML
  - **Objective:** The primary objective of this project is to design and implement a robust machine learning based classification system for cardiovascular disease (CVD) detection and severity assessment using an optimized feature selection mechanism. Specifically, the project aims to integrate the Artificial Flora Algorithm (AFA) for selecting the most relevant features from medical and behavioral data inputs, which include age, gender, chest pain type, fasting blood sugar, heart rate, and slope of the ST segment. These features will be used to predict not just the presence of heart disease, but also its severity level-categorized into normal, mild, moderate, and severe.
- **P-017-ML**
  - **Title:** An Explainable Artificial Intelligence Model for the Classification of Breast Cancer
  - **Domain:** ML
  - **Objective:** The primary objective of this project is to develop an Explainable Artificial Intelligence (XAI) model for the classification of breast cancer using a combination of machine learning and deep learning algorithms. Specifically, the project aims to: (1) implement CatBoost, LSTM, MLP, and CNN models to analyze breast cancer datasets; (2) compare the performance of these models in

terms of classification accuracy and computational efficiency; and (3) integrate explainability tools such as SHAP or LIME to visualize and interpret the decision making process of each model. The ultimate goal is to assist medical professionals in understanding model outputs, identifying the most important tumor related features, and making informed clinical decisions based on reliable AI support.

- **P-018-ML**
    - **Title:** Ad Click Fraud Detection Using Machine Learning and Deep Learning Algorithms
    - **Domain:** ML
    - **Objective:** This project focuses on detecting fraudulent ad clicks in mobile advertising, a growing concern causing major financial losses. Using a dataset with features like IP address, app ID, device type, and timestamps, the system predicts whether a click results in an actual app download. A wide range of machine learning models-such as Logistic Regression, Random Forest, SVM, XGBoost, and LightGBM-alongside deep learning models including ANN, CNN, LSTM, and GRU were implemented. A Stacking Classifier further improves performance by combining multiple models. The system is deployed via a Flask web application, enabling users to input click data and receive real time fraud predictions.
- **P-019-ML**
    - **Title:** Financial Market Trend Analysis with Time Series Clustering
    - **Domain:** ML & Finance
    - **Objective:** To develop a machine learning model that analyzes historical stock market data to identify recurring patterns or trends. The project would use time series clustering techniques to group similar market behaviors and predict future movements, providing insights for investment strategies.

**P-020-ML**

- **Title:** Crop Yield Prediction using Satellite Imagery and Environmental Data
- **Domain:** ML & Agriculture
- **Objective:** To build a predictive model that forecasts crop yields by integrating satellite imagery analysis with environmental variables such as temperature, rainfall, and soil moisture. The system would use regression models to provide farmers with actionable insights for optimizing their harvest.

**P-021-ML**

- **Title:** Customer Churn Prediction for E-commerce Platforms
- **Domain:** ML & Business Analytics
- **Objective:** To develop a machine learning model that predicts which customers are likely to stop using a service or platform. By analyzing user behavior, purchase history, and demographics, the model would identify at-risk customers, allowing the business to implement targeted retention strategies.

**P-022-ML**

- **Title:** Optimized Resource Allocation in Cloud Computing with Reinforcement Learning
- **Domain:** ML & Cloud Computing
- **Objective:** To design and implement a reinforcement learning agent that learns to dynamically allocate cloud resources (CPU, memory) to different applications to maximize efficiency and minimize costs. The project would focus on developing an agent that can adapt to changing workloads in real-time.

**P-023-ML**

- **Title:** Real-time Spam and Phishing Email Detection with Ensemble Learning
- **Domain:** ML & Cybersecurity
- **Objective:** To create a robust system for detecting spam and phishing emails in real-time. The project would use an ensemble of machine learning models, such as Random Forest and Gradient Boosting, to analyze email headers, content, and sender metadata to achieve high accuracy and low false positive rates.

## 4. Blockchain neufology

- **P-001-BC**
  - **Title:** Secure Voting System
  - **Domain:** Blockchain & Governance
  - **Objective:** To create a decentralized, tamper-proof voting system where each vote is a transaction on a blockchain. This ensures transparency, prevents fraud, and provides a publicly auditable record of the election results.
- **P-002-BC**
  - **Title:** Decentralized File Storage
  - **Domain:** Blockchain & Data Management
  - **Objective:** To develop a system that breaks files into encrypted chunks and distributes them across a network of nodes. The blockchain manages the file's metadata and access keys, ensuring data security and censorship resistance.
- **P-003-BC**
  - **Title:** Supply Chain Traceability
  - **Domain:** Blockchain & Logistics
  - **Objective:** To build a platform for tracking products from origin to consumer. Each stage of the supply chain is recorded as an immutable transaction on the blockchain, providing transparency and verifying the authenticity of goods.
- **P-004-BC**
  - **Title:** Non-Fungible Token (NFT) Marketplace

    - **Domain:** Blockchain & Digital Assets
    - **Objective:** To create a platform for users to mint, buy, and sell unique digital assets. Smart contracts would handle the ownership and transfer of NFTs, ensuring secure and direct transactions.
- **P-005-BC**
    - **Title:** Peer-to-Peer Energy Trading
    - **Domain:** Blockchain & IoT
    - **Objective:** To design a decentralized system for households with solar panels to trade excess energy with their neighbors. Smart contracts would automate the transactions based on real-time energy usage data from IoT devices.
- **P-006-BC**
    - **Title:** Digital Identity Management
    - **Domain:** Blockchain & Cybersecurity
    - **Objective:** To develop a self-sovereign identity platform where users have full control over their personal data. The blockchain would store cryptographic hashes of identity documents, allowing for verifiable and secure authentication without a central authority.
- **P-007-BC**
    - **Title:** Crowdfunding Platform
    - **Domain:** Blockchain & Finance
    - **Objective:** To build a decentralized crowdfunding application using smart contracts. This would automate the release of funds to project creators only when specific milestones are met, providing greater trust and accountability for investors.
- **P-008-BC**
    - **Title:** Digital Certificate Authenticity
    - **Domain:** Blockchain & Education
    - **Objective:** To create a system for issuing and verifying academic certificates on a blockchain. This would prevent forgery and allow employers to instantly verify the authenticity of a degree or professional certification.
- **P-009-BC**
    - **Title:** Real Estate Management
    - **Domain:** Blockchain & Real Estate
    - **Objective:** To develop a system for managing property ownership records and transactions on a blockchain. This would simplify property transfers, reduce fraud, and provide a transparent and secure record of ownership.
- **P-010-BC**
    - **Title:** Royalty Distribution for Artists
    - **Domain:** Blockchain & Music/Art
    - **Objective:** To build a platform that automates the distribution of royalties to artists. Smart contracts would automatically split revenue from music streams or art sales among all contributing parties, ensuring fair and transparent payments.
- **P-011-BC**
    - **Title:** Medical Records Management

    - **Domain:** Blockchain & Healthcare
    - **Objective:** To create a secure and interoperable system for storing and sharing patient medical records. The blockchain would ensure data integrity and give patients control over who can access their health information.
- **P-012-BC**
    - **Title:** Decentralized Social Media Platform
    - **Domain:** Blockchain & Social Media
    - **Objective:** To build a social network that is not controlled by a central corporation. The platform would use a blockchain to store user data and content, giving users more control over their privacy and monetizing their contributions directly.
- **P-013-BC**
    - **Title:** Betting and Gambling Platform
    - **Domain:** Blockchain & Gaming
    - **Objective:** To create a transparent and provably fair gambling platform. The blockchain's public ledger would record all bets and outcomes, ensuring that the games are not rigged and that all payouts are fair.
- **P-014-BC**
    - **Title:** Carbon Credit Trading
    - **Domain:** Blockchain & Environmental Science
    - **Objective:** To develop a blockchain-based market for trading carbon credits. This would create a transparent and verifiable system to track emissions and their reduction, preventing double-counting and fraud.
- **P-015-BC**
    - **Title:** Lending and Borrowing Platform (DeFi)
    - **Domain:** Blockchain & Finance
    - **Objective:** To build a decentralized finance (DeFi) protocol where users can lend or borrow cryptocurrency without a bank. Smart contracts would govern the terms of the loans, collateral, and interest rates.
- **P-016-BC**
    - **Title:** Domain Name System (DNS)
    - **Domain:** Blockchain & Web Services
    - **Objective:** To create a decentralized alternative to the traditional DNS. Users would register domain names as NFTs on the blockchain, providing a censorship-resistant and secure naming service.
- **P-017-BC**
    - **Title:** Sports Betting and Prediction Markets
    - **Domain:** Blockchain & Gaming
    - **Objective:** To build a decentralized application where users can place bets on sports outcomes or other real-world events. The platform would use a blockchain to ensure transparent odds and automated payouts through smart contracts.
- **P-018-BC**
    - **Title:** Data Monetization Platform
    - **Domain:** Blockchain & Data Economy

