**Section 1 : Topic Submission Form**

This form should be submitted by the mentioned deadline.

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Student Number:              PN1135379

Course: LJMU Master in Machine Learning and AI April 2024

**Fill your topic/s below**

# Project Title/Area 1: Design a diagnostic tool for the differentiation of skin cancer images

Dataset: HAM10000 (HUMAN Against Machine) dataset   (https://datasets.activeloop.ai/docs/ml/datasets/ham10000-dataset/)

Description: Use data augmentation and CNN with transfer learning to improve the accuracy of Skin cancer detection through digital images

Project Title/Area 2:   A new approach to Finanacial time series forecasting

Dataset: SP500 Stock Price by Ticker 06.08.2024(10years) (https://www.kaggle.com/datasets/paikim/sp500-stock-price-by-ticker-06-08-202410years)

Description:

1. ShoTS Forecasting: Short Time SeriesForecasting for Management Research(https://onlinelibrary.wiley.com/doi/epdf/10.1111/1467-8551.12624)

### [A bi‐level ensemble learning approach to complex time series forecasting: Taking exchange rates as an example](https://ljmu.primo.exlibrisgroup.com/discovery/fulldisplay?docid=cdi_proquest_journals_2844395262&context=PC&vid=44JMU_INST:44JMU_VU1&lang=en&adaptor=Primo%20Central&tab=Everything&query=any%2Ccontains%2Ctime%20series%20forecasting&offset=10). Hao, Jun ; Feng, Qian Qian ; Li, Jianping ; Sun, Xiaolei

### [A new linear & nonlinear artificial neural network model for time series forecasting](https://ljmu.primo.exlibrisgroup.com/discovery/fulldisplay?docid=cdi_webofscience_primary_000316516000011&context=PC&vid=44JMU_INST:44JMU_VU1&lang=en&adaptor=Primo%20Central&tab=Everything&query=any%2Ccontains%2Ctime%20series%20forecasting&offset=0).

Yolcu, Ufuk ; Egrioglu, Erol ; Aladag, Cagdas H.

### [Applying k‐nearest neighbors to time series forecasting: Two new approaches](https://ljmu.primo.exlibrisgroup.com/discovery/fulldisplay?docid=cdi_proquest_journals_3074207218&context=PC&vid=44JMU_INST:44JMU_VU1&lang=en&adaptor=Primo%20Central&tab=Everything&query=any%2Ccontains%2Ctime%20series%20forecasting&offset=0). Tajmouati, Samya ; Wahbi, Bouazza E. L. ; Bedoui, Adel ; Abarda, Abdallah ; Dakkon, Mohamed

1. A novel hybrid model combining βSARMA and LSTM for time series forecasting Bhupendra Kumar a , Sunil a , Neha Yadav b,∗

Project Title/Area 3: To use advanced techniques in object detection and recognition, such as using deep learning models like Faster R-CNN, YOLO, or SSD. Focus on improving accuracy and speed.

Dataset:  COCO dataset

Description:

### 1>[Computer vision using deep learning : neural network architectures with Python and Keras](https://ljmu.primo.exlibrisgroup.com/discovery/fulldisplay?docid=alma9911587915103826&context=L&vid=44JMU_INST:44JMU_VU1&lang=en&search_scope=MyInst_and_CI&adaptor=Local%20Search%20Engine&tab=Everything&query=any%2Ccontains%2Cobject%20detection%20recognition%20deep%20learning&offset=0)

Verdhan, Vaibhav, author.

### 2> [Object recognition and detection with deep learning for autonomous driving applications](https://ljmu.primo.exlibrisgroup.com/discovery/fulldisplay?docid=cdi_webofscience_primary_000407917500005CitationCount&context=PC&vid=44JMU_INST:44JMU_VU1&lang=en&adaptor=Primo%20Central&tab=Everything&query=any%2Ccontains%2Cobject%20detection%20recognition%20deep%20learning&offset=0)

Uçar, Ayşegül ; Demir, Yakup ; Güzeliş, Cüneyt; Fortino, Giancarlo ; Yıldırım, Tülay

London, England: SAGE Publications

### 3> [A Review of Machine Learning and Deep Learning for Object Detection, Semantic Segmentation, and Human Action Recognition in Machine and Robotic Vision](https://ljmu.primo.exlibrisgroup.com/discovery/fulldisplay?docid=cdi_doaj_primary_oai_doaj_org_article_377d698d4c3140beb80428080e86a0bb&context=PC&vid=44JMU_INST:44JMU_VU1&lang=en&search_scope=MyInst_and_CI&adaptor=Primo%20Central&tab=Everything&query=any%2Ccontains%2Cobject%20detection%20recognition%20deep%20learning&offset=0)

Manakitsa, Nikoleta ; Maraslidis, George S ; Moysis, Lazaros ; Fragulis, George F

### 4> [Computer Vision: Object Recognition with Deep Learning Applied to Fashion Items Detection in Images](https://ljmu.primo.exlibrisgroup.com/discovery/fulldisplay?docid=cdi_proquest_journals_2689289703&context=PC&vid=44JMU_INST:44JMU_VU1&lang=en&search_scope=MyInst_and_CI&adaptor=Primo%20Central&tab=Everything&query=any%2Ccontains%2Cobject%20detection%20recognition%20deep%20learning&facet=rtype%2Cinclude%2Cdissertations&offset=0)