    - **Objective:** To develop a platform that allows users to securely sell their data to companies. The blockchain would manage data access permissions and payments, giving users control over their data and a way to monetize it.
- **P-019-BC**
    - **Title:** Insurance Claims Processing
    - **Domain:** Blockchain & Insurance
    - **Objective:** To create a system that automates the processing of insurance claims. Smart contracts would automatically release payouts to policyholders once predefined conditions for a claim are verified by an oracle (a service that provides external data to a smart contract).
- **P-020-BC**
    - **Title:** Digital Art Provenance
    - **Domain:** Blockchain & Art

## 5. Cybersecurity (CS) neufology

- **P-001-CS**
    - **Title:** Network Traffic Analyzer
    - **Domain:** Network Security
    - **Objective:** To develop a Python-based tool that uses libraries like Scapy to capture and analyze network packets. The project would focus on identifying common security threats, such as port scans, unencrypted data transfers, and unusual traffic patterns.
- **P-002-CS**
    - **Title:** Simple Intrusion Detection System (IDS)
    - **Domain:** Network Security
    - **Objective:** To build a basic IDS that monitors network or host activities for malicious behavior or policy violations. The system would log potential threats and send alerts, focusing on signature-based detection.
- **P-003-CS**
    - **Title:** Malware Signature Scanner
    - **Domain:** Malware Analysis
    - **Objective:** To create a file scanner that checks for known malware signatures (hashes). The project would involve building a database of malicious file hashes and developing a script to compare files on a system against the database.
- **P-004-CS**
    - **Title:** Password Strength Checker
    - **Domain:** Cryptography & Authentication
    - **Objective:** To develop a web-based application that evaluates the strength of a password in real-time. The system would analyze password characteristics like length, complexity, and commonality, and provide user-friendly feedback.
- **P-005-CS**

    - **Title:** Simple Ransomware Simulator
    - **Domain:** Ethical Hacking & Red Teaming
    - **Objective:** To create a non-malicious program that simulates the behavior of ransomware by encrypting dummy files in a controlled directory. The project's goal is to understand how ransomware works and develop a decryption key to restore the files.

- **P-006-CS**
    - **Title:** Cross-Site Scripting (XSS) Vulnerability Scanner
    - **Domain:** Web Security
    - **Objective:** To build a script that automatically tests web pages for XSS vulnerabilities. The tool would inject test payloads into forms and URLs to see if they are executed by the browser, demonstrating a common web security flaw.
- **P-007-CS**
    - **Title:** SQL Injection Prevention
    - **Domain:** Web Security
    - **Objective:** To create a simple web application with a vulnerable login form and then implement best practices, such as prepared statements, to prevent SQL injection attacks. The project would serve as a practical demonstration of secure coding.
- **P-008-CS**
    - **Title:** IoT Device Security Analyzer
    - **Domain:** IoT Security
    - **Objective:** To develop a tool that scans a local network to identify IoT devices and assess their security posture. The project would check for default passwords, open ports, and unencrypted communication.
- **P-009-CS**
    - **Title:** File Integrity Monitor
    - **Domain:** System Security
    - **Objective:** To build a tool that monitors critical system files for unauthorized changes. The project would create a database of file hashes and periodically re-calculate them, alerting an administrator to any mismatches.
- **P-010-CS**
    - **Title:** Wi-Fi Deauthentication Attack Detector
    - **Domain:** Wireless Security
    - **Objective:** To develop a program that detects deauthentication packets on a Wi-Fi network. The project would use a Wi-Fi card in monitor mode to identify and log these packets, which are commonly used in denial-of-service attacks.
- **P-011-CS**
    - **Title:** Basic Cryptography Tool
    - **Domain:** Cryptography

    - **Objective:** To create a command-line tool that can encrypt and decrypt files using a modern encryption algorithm like AES. The project would focus on correctly implementing the algorithm and key management.
- **P-012-CS**
    - **Title:** Phishing Email Analyzer
    - **Domain:** Email Security & Social Engineering
    - **Objective:** To develop a script that analyzes email headers and content to detect signs of phishing. The tool would check for suspicious sender addresses, mismatched links, and common phishing keywords.

- **P-013-CS**
    - **Title:** Secure Chat Application
    - **Domain:** Application Security
    - **Objective:** To build a simple chat application that uses end-to-end encryption. The project would demonstrate how to implement secure communication protocols to ensure that messages can only be read by the intended recipient.
- **P-014-CS**
    - **Title:** Brute-Force Password Attack Script
    - **Domain:** Ethical Hacking
    - **Objective:** To create a script that attempts to guess a password by systematically trying a list of common passwords or combinations. This project's purpose is to demonstrate how these attacks work and the importance of using strong passwords.
- **P-015-CS**
    - **Title:** Web Server Log Analyzer
    - **Domain:** Log Analysis
    - **Objective:** To build a tool that parses web server logs to identify potential security threats, such as multiple failed login attempts, unusual user-agent strings, or requests for sensitive files.
- **P-016-CS**
    - **Title:** Denial-of-Service (DoS) Attack Simulator
    - **Domain:** Network Security & Red Teaming
    - **Objective:** To create a script that floods a local server with traffic to demonstrate how a DoS attack works. This project is for educational purposes only and should not be used against any external network.
- **P-017-CS**
    - **Title:** Vulnerability Scanning with Nmap
    - **Domain:** Ethical Hacking
    - **Objective:** To write scripts or commands that automate common vulnerability scans using Nmap. The project would focus on identifying open ports, running services, and known vulnerabilities on a target system.

- **P-018-CS**
    - **Title:** Encrypted File System
    - **Domain:** Data Security
    - **Objective:** To develop a proof-of-concept for an encrypted file system. The project would demonstrate how to encrypt all data written to a specific directory, ensuring that the information is unreadable without the correct key.
- **P-019-CS**
    - **Title:** Keylogger Detector
    - **Domain:** Endpoint Security
    - **Objective:** To build a program that monitors system processes and API calls to detect the presence of a keylogger. The project would focus on identifying suspicious activity related to keyboard input.
- **P-020-CS**
    - **Title:** Honeypot for Network Reconnaissance
    - **Domain:** Threat Intelligence
    - **Objective:** To set up a simple honeypot (a decoy system) that mimics a vulnerable service. The project would log attempts by attackers to interact with the service, providing insights into common reconnaissance techniques and attack vectors.
- **P-021-CS**
    - **Title:** Mobile App Permission Analyzer
    - **Domain:** Mobile Security
    - **Objective:** To develop a tool that analyzes an Android application's manifest file to understand the permissions it requests. The project would then flag permissions that are considered high-risk or unnecessary for the app's functionality.
- **P-022-CS**
    - **Title:** Basic Cloud Security Scanner
    - **Domain:** Cloud Security
    - **Objective:** To create a script that scans for common misconfigurations in a cloud environment, such as publicly exposed storage buckets (e.g., AWS S3). The tool would serve as a simple security posture checker.
- **P-023-CS**
    - **Title:** File Metadata Analyzer
    - **Domain:** Digital Forensics
    - **Objective:** To build a command-line tool that extracts and analyzes metadata from various file types (e.g., images, documents, executables). The project would focus on identifying hidden information like creation dates, author names, and geolocation data.
- **P-024-CS**
    - **Title:** Web Server Security Header Analyzer
    - **Domain:** Web Security
    - **Objective:** To develop a script that checks a website's HTTP security headers (e.g., Content Security Policy, X-Frame-Options, Strict-Transport-Security). The

tool would report on missing or misconfigured headers that could expose the site to attacks.

- **P-025-CS**
  - **Title:** Automated Port Scanner and Service Enumerator
  - **Domain:** Network Security & Ethical Hacking
  - **Objective:** To create a tool that not only scans for open ports on a target, but also attempts to identify the specific service and version running on each port. This project would combine basic scanning with service fingerprinting techniques.

## 6. Data Science (DS) neufology

- **P-001-DS**
  - **Title:** Exploratory Data Analysis of a Public Dataset
  - **Domain:** Data Analysis
  - **Objective:** To select a public dataset (e.g., from Kaggle or data.gov) and perform a comprehensive exploratory data analysis (EDA). The project would involve data cleaning, visualization, and summarizing key insights to tell a story about the data.
- **P-002-DS**
  - **Title:** Housing Price Prediction Model
  - **Domain:** Predictive Modeling
  - **Objective:** To build a regression model that predicts housing prices based on features like location, number of bedrooms, and square footage. The project would focus on data preprocessing, feature engineering, and evaluating model performance using metrics like Mean Squared Error ().
- **P-003-DS**
  - **Title:** Customer Segmentation with K-Means Clustering
  - **Domain:** Unsupervised Learning
  - **Objective:** To use unsupervised machine learning, specifically K-Means clustering, to segment a customer dataset based on purchasing behavior. The goal is to identify distinct customer groups for targeted marketing campaigns.
- **P-004-DS**
  - **Title:** Sentiment Analysis of Social Media Data
  - **Domain:** Natural Language Processing (NLP)
  - **Objective:** To collect a dataset of tweets or product reviews and build a classification model to determine whether the text sentiment is positive, negative,

or neutral. The project would use NLP techniques like tokenization and vectorization.

- **P-005-DS**
  - **Title:** Time Series Forecasting for Stock Prices
  - **Domain:** Time Series Analysis
  - **Objective:** To build a time-series model (e.g., ARIMA or Prophet) to forecast future stock prices based on historical data. The project would demonstrate the ability to handle temporal data and make short-term predictions.
- **P-006-DS**
  - **Title:** Spam Email Classifier
  - **Domain:** NLP & Classification
  - **Objective:** To create a model that classifies emails as either "spam" or "ham" (not spam). The project would involve using a Naive Bayes or Logistic Regression classifier trained on a labeled email dataset.
- **P-007-DS**
  - **Title:** Movie Recommendation System
  - **Domain:** Recommendation Systems
  - **Objective:** To build a recommendation engine that suggests movies to users based on their viewing history and preferences. The project would implement either a collaborative filtering or content-based filtering approach.
- **P-008-DS**
  - **Title:** Churn Prediction for a Telecommunications Company
  - **Domain:** Predictive Modeling
  - **Objective:** To develop a classification model that predicts which customers are likely to cancel their service. The project would use features like call duration, data usage, and customer support interactions to identify at-risk customers.
- **P-009-DS**
  - **Title:** Image Classification with a Convolutional Neural Network (CNN)
  - **Domain:** Computer Vision
  - **Objective:** To build a CNN model to classify images into different categories (e.g., cats vs. dogs, or different types of flowers). The project would focus on data augmentation, model training, and performance evaluation.
- **P-010-DS**
  - **Title:** A/B Testing for a Website
  - **Domain:** Statistical Analysis
  - **Objective:** To simulate an A/B test for a website feature and use statistical methods to determine if one version performs significantly better than the other. The project would involve hypothesis testing and p-value calculation.
- **P-011-DS**
  - **Title:** Web Scraping and Data Analysis
  - **Domain:** Data Collection & Analysis
  - **Objective:** To create a Python script using libraries like BeautifulSoup or Scrapy to scrape data from a website. The project would then involve cleaning and analyzing the scraped data to extract meaningful insights.

- **P-012-DS**
  - **Title:** Fraud Detection with Anomaly Detection
  - **Domain:** Anomaly Detection
  - **Objective:** To build a model that identifies fraudulent transactions in a financial dataset. The project would use unsupervised learning techniques like Isolation Forest or one-class SVM to spot unusual patterns that deviate from normal behavior.
- **P-013-DS**
  - **Title:** Customer Lifetime Value (CLV) Prediction
  - **Domain:** Predictive Analytics
  - **Objective:** To build a model that predicts the future revenue a customer will generate over their entire relationship with a company. This project is crucial for optimizing marketing spend and customer retention efforts.
- **P-014-DS**
  - **Title:** Weather Forecasting Model
  - **Domain:** Predictive Modeling
  - **Objective:** To use historical meteorological data to build a model that predicts weather conditions. The project would involve working with large datasets and potentially applying time series or deep learning models.
- **P-015-DS**
  - **Title:** Credit Card Approval Prediction
  - **Domain:** Classification
  - **Objective:** To create a classification model that predicts whether a credit card application should be approved or denied. The project would involve handling a dataset with a mix of categorical and numerical features.
- **P-016-DS**
  - **Title:** Natural Language Generation with a GPT-2 Model
  - **Domain:** NLP & Generative AI
  - **Objective:** To fine-tune an existing pre-trained language model, like GPT-2, on a specific text corpus to generate new, contextually relevant text. The project would demonstrate an understanding of transfer learning in NLP.
- **P-017-DS**
  - **Title:** Facial Expression Recognition
  - **Domain:** Computer Vision
  - **Objective:** To develop a deep learning model to recognize and classify human emotions from facial expressions in images. The project would require a dataset of labeled facial expressions.
- **P-018-DS**
  - **Title:** A Data Dashboard with Python (Dash/Streamlit)
  - **Domain:** Data Visualization
  - **Objective:** To build an interactive web-based dashboard using a Python library like Dash or Streamlit. The project would display key metrics from a dataset and allow users to filter the data and explore it interactively.

- **P-019-DS**
  - **Title:** Voice Command Recognizer
  - **Domain:** Audio Processing
  - **Objective:** To build a model that can recognize simple voice commands. The project would involve converting audio data into a format suitable for machine learning and training a classification model on audio samples.
- **P-020-DS**
  - **Title:** E-commerce Sales Forecasting
  - **Domain:** Business Analytics
  - **Objective:** To use historical sales data from an e-commerce platform to forecast future sales. The project would involve analyzing seasonality and trends to provide business insights for inventory management and marketing strategies.
- **P-021-DS**
  - **Title:** Recommendation System for Music Streaming
  - **Domain:** Recommendation Systems
  - **Objective:** To build a system that suggests new songs or artists to users based on their listening history. The project would explore collaborative filtering and content-based filtering approaches using music metadata and user ratings.
- **P-022-DS**
  - **Title:** Predictive Maintenance for Industrial Equipment
  - **Domain:** Time Series & Predictive Modeling
  - **Objective:** To use time-series data from sensors on industrial machinery to predict when a component is likely to fail. The goal is to enable proactive maintenance, reducing downtime and operational costs.
- **P-023-DS**
  - **Title:** Text Summarization with NLP
  - **Domain:** Natural Language Processing (NLP)
  - **Objective:** To develop a model that can automatically generate a concise summary of a longer text document. The project would involve using either an extractive (selecting key sentences) or abstractive (generating new sentences) approach.
- **P-024-DS**
  - **Title:** Object Detection in Images
  - **Domain:** Computer Vision
  - **Objective:** To build a deep learning model (e.g., using YOLO or SSD) that can identify and locate multiple objects within an image. The project would focus on training the model on a dataset with bounding box annotations.
- **P-025-DS**
  - **Title:** Credit Risk Assessment
  - **Domain:** Predictive Modeling

    - **Objective:** To create a classification model that assesses the credit risk of a loan applicant. The project would involve analyzing a dataset with financial and demographic information to predict the likelihood of default.
- **P-026-DS**
    - **Title:** Geospatial Data Analysis of Crime Rates
    - **Domain:** Data Analysis & Visualization
    - **Objective:** To use geospatial data to analyze and visualize crime rates in a city. The project would involve using libraries like geopandas and folium to create interactive maps and identify high-crime areas.
- **P-027-DS**
    - **Title:** Stock Market Volatility Prediction
    - **Domain:** Time Series Analysis & Finance
    - **Objective:** To build a model that predicts the volatility of a stock or market index. The project would involve using time-series analysis and financial indicators to forecast periods of high or low volatility.
- **P-028-DS**
    - **Title:** Personality Prediction from Text
    - **Domain:** NLP & Behavioral Science
    - **Objective:** To develop a model that can infer a person's personality traits (e.g., based on the Big Five model) from their written text. The project would involve training a classification model on a dataset of social media posts or essays labeled with personality scores.

## 7. Computer Vision (CV) neufology

- **P-001-CV**
    - **Title:** Real-time Object Detection with YOLO
    - **Domain:** Object Detection
    - **Objective:** To build a real-time object detection application using a pre-trained model like YOLO (You Only Look Once) to identify and classify multiple objects in a live video stream from a webcam.
- **P-002-CV**
    - **Title:** Face and Eye Detection
    - **Domain:** Facial Recognition
    - **Objective:** To use Haar Cascades from OpenCV to detect faces and eyes in both static images and a real-time video feed. This project serves as a foundation for more complex facial recognition systems.
- **P-003-CV**
    - **Title:** Hand Gesture Recognition
    - **Domain:** Human-Computer Interaction
    - **Objective:** To build a model that can recognize and classify different hand gestures from a webcam. The project could use landmarks or contours to map hand shapes to specific commands, like controlling a media player.

- **P-004-CV**
    - **Title:** Image Style Transfer
    - **Domain:** Image Generation
    - **Objective:** To use a deep learning model to apply the artistic style of one image (e.g., a painting by Van Gogh) to the content of another image (e.g., a photograph).
- **P-005-CV**
    - **Title:** Document Scanner and Text Extraction
    - **Domain:** Optical Character Recognition (OCR)
    - **Objective:** To create a script that automatically detects the edges of a document in an image, corrects perspective, and uses a library like Tesseract to extract the text.

- **P-006-CV**
    - **Title:** Augmented Reality Face Filter
    - **Domain:** Augmented Reality
    - **Objective:** To use OpenCV to detect facial landmarks and overlay virtual elements, such as glasses, a hat, or a mustache, onto a person's face in a live video feed.
- **P-007-CV**
    - **Title:** Traffic Sign Recognition
    - **Domain:** Autonomous Systems
    - **Objective:** To train a Convolutional Neural Network () to recognize and classify different traffic signs from a dataset of images. This is a foundational project for self-driving cars.
- **P-008-CV**
    - **Title:** Image Captioning
    - **Domain:** Computer Vision & NLP
    - **Objective:** To build a model that can generate a descriptive sentence for an image. The project would combine a CNN for image feature extraction and a Recurrent Neural Network (RNN) for text generation.
- **P-009-CV**
    - **Title:** Medical Image Analysis for Tumor Detection
    - **Domain:** Healthcare
    - **Objective:** To train a deep learning model to segment and classify tumors from medical images like MRI or CT scans. This project would require a specialized medical dataset.
- **P-010-CV**
    - **Title:** Plant Leaf Disease Detection
    - **Domain:** Smart Agriculture

    - **Objective:** To build an image classification model that can identify diseases in plant leaves from photographs. The project would help farmers diagnose and treat plant diseases early.
- **P-011-CV**
    - **Title:** Video Surveillance and Motion Detection
    - **Domain:** Video Analysis
    - **Objective:** To create a system that uses background subtraction to detect motion in a video feed. The system would then highlight moving objects or trigger an alert when motion is detected in a specific area.
- **P-012-CV**
    - **Title:** Image Colorization
    - **Domain:** Image Processing
    - **Objective:** To use a deep learning model to add color to a black-and-white image. The project would involve training the model on a large dataset of paired color and grayscale images.
- **P-013-CV**
    - **Title:** Pose Estimation
    - **Domain:** Human Pose Analysis
    - **Objective:** To use a pre-trained model (e.g., OpenPose or MediaPipe) to detect and track the key body joints of a person in a video. This can be used for fitness applications or gesture control.
- **P-014-CV**
    - **Title:** Drowsiness Detection System
    - **Domain:** Driver Safety
    - **Objective:** To build a real-time system that monitors a driver's eyes and alerts them if they show signs of drowsiness, such as closed eyes for an extended period.
- **P-015-CV**
    - **Title:** License Plate Recognition
    - **Domain:** Smart Cities
    - **Objective:** To create a system that can detect and read license plates from images of vehicles. The project would involve object detection for the plate and OCR for the characters on the plate.
- **P-016-CV**
    - **Title:** Image Segmentation
    - **Domain:** Image Processing
    - **Objective:** To build a model (e.g., using U-Net) that can segment an image by assigning a class to each pixel. The project would be able to distinguish between a person and the background, for example.
- **P-017-CV**
    - **Title:** Visual Product Search
    - **Domain:** E-commerce
    - **Objective:** To create a system where a user can upload a picture of a product and the model will search a database of products to find visually similar items.

- **P-018-CV**
    - **Title:** Automated Attendance System
    - **Domain:** Facial Recognition
    - **Objective:** To develop a system that uses facial recognition to automatically mark the attendance of students or employees. The project would involve enrolling individuals and then recognizing them from a live video feed.
- **P-019-CV**
    - **Title:** Calorie Estimation from Food Images
    - **Domain:** Healthcare & Nutrition
    - **Objective:** To build a model that can identify different food items in a picture and estimate their calorie count. The project would involve training an object detection model on a food image dataset.
- **P-020-CV**
    - **Title:** Image Forgery Detection
    - **Domain:** Digital Forensics
    - **Objective:** To develop a model that can detect whether an image has been manipulated or is authentic. The project would focus on identifying inconsistencies in image metadata or subtle pixel-level anomalies.
- **P-021-CV**
    - **Title:** Image Noise Reduction
    - **Domain:** Image Processing
    - **Objective:** To build a tool that can automatically remove various types of noise (e.g., salt-and-pepper, Gaussian) from images using classical or deep learning techniques to improve image quality.
- **P-022-CV**
    - **Title:** Lane Line Detection for Self-Driving Cars
    - **Domain:** Autonomous Systems & Robotics
    - **Objective:** To develop a system that can detect and track lane lines on a road from a dashboard camera video using techniques like Hough Transforms or deep learning segmentation.
- **P-023-CV**
    - **Title:** Fingerprint Recognition System
    - **Domain:** Biometrics
    - **Objective:** To create a system that can take a fingerprint image, extract unique features (minutiae), and match it against a database of known fingerprints for user authentication.
- **P-024-CV**
    - **Title:** Gaze Tracking for Webcams
    - **Domain:** Human-Computer Interaction
    - **Objective:** To build a system that uses a webcam to determine where a user is looking on the screen. This can be used for accessibility, user behavior analysis, or to create interactive applications that respond to a user's gaze.

## 8. Mobile App Development (MD)

- **P-001-MD**
  - **Title:** A Secure and Decentralized Mobile Healthcare Data Management System Using Blockchain
  - **Domain:** Blockchain & Healthcare
  - **Objective:** To design and implement a mobile application that uses blockchain technology to securely store and share patient health records. The project would focus on ensuring data privacy, integrity, and patient-controlled access, with a research emphasis on latency and scalability.
- **P-002-MD**
  - **Title:** Real-Time Traffic Density Estimation from Mobile-Captured Imagery Using Edge AI
  - **Domain:** Computer Vision & Smart Cities
  - **Objective:** To develop a mobile application that processes video captured by a device's camera to estimate real-time traffic density. The project would utilize on-device machine learning models to reduce latency and data transmission costs, suitable for smart city planning research.
- **P-003-MD**
  - **Title:** An IoT-Based Mobile Application for Smart Home Automation and Energy Optimization
  - **Domain:** IoT & Energy Management
  - **Objective:** To create a mobile application that acts as a central control hub for IoT devices in a smart home. The project's research focus would be on developing an intelligent algorithm within the app to optimize energy consumption based on user behavior and external data.
- **P-004-MD**
  - **Title:** A Mobile Framework for Indoor Navigation Using Augmented Reality and Sensor Fusion
  - **Domain:** Augmented Reality & Navigation
  - **Objective:** To build a mobile application that provides indoor navigation without GPS. The project would use the device's camera and internal sensors (e.g., gyroscope, accelerometer) to map a user's location in real-time and display directions through an AR overlay.
- **P-005-MD**
  - **Title:** Multi-Modal Biometric Authentication for Mobile Devices
  - **Domain:** Cybersecurity & Biometrics
  - **Objective:** To develop a secure login system for a mobile application that combines multiple biometric factors, such as fingerprint, facial recognition, and voice patterns. The research would focus on improving authentication accuracy and resistance to spoofing attacks.
- **P-006-MD**
  - **Title:** Context-Aware Mobile Ad-Hoc Network for Emergency Response
  - **Domain:** Networking & Disaster Management
  - **Objective:** To create a mobile application that allows devices to form a peer-to-peer network for communication in areas with no cellular service. The

project would research protocols for data relay and context-aware messaging in disaster scenarios.

- **P-007-MD**
  - **Title:** A Mobile-Based System for Real-Time Plant Disease Diagnosis Using Deep Learning
  - **Domain:** Machine Learning & Agriculture
  - **Objective:** To develop a mobile application where a user can take a photo of a plant leaf and the app will instantly diagnose potential diseases. The project's research would focus on training a highly accurate deep learning model optimized for mobile deployment.
- **P-008-MD**
  - **Title:** Drowsiness and Distraction Detection for Drivers Using Mobile Camera and Edge AI
  - **Domain:** Computer Vision & Driver Safety
  - **Objective:** To implement a real-time mobile application that monitors a driver's face and eyes using the front camera to detect signs of drowsiness or distraction. The research would focus on developing an efficient algorithm with minimal false positives.
- **P-009-MD**
  - **Title:** A Mobile Chatbot for Mental Health Support with Sentiment Analysis
  - **Domain:** NLP & Healthcare
  - **Objective:** To create a mobile chatbot that provides conversational support for mental well-being. The project would use natural language processing and sentiment analysis to understand user emotions and offer personalized, research-backed coping strategies.
- **P-010-MD**
  - **Title:** Crowdsourced Mobile Sensing for Air Quality Monitoring
  - **Domain:** Data Science & Environmental Science
  - **Objective:** To develop a mobile app that collects and aggregates sensor data from users' devices (e.g., GPS, accelerometer) and, in conjunction with external datasets, provides real-time air quality maps. The research would be on data fusion and visualization techniques.
- **P-011-MD**
  - **Title:** An AI-Powered Mobile App for Personalized Fitness and Workout Planning
  - **Domain:** AI & Fitness
  - **Objective:** To build a mobile application that uses AI to create customized workout plans based on a user's goals, fitness level, and progress. The project would research the effectiveness of AI-driven personalization over static plans.
- **P-012-MD**
  - **Title:** Mobile-Based System for Sign Language to Text Translation
  - **Domain:** Computer Vision & Accessibility
  - **Objective:** To develop a mobile app that uses the device's camera to recognize American Sign Language (ASL) gestures and translate them into text or speech

in real-time. The research would focus on the accuracy of gesture recognition models.

- **P-013-MD**
  - **Title:** A Mobile-Based System for Fall Detection in Elderly Care
  - **Domain:** IoT & Healthcare
  - **Objective:** To create a mobile application that uses the device's accelerometer and gyroscope to detect a sudden fall. The project would research the feasibility and reliability of using a smartphone as a non-intrusive fall-detection device.
- **P-014-MD**
  - **Title:** Mobile Application for Secure Passwordless Authentication
  - **Domain:** Cybersecurity & Authentication
  - **Objective:** To develop a mobile app that serves as a secure authenticator for web and desktop applications, eliminating the need for passwords. The research would focus on implementing a secure challenge-response protocol using QR codes.
- **P-015-MD**
  - **Title:** A Mobile Framework for Predictive Maintenance in Industrial IoT
  - **Domain:** Data Science & Industry
  - **Objective:** To build a mobile application that receives data from IoT sensors on industrial machinery and uses a predictive model to alert maintenance teams before a failure occurs. The research would focus on the efficiency of the predictive model on a mobile platform.
- **P-016-MD**
  - **Title:** Interactive E-Learning Mobile App with Gamification Elements
  - **Domain:** Education & Gamification
  - **Objective:** To develop a mobile learning platform that integrates gamification principles to enhance user engagement. The research would evaluate the impact of game mechanics on learning outcomes.
- **P-017-MD**
  - **Title:** A Secure and Private Mobile Contact Tracing Application
  - **Domain:** Cybersecurity & Public Health
  - **Objective:** To create a mobile application that helps with contact tracing without compromising user privacy. The project would focus on developing a protocol that uses Bluetooth signals and cryptographic principles to ensure anonymity.
- **P-018-MD**
  - **Title:** Mobile App for Automated Waste Segregation with Object Detection
  - **Domain:** Computer Vision & Environmental Science
  - **Objective:** To develop a mobile application that uses a deep learning model to identify and classify waste materials (e.g., plastic, glass, paper) from an image, guiding users on proper disposal.
- **P-019-MD**
  - **Title:** An AR-Based Mobile App for E-commerce Product Visualization
  - **Domain:** Augmented Reality & E-commerce

    - **Objective:** To build a mobile application that allows users to place a virtual 3D model of a product (e.g., furniture) in their real-world environment using AR. The research would focus on the impact of AR on purchase decisions.
- **P-020-MD**
    - **Title:** A Mobile App for Emotion-Based Music Recommendation
    - **Domain:** AI & Music
    - **Objective:** To create a mobile application that analyzes a user's emotional state from their face and recommends music that matches or influences their mood. The research would focus on the accuracy of emotion detection models and user response.
- **P-021-MD**
    - **Title:** A Mobile Application for Indoor Air Quality Monitoring
    - **Domain:** IoT & Environmental Science
    - **Objective:** To develop a mobile app that connects to low-cost air quality sensors (e.g., for PM2.5, CO2) and provides real-time data and alerts. The research would focus on the user interface design for displaying complex environmental data in an accessible way.
- **P-022-MD**
    - **Title:** Mobile-Based System for Real-Time Human Pose Analysis
    - **Domain:** Computer Vision & Fitness
    - **Objective:** To build a mobile application that analyzes a user's pose during exercises using the device's camera. The app would provide real-time feedback on form and technique, with a research focus on the accuracy of on-device pose estimation models.
- **P-023-MD**
    - **Title:** A Mobile Platform for Citizen Science and Biodiversity Tracking
    - **Domain:** Data Science & Ecology
    - **Objective:** To create a mobile application that allows users to upload photos and locations of plants and animals, helping to build a crowdsourced database for scientific research. The project would research the use of machine learning to automatically identify species from user-submitted images.
- **P-024-MD**
    - **Title:** Mobile Augmented Reality Game with Geolocation
    - **Domain:** Augmented Reality & Gaming
    - **Objective:** To develop a mobile game that blends the virtual and real worlds. The game would use the user's location and the phone's camera to create an interactive experience, with a research focus on the design of engaging AR game mechanics.
- **P-025-MD**
    - **Title:** A Mobile Framework for Voice-Based Authentication
    - **Domain:** Cybersecurity & Biometrics
    - **Objective:** To build a mobile application that uses a user's voice for authentication. The project would focus on developing a robust system that can verify a user's identity from a short voice sample, resistant to replay attacks.

## 9. Web Development (WD)

- **P-001-WD**
  - **Title:** A Progressive Web Application (PWA) for Offline-First Data Synchronization
  - **Domain:** Front-End & PWA
  - **Objective:** To design and build a PWA that works reliably offline. The project would focus on using service workers to cache content and IndexedDB to store data locally, with a research emphasis on seamless data synchronization when the user reconnects to the internet.
- **P-002-WD**
  - **Title:** An AI-Powered E-commerce Product Recommendation Engine
  - **Domain:** E-commerce & Machine Learning
  - **Objective:** To develop a full-stack web application for e-commerce that uses a machine learning model to provide personalized product recommendations. The research would focus on the effectiveness of different recommendation algorithms (e.g., collaborative filtering vs. content-based) on user engagement and conversion rates.
- **P-003-WD**
  - **Title:** A Real-Time Collaborative Document Editor
  - **Domain:** Real-time Applications
  - **Objective:** To build a web application that allows multiple users to edit the same document simultaneously. The project would focus on using WebSockets to enable real-time updates and an operational transformation (OT) or conflict-free replicated data type (CRDT) algorithm to handle concurrent edits.
- **P-004-WD**
  - **Title:** Secure API Gateway with Microservices Architecture
  - **Domain:** Back-End & Security
  - **Objective:** To create a secure API gateway that authenticates and routes requests to multiple back-end microservices. The research would focus on implementing a robust security protocol, such as JWT, and analyzing the performance and scalability of the microservices approach.
- **P-005-WD**
  - **Title:** A Decentralized Social Media Platform using Web3 Technologies
  - **Domain:** Blockchain & Web3
  - **Objective:** To build a social media platform where user data and interactions are stored on a decentralized ledger. The project would focus on using smart contracts to manage user profiles and content, with a research emphasis on privacy and censorship resistance.
- **P-006-WD**
  - **Title:** A Headless CMS with Dynamic Content Management
  - **Domain:** Full-Stack
  - **Objective:** To develop a headless Content Management System (CMS) that exposes a GraphQL or REST API for content delivery. The project's research

would focus on creating an intuitive user interface for content creators and analyzing the performance benefits of a decoupled architecture.

- **P-007-WD**
  - **Title:** A Web-Based System for DDoS Attack Detection
  - **Domain:** Web Security
  - **Objective:** To build a real-time web application that monitors network traffic and uses machine learning to detect patterns indicative of a Distributed Denial-of-Service (DDoS) attack. The research would focus on the model's accuracy and its ability to distinguish malicious from legitimate traffic.
- **P-008-WD**
  - **Title:** A Serverless Web Application for On-Demand Image Processing
  - **Domain:** Cloud Computing & Serverless
  - **Objective:** To create a web application that uses a serverless architecture (e.g., AWS Lambda, Azure Functions) to resize and optimize images on the fly. The research would focus on the cost-effectiveness and scalability of a serverless approach for resource-intensive tasks.
- **P-009-WD**
  - **Title:** A Web-Based Dashboard for IoT Sensor Data Visualization
  - **Domain:** IoT & Data Visualization
  - **Objective:** To develop a web dashboard that collects and displays real-time data from multiple IoT sensors. The project would focus on building a robust data pipeline and creating interactive visualizations to help users monitor environmental conditions or device status.
- **P-010-WD**
  - **Title:** An Accessibility-Auditing Web Tool
  - **Domain:** Web Accessibility
  - **Objective:** To create a tool that automatically scans a web page for common accessibility issues (e.g., missing alt text, poor color contrast, improper HTML semantics). The research would focus on the tool's effectiveness in helping developers comply with WCAG standards.
- **P-011-WD**
  - **Title:** A Web-Based Voice-Activated Personal Assistant
  - **Domain:** NLP & Front-End
  - **Objective:** To build a web application that acts as a voice-controlled personal assistant. The project would use Web Speech API for voice recognition and a back-end NLP model to process commands and respond to user queries.
- **P-012-WD**
  - **Title:** Web Application for Automated API Documentation
  - **Domain:** Back-End & Automation
  - **Objective:** To develop a web tool that can automatically generate interactive API documentation from source code or an OpenAPI specification. The research would focus on how automation improves developer workflow and reduces documentation errors.
- **P-013-WD**

    - **Title:** Gamified E-Learning Platform with Progress Tracking
    - **Domain:** Education & Gamification
    - **Objective:** To build an e-learning website that incorporates game-like elements, such as points, badges, and leaderboards, to motivate students. The research would evaluate the impact of these features on user engagement and learning outcomes.
- **P-014-WD**
    - **Title:** Cross-Platform Mobile App Development using a Web Framework
    - **Domain:** Hybrid App Development
    - **Objective:** To build a single web application using a framework like React Native or Ionic that can be deployed as both an Android and iOS app. The project's research would compare the performance and development efficiency of a hybrid approach against native development.
- **P-015-WD**
    - **Title:** A Web-Based Portfolio Generator with AI-Assisted Design
    - **Domain:** AI & Design
    - **Objective:** To create a web application that uses an AI model to generate personalized portfolio website layouts based on a user's content and style preferences. The research would focus on the usability and creative potential of AI in web design.
- **P-016-WD**
    - **Title:** A Web-Based System for Real-Time Human Pose Analysis
    - **Domain:** Computer Vision & Fitness
    - **Objective:** To build a web application that uses a user's webcam to track body movements and analyze their exercise form. The project would focus on implementing a real-time pose estimation model and providing instant feedback to the user.
- **P-017-WD**
    - **Title:** A Secure and Private End-to-End Encrypted Chat Application
    - **Domain:** Web Security & Cryptography
    - **Objective:** To develop a web-based chat application that uses a robust end-to-end encryption protocol (e.g., Signal Protocol). The research would focus on the application's security against man-in-the-middle attacks and data breaches.
- **P-018-WD**
    - **Title:** A Web-Based Collaborative Drawing Board
    - **Domain:** Real-time & Graphics
    - **Objective:** To build a web application that allows multiple users to draw on a shared canvas in real-time. The project would focus on optimizing canvas rendering performance and using WebSockets to synchronize drawing strokes between clients.
- **P-019-WD**
    - **Title:** A Content Delivery Network (CDN) with Optimized Caching
    - **Domain:** Networking & Performance

    - **Objective:** To create a simplified CDN that caches static assets (images, CSS, JS) at geographically distributed edge servers. The research would focus on developing an intelligent caching strategy to minimize latency and improve website load times.
- **P-020-WD**
    - **Title:** A Web Application for Financial Dashboard and Analytics
    - **Domain:** Data Visualization & Finance
    - **Objective:** To build an interactive web dashboard that connects to financial data APIs (e.g., stock prices, cryptocurrency) and displays real-time analytics and visualizations. The project would focus on the user experience of navigating and interpreting complex financial data.
- **P-021-WD**
    - **Title:** An AI-Based Web-Based Language Tutor
    - **Domain:** NLP & Education
    - **Objective:** To create a web application that acts as a language tutor, using a chatbot to engage users in conversation and an NLP model to correct grammar and pronunciation. The research would focus on the effectiveness of a conversational AI for language learning.
- **P-022-WD**
    - **Title:** A Web-Based Image Forgery Detector
    - **Domain:** Computer Vision & Security
    - **Objective:** To develop a web application where users can upload an image and have it analyzed for signs of digital manipulation or forgery. The project would utilize deep learning models trained on datasets of authentic and manipulated images.
- **P-023-WD**
    - **Title:** A Web-Based System for Facial Emotion Recognition
    - **Domain:** Computer Vision & UI/UX
    - **Objective:** To build a web application that uses a webcam to detect a user's facial expressions and infer their emotional state. The research would focus on how this technology can be used to create adaptive user interfaces that respond to a user's mood.
- **P-024-WD**
    - **Title:** A Web App for Data-Driven COVID-19 Dashboard
    - **Domain:** Data Science & Public Health
    - **Objective:** To create a web-based dashboard that visualizes real-time COVID-19 data from public APIs. The project would focus on presenting complex epidemiological data in a clear and interactive way.
- **P-025-WD**
    - **Title:** An Interactive Web-Based 3D Product Visualizer
    - **Domain:** 3D Graphics & E-commerce
    - **Objective:** To develop a web application that allows users to view and customize 3D models of products directly in their browser without the need for a separate

app. The project would focus on optimizing 3D rendering performance for the web using libraries like Three.js.

## 10. Game Development (GD)

- **P-001-GD**
  - **Title:** A 2D Platformer with Dynamic Level Generation
  - **Domain:** Procedural Generation & 2D Graphics
  - **Objective:** To develop a 2D platformer game that uses a procedural algorithm to generate unique and playable levels. The research would focus on developing an algorithm that ensures level complexity and player progression are balanced.
- **P-002-GD**
  - **Title:** A 3D Endless Runner with Real-time Environment Adaptation
  - **Domain:** 3D Graphics & AI
  - **Objective:** To create an endless runner game in a 3D environment where the level dynamically changes based on the player's performance. The project would focus on implementing an AI that adjusts the difficulty in real-time.
- **P-003-GD**
  - **Title:** A Turn-Based Strategy Game with Adversarial Search AI
  - **Domain:** Artificial Intelligence
  - **Objective:** To develop a turn-based strategy game where the opponent is an AI that uses an adversarial search algorithm, like Minimax or Alpha-Beta pruning, to make optimal moves. The research would focus on the algorithm's effectiveness in challenging the player.
- **P-004-GD**
  - **Title:** A Mobile Game with Location-Based Augmented Reality (AR)
  - **Domain:** Mobile & AR
  - **Objective:** To create a mobile game that blends the virtual and real worlds. The project would use a user's geolocation and the device's camera to place virtual objects or characters in the real world for interactive gameplay.
- **P-005-GD**
  - **Title:** A Rhythm Game with Audio-Reactive Visuals
  - **Domain:** Audio & Graphics
  - **Objective:** To develop a rhythm game where the visual elements (e.g., obstacles, colors, animations) are synchronized with the music's beat and frequency. The research would focus on algorithms for real-time audio analysis and visual mapping.
- **P-006-GD**
  - **Title:** A Multiplayer Game with Peer-to-Peer Networking
  - **Domain:** Networking
  - **Objective:** To build a real-time multiplayer game that uses a peer-to-peer networking model instead of a centralized server. The project would focus on overcoming challenges like latency, NAT traversal, and synchronization without a dedicated server.

- **P-007-GD**
    - **Title:** A Game for Cognitive Training and Assessment
    - **Domain:** Serious Games & Neuro-Gaming
    - **Objective:** To design and develop a game that is specifically designed to improve cognitive skills, such as memory, attention, or problem-solving. The research would focus on evaluating the game's effectiveness through user studies and data analysis.
- **P-008-GD**
    - **Title:** An AI-Based Game for Procedural Storytelling
    - **Domain:** AI & Narrative
    - **Objective:** To create a game where the storyline is not pre-written but is dynamically generated by an AI based on the player's actions and choices. The research would focus on the AI's ability to generate coherent and engaging narratives.
- **P-009-GD**
    - **Title:** A Web-Based Game with Optimized Performance
    - **Domain:** Web & Performance
    - **Objective:** To develop a web game that runs smoothly across different browsers and devices. The project would focus on performance optimizations, such as asset compression, WebGL rendering, and efficient client-server communication.
- **P-010-GD**
    - **Title:** A Game Engine from Scratch
    - **Domain:** Engine Development
    - **Objective:** To build a basic 2D or 3D game engine using a low-level language like C++ or a high-level one like Python. The project would focus on implementing core components like a rendering pipeline, input management, and a physics system.
- **P-011-GD**
    - **Title:** A Game with Physics-Based Puzzles
    - **Domain:** Physics Simulation
    - **Objective:** To create a game where the puzzles are solved by manipulating objects in a realistic physics environment. The project would involve building or integrating a physics engine to simulate collisions, gravity, and other forces.
- **P-012-GD**
    - **Title:** A Game with Adaptive Difficulty using Machine Learning
    - **Domain:** Machine Learning
    - **Objective:** To develop a game where the difficulty automatically adjusts based on the player's skill level. The project would use machine learning algorithms to analyze player data and dynamically modify game parameters.
- **P-013-GD**
    - **Title:** A Virtual Reality (VR) Game for Phobia Treatment
    - **Domain:** VR & Psychology

    - **Objective:** To design and build a simple VR game that creates a safe, controlled environment for exposure therapy. The research would focus on the effectiveness of VR for treating phobias and anxiety disorders.
- **P-014-GD**
    - **Title:** A Game with Genetic Algorithms for AI Behavior
    - **Domain:** AI
    - **Objective:** To create a game where the AI opponents learn and evolve their behavior over time using a genetic algorithm. The research would focus on how the AI's strategies change across generations to become more challenging.
- **P-015-GD**
    - **Title:** A Gamified System for Learning a Programming Language
    - **Domain:** Education
    - **Objective:** To develop an application that teaches a programming language through interactive puzzles, quests, and challenges. The project would focus on using game design principles to make the learning process engaging and effective.
- **P-016-GD**
    - **Title:** A Game for Crowd Simulation with Boid Algorithms
    - **Domain:** AI & Simulation
    - **Objective:** To create a game where the behavior of a large number of characters (a "crowd") is simulated using a boid algorithm (flocking behavior). The project would focus on optimizing the algorithm for real-time performance.
- **P-017-GD**
    - **Title:** A Game with Neural Style Transfer for Art Generation
    - **Domain:** AI & Art
    - **Objective:** To develop a game where the art style of the world or a specific character changes in real-time based on a neural style transfer model. The research would focus on the computational efficiency of the model on a game engine.
- **P-018-GD**
    - **Title:** A Game with User-Generated Content
    - **Domain:** UGC & Community
    - **Objective:** To build a game that allows players to create and share their own levels, characters, or assets. The project would focus on creating intuitive content creation tools and a system for community moderation and sharing.
- **P-019-GD**
    - **Title:** A Gamified System for Personal Finance Management
    - **Domain:** Gamification & Finance
    - **Objective:** To create a web or mobile application that makes managing personal finances fun and engaging. The project would use game mechanics like quests, achievements, and leaderboards to motivate users to save money and pay off debt.
- **P-020-GD**
    - **Title:** A Game with a Dynamic Dialogue System

    - **Domain:** AI & Narrative
    - **Objective:** To develop a game where the non-player characters' (NPC) dialogue changes dynamically based on the player's past actions and relationships. The project would use a state machine or a more advanced AI to manage dialogue flow.
- **P-021-GD**
    - **Title:** A Web-Based Game with Procedural Music Generation
    - **Domain:** Audio & Procedural Generation
    - **Objective:** To develop a game where the background music is generated in real-time by an algorithm. The project would focus on creating a system that can generate coherent and atmospheric music that adapts to the player's actions or the game's state.
- **P-022-GD**
    - **Title:** A Game for Training and Evaluating Robotic Control
    - **Domain:** Robotics & Simulation
    - **Objective:** To build a physics-based game that serves as a virtual environment for training and testing robotic control algorithms. The research would focus on the simulation's realism and its ability to accurately model real-world robotics.
- **P-023-GD**
    - **Title:** A Multiplayer Board Game with an AI Opponent
    - **Domain:** Multiplayer & AI
    - **Objective:** To create a web-based multiplayer board game that also includes an intelligent AI opponent. The project would focus on the a robust multiplayer system and a challenging AI using a search algorithm or a neural network.

## 11. Internet of Things (IoT)

- **P-001-IoT**
    - **Title:** Smart Home Automation System
    - **Domain:** Smart Home
    - **Objective:** To develop a system that allows users to control home appliances (e.g., lights, fans) remotely via a mobile application or a web interface. The project would use a microcontroller (like an ESP32) and relays to switch devices on and off.
- **P-002-IoT**
    - **Title:** Smart Irrigation System
    - **Domain:** Agriculture
    - **Objective:** To build an automated irrigation system that uses soil moisture sensors to water plants only when necessary. The system would collect data on soil moisture and automatically activate a water pump, optimizing water usage.
- **P-003-IoT**
    - **Title:** Home Security and Surveillance System
    - **Domain:** Security

    - **Objective:** To create a system that detects motion using a PIR sensor and sends a real-time alert (e.g., an email or a push notification) to the owner's phone. A small camera could also be integrated for live video feed.
- **P-004-IoT**
    - **Title:** Smart Pet Feeder
    - **Domain:** Pet Care
    - **Objective:** To design a pet feeder that can be controlled remotely. The project would use a microcontroller and a servo motor to dispense food at pre-set times or on command via a web or mobile application.
- **P-005-IoT**
    - **Title:** Environmental Monitoring System
    - **Domain:** Environmental Science
    - **Objective:** To build a device that continuously measures environmental parameters like temperature, humidity, air quality (e.g., CO, smoke), and sends the data to a cloud platform for analysis and visualization.
- **P-006-IoT**
    - **Title:** Smart Waste Management System
    - **Domain:** Smart Cities
    - **Objective:** To develop a system that uses an ultrasonic sensor to monitor the fill level of a garbage bin. When the bin is full, the device sends an alert to waste collection services, optimizing collection routes.
- **P-007-IoT**
    - **Title:** Smart Street Lighting System
    - **Domain:** Smart Cities
    - **Objective:** To create a system where streetlights automatically adjust their brightness based on ambient light levels detected by an LDR (Light Dependent Resistor) sensor, saving energy.
- **P-008-IoT**
    - **Title:** Personal Health and Fitness Tracker
    - **Domain:** Healthcare
    - **Objective:** To build a wearable device that collects data on a user's heart rate and body temperature and sends it to a smartphone app for health monitoring.
- **P-009-IoT**
    - **Title:** Water Quality Monitoring System
    - **Domain:** Environmental Science
    - **Objective:** To develop a device that measures the pH and turbidity of water in a lake or river. The data would be sent to a central server, allowing for real-time monitoring of water quality.
- **P-010-IoT**
    - **Title:** Vehicle Anti-Theft System
    - **Domain:** Security
    - **Objective:** To create a system that uses a GPS module to track a vehicle's location and an accelerometer to detect unauthorized movement. An alert would be sent to the owner's phone if the vehicle is moved without permission.

- **P-011-IoT**
    - **Title:** Smart Parking Lot Management
    - **Domain:** Smart Cities
    - **Objective:** To build a system that uses ultrasonic sensors in parking spots to detect if they are occupied. The status of each spot would be displayed on a central dashboard, helping drivers find available spaces.
- **P-012-IoT**
    - **Title:** Smart Refrigerator with Inventory Management
    - **Domain:** Smart Home
    - **Objective:** To create a prototype of a smart refrigerator that uses weight sensors or a camera to monitor food inventory. The system would notify the user when an item is running low.
- **P-013-IoT**
    - **Title:** Baby Monitoring System
    - **Domain:** Smart Home
    - **Objective:** To develop a system that monitors a baby's room for temperature, sound, and motion. The system would send alerts to a parent's phone, providing peace of mind.
- **P-014-IoT**
    - **Title:** Automated Greenhouse
    - **Domain:** Agriculture
    - **Objective:** To build a small-scale greenhouse that automatically regulates temperature, humidity, and light levels based on sensor data. The system would use actuators like fans, misters, and grow lights.
- **P-015-IoT**
    - **Title:** IoT-Based Smart Door Lock
    - **Domain:** Security
    - **Objective:** To create a smart lock that can be controlled remotely via a smartphone. The project could use RFID, a fingerprint scanner, or a secure web protocol to unlock the door.
- **P-016-IoT**
    - **Title:** Personal Weather Station
    - **Domain:** Weather
    - **Objective:** To build a device that measures and records local weather conditions, including temperature, humidity, pressure, and wind speed. The data would be accessible through a web interface.
- **P-017-IoT**
    - **Title:** Asset Tracking System
    - **Domain:** Logistics
    - **Objective:** To develop a system that uses GPS and cellular connectivity to track the location of valuable assets in real-time. The project would focus on creating a robust tracking dashboard.
- **P-018-IoT**
    - **Title:** Smart Energy Monitoring

    - **Domain:** Energy Management
    - **Objective:** To build a device that monitors a household's electricity usage in real-time. The data would be sent to a web dashboard, helping users identify energy-hungry appliances and reduce consumption.
- **P-019-IoT**
    - **Title:** Smart Vending Machine
    - **Domain:** Retail
    - **Objective:** To create a prototype of a smart vending machine that monitors its inventory levels and sends alerts when products need restocking. It could also integrate with a mobile payment system.
- **P-020-IoT**
    - **Title:** Fall Detection System for the Elderly
    - **Domain:** Healthcare
    - **Objective:** To build a wearable device using an accelerometer and gyroscope that detects a sudden fall. The device would automatically send an alert to a caregiver or family member.
- **P-021-IoT**
    - **Title:** IoT-Based Smart Dustbin
    - **Domain:** Smart Cities
    - **Objective:** To develop a smart dustbin that uses a camera and a machine learning model to sort waste into categories (e.g., plastic, paper, metal) and an automated system to direct the waste into the correct compartment.
- **P-022-IoT**
    - **Title:** Automated Window Blinds
    - **Domain:** Smart Home
    - **Objective:** To create a system that automatically opens and closes window blinds based on sunlight exposure. An LDR sensor would detect light, and a motor would control the blinds.
- **P-023-IoT**
    - **Title:** Smart Water Dispenser
    - **Domain:** Smart Home
    - **Objective:** To build a water dispenser that can be activated remotely and monitors its water level. The system would send a notification to the user when the tank is low.
- **P-024-IoT**
    - **Title:** Smart Alarm Clock
    - **Domain:** Smart Home
    - **Objective:** To design an alarm clock that uses sensors to monitor a user's sleep cycle and wakes them up during the lightest sleep phase. This would provide a less jarring wake-up experience.
- **P-025-IoT**
    - **Title:** Smart Luggage
    - **Domain:** Logistics

    - **Objective:** To create a prototype of smart luggage that includes a GPS tracker, a weight sensor, and a remote lock. A mobile app would allow the user to track their bag and lock it.
- **P-026-IoT**
    - **Title:** Smart Home Energy Meter
    - **Domain:** Energy Management
    - **Objective:** To build a device that plugs into a power outlet and monitors the energy consumption of a specific appliance. The data would be displayed on a web dashboard for granular analysis.
- **P-027-IoT**
    - **Title:** Smart Aquarium Monitoring
    - **Domain:** Pet Care
    - **Objective:** To create a system that monitors the temperature and pH levels of an aquarium. The system would send alerts to a user's phone if the conditions fall outside of the ideal range.
- **P-028-IoT**
    - **Title:** Smart Mirror
    - **Domain:** Smart Home
    - **Objective:** To build a smart mirror that displays information like the weather, time, news, and data from other IoT devices. The project would involve a two-way mirror, a display screen, and a microcontroller.

## 12. Cloud Computing (CC)

- **P-001-CC**
    - **Title:** A Serverless Web Application for Image Processing
    - **Domain:** Serverless & PaaS
    - **Objective:** To build a web application that allows users to upload images, which are then automatically processed (e.g., resized, watermarked) using cloud functions (e.g., AWS Lambda, Google Cloud Functions). The processed image is then stored in cloud storage (e.g., S3, Google Cloud Storage).
- **P-002-CC**
    - **Title:** A Simple IaaS-Based Web Server Deployment
    - **Domain:** IaaS
    - **Objective:** To provision a virtual machine (VM) on a cloud platform (e.g., AWS EC2, Google Cloud Compute Engine) and deploy a simple web server (e.g., Nginx, Apache) on it. This project focuses on understanding core IaaS concepts like VMs, networking, and security groups.
- **P-003-CC**
    - **Title:** A Cloud-Based Data Analytics Pipeline
    - **Domain:** Big Data & Analytics

    - **Objective:** To create a data pipeline that ingests data from a source (e.g., a streaming API), stores it in a data warehouse (e.g., BigQuery, Redshift), and uses a cloud-based service (e.g., Looker, Tableau) for visualization and reporting.
- **P-004-CC**
    - **Title:** A Machine Learning Model Deployment on the Cloud
    - **Domain:** Machine Learning
    - **Objective:** To train a machine learning model locally and then deploy it as a web service using a cloud platform's machine learning services (e.g., AWS SageMaker, Google AI Platform). The project would focus on creating a RESTful API for real-time predictions.
- **P-005-CC**
    - **Title:** Cloud-Based Disaster Recovery as a Service
    - **Domain:** Cloud Security & DevOps
    - **Objective:** To design and implement a simple disaster recovery plan by replicating data from an on-premise system to a cloud-based storage service. The project would focus on setting up automated backups and defining a recovery strategy.
- **P-006-CC**
    - **Title:** A Containerized Web Application with Kubernetes
    - **Domain:** Containerization & DevOps
    - **Objective:** To containerize a simple web application using Docker and deploy it to a managed Kubernetes service (e.g., GKE, EKS). The project would focus on understanding container orchestration, scaling, and load balancing.
- **P-007-CC**
    - **Title:** An IoT Data Ingestion and Processing System
    - **Domain:** IoT & Big Data
    - **Objective:** To set up a cloud-based system that can ingest high volumes of data from IoT devices. The project would use a message queuing service (e.g., RabbitMQ, SQS) and a stream processing framework (e.g., Apache Spark) to process the data in real-time.
- **P-008-CC**
    - **Title:** A Multi-Cloud Storage and Synchronization Service
    - **Domain:** Multi-Cloud
    - **Objective:** To develop a service that allows users to seamlessly store and synchronize files across different cloud storage providers (e.g., Google Drive, Dropbox, AWS S3) from a single interface.
- **P-009-CC**
    - **Title:** A Cloud-Based Video Transcoding Pipeline
    - **Domain:** Media Processing
    - **Objective:** To build a system that automatically transcodes uploaded videos into different formats and resolutions. The project would use serverless functions to trigger the transcoding process and store the final output in cloud storage.
- **P-010-CC**
    - **Title:** Web Hosting with PaaS

    - **Domain:** PaaS
    - **Objective:** To deploy a simple web application (e.g., a blog, a portfolio) using a Platform as a Service (PaaS) provider like Heroku, Google App Engine, or AWS Elastic Beanstalk. This project is a great introduction to the benefits of managed platforms.
- **P-011-CC**
    - **Title:** Cloud-Based Data Warehousing and Business Intelligence
    - **Domain:** Big Data & Analytics
    - **Objective:** To set up a data warehouse and perform business intelligence analysis. The project would involve ingesting data from different sources into a data warehouse and using a BI tool to create dashboards and reports.
- **P-012-CC**
    - **Title:** An AI Chatbot as a Cloud Service
    - **Domain:** AI & Serverless
    - **Objective:** To create a chatbot that uses a cloud-based AI service (e.g., Dialogflow, AWS Lex) for natural language understanding and a serverless function to handle the business logic and integration with other services.
- **P-013-CC**
    - **Title:** A Distributed Web Crawler
    - **Domain:** Distributed Systems
    - **Objective:** To build a web crawler that runs on multiple virtual machines. The project would use a message queue to distribute crawling tasks and a cloud database to store the collected data.
- **P-014-CC**
    - **Title:** Implementing Continuous Integration/Continuous Deployment (CI/CD)
    - **Domain:** DevOps
    - **Objective:** To set up a CI/CD pipeline for a web application using cloud-based tools (e.g., GitLab CI/CD, AWS CodePipeline). The pipeline would automatically build, test, and deploy the application with every code commit.
- **P-015-CC**
    - **Title:** Cloud-Based Predictive Maintenance
    - **Domain:** IoT & Machine Learning
    - **Objective:** To build a system that collects data from sensors on industrial equipment and uses a cloud-based machine learning model to predict when maintenance will be needed. The project would focus on anomaly detection.
- **P-016-CC**
    - **Title:** A Content Delivery Network (CDN) Setup
    - **Domain:** Networking & Performance
    - **Objective:** To improve the performance of a static website by using a CDN (e.g., Cloudflare, AWS CloudFront). The project would focus on configuring the CDN to cache assets and serve them from edge locations.
- **P-017-CC**
    - **Title:** A Cloud-Based File Sharing System
    - **Domain:** Storage

    - **Objective:** To develop a file-sharing web application that allows users to upload, download, and share files. The project would use a cloud object storage service for storing the files and a database for managing user data and permissions.
- **P-018-CC**
    - **Title:** A Cloud-Based Video Conferencing Service
    - **Domain:** Real-time & Media
    - **Objective:** To build a simple video conferencing service using a cloud-based real-time communication platform (e.g., WebRTC). The project would focus on managing connections and handling video streams.
- **P-019-CC**
    - **Title:** A Cloud-Based Gaming Backend
    - **Domain:** Gaming
    - **Objective:** To create a backend for a mobile or web game that uses a cloud database to store player data, achievements, and leaderboards. The project would focus on building a scalable and low-latency backend.
- **P-020-CC**
    - **Title:** Cloud-Based Network Monitoring
    - **Domain:** Networking & Security
    - **Objective:** To set up a system that monitors the performance and security of a cloud network. The project would use cloud-based monitoring services to collect logs and metrics and trigger alerts for suspicious activity.
- **P-021-CC**
    - **Title:** A Blockchain as a Service (BaaS) Application
    - **Domain:** Blockchain
    - **Objective:** To develop a simple decentralized application (dApp) using a BaaS platform (e.g., AWS Blockchain, Azure Blockchain). The project would focus on the ease of setting up and managing a blockchain network without deep expertise.
- **P-022-CC**
    - **Title:** A Serverless API Gateway
    - **Domain:** Serverless & API
    - **Objective:** To build a RESTful API using a serverless approach. The project would use a managed API gateway (e.g., API Gateway, Azure API Management) to handle requests and route them to serverless functions for processing.
- **P-023-CC**
    - **Title:** A Cloud-Based Social Media Dashboard
    - **Domain:** Big Data
    - **Objective:** To create a web application that collects data from social media APIs and analyzes it in the cloud. The project would focus on data ingestion, sentiment analysis, and visualization of trends.
- **P-024-CC**
    - **Title:** A Cloud-Based Document Search Engine
    - **Domain:** Data Management & Search

- **Objective:** To build a system that can index and search a large collection of documents (e.g., PDFs, Word files) stored in the cloud. The project would use a managed search service (e.g., Elasticsearch Service, Azure Cognitive Search).