### 5>[Joint Neural Networks for One-Shot Object Recognition and Detection](https://ljmu.primo.exlibrisgroup.com/discovery/fulldisplay?docid=cdi_proquest_journals_2579510567&context=PC&vid=44JMU_INST:44JMU_VU1&lang=en&search_scope=MyInst_and_CI&adaptor=Primo%20Central&tab=Everything&query=any%2Ccontains%2Cobject%20detection%20recognition%20deep%20learning&facet=rtype%2Cinclude%2Cdissertations&offset=0)

Vargas Cortes, Camilo Jose

**Fill in this section if a member of staff has agreed to be your supervisor:**

Member of Staff:    Mohammed Maaz                  \_\_\_\_

If you have found a supervisor then you and the member of staff who agreed to supervise your project should sign below.

*Sagarika Shukla*\_

Student Signature                                                                         Supervisor Signature

\_\_\_\_14/07/2024\_\_\_\_\_\_\_\_\_                                                                            \_\_\_\_\_\_\_\_\_\_\_\_

Date                                                                                               Date

**Section 2 : Topic Selection Research**

**Table 1 : Topic 1**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Title** | **Link to the Paper** | **Understanding of the Dataset** | **Understanding the Methodology Used** | **Dataset Link** |
| The HAM10000 dataset, a large collection of multi-source dermatoscopic images of common pigmented skin lesion | https://www.nature.com/  articles/sdata2018161 | collection of 10,015 multi-source dermatoscopic images of common pigmented skin lesions | **Sources**: The dataset includes images from multiple sources such as Rosendahl and ViDIR series.  **Extraction**: Images and metadata were extracted from PowerPoint files, diapositives, and a digital dermatoscopy system.  **Filtering**: An automated method was used to screen and categorize images into "overviews", "close-ups", and "dermatoscopy". | https://datasets.activeloop.ai/  docs/ml/datasets/ham10000-dataset/ |
| Advancements of Skin Cancer Classification using Transfer Learning Segmentation | <https://ieeexplore.ieee.org/document/10575608> | collection of 10,015 multi-source dermatoscopic images of common pigmented skin lesions | The study employs a Convolutional Neural Network (CNN) framework using ResNet101 and Transfer Learning to classify skin cancer. | https://datasets.activeloop.ai/  docs/ml/datasets/ham10000-dataset/ |
| Melanoma Skin Lesions Classification using Deep Convolutional Neural Network with Transfer Learning | https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=9425117 | collection of 10,015 multi-source dermatoscopic images of common pigmented skin lesions | Deep CNN architecture was used with transfer learning. Specifically, they used the ResNet-101 model, which was pre-trained on a large dataset and fine-tuned on the skin lesion images.  Images were resized, normalized, and augmented to enhance the training process.  The model was trained using a fully connected layer with two outputs. | https://datasets.activeloop.ai/  docs/ml/datasets/ham10000-dataset/ |
| Design and validation of a new machinelearning-based diagnostic tool for the differentiation of dermatoscopic skin cancer images | https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10104315/pdf/pone.0284437.pdf | collection of 10,015 multi-source dermatoscopic images of common pigmented skin lesions |  Applied data augmentation techniques to increase the dataset. Also  included EfficientNetB1 with additional layers for classification for model architecture | https://datasets.activeloop.ai/  docs/ml/datasets/ham10000-dataset/ |
| A Preliminary Research on Automatic Identification of Melanocytic Skin Lesions from Digital Images | https://www.sciencedirect.com/science/article/pii/S1877050923016277?via%3Dihub | collection of 10,015 multi-source dermatoscopic images of common pigmented skin lesions | data augmentation significantly improved model performance, and both smaller (150x150) and larger (320x225) image resolutions can produce good results, with trade-offs in terms of learning stability and resource requirements. | https://datasets.activeloop.ai/  docs/ml/datasets/ham10000-dataset/ |

**Table 2 : Topic 2**

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| --- | --- | --- | --- | --- |
| **Title** | **Link to the Paper** | **Understanding of the Dataset** | **Understanding the Methodology Used** | **Dataset Link** |
| Prediction of Stock Market Returns and Direction: Application of Machine Learning Models | <https://www.proquest.com>  /docview/2522710074/fulltextPDF?pq-origsite=primo | four stock indices: the S&P 500, FTSE 100, Bovespa, and All Share Index (ALSI) | machine learning techniques for classification problems, including Support Vector Machines (SVM), K-Nearest Neighbours (K-NN), Decision Trees (DTs), Random Forests (RFs), and Linear Discriminant Analysis (LDA) |  |
| Earnings Prediction using Machine Learning Methods and Analyst Comparison | <https://www.proquest.com>  /docview/2956856847/  fulltextPDF?pq-origsite=primo | the S&P 500, FTSE 100, Bovespa, and All Share Index (ALSI) spanning from 1995 to 2018 | Various ML models used in the study include K-Nearest Neighbors (KNN), CatBoost Classifier, Support Vector Machines (SVM), and Neural Networks. Using metrics like confusion matrix and accuracy tests to evaluate model performance. The predictive power of different variables used in the models. |  |
| Time series data analysis of stock price movement using machine learning techniques | https://link.springer.com/content/pdf/10.1007/s00500-020-04957-x.pdf | stock data from January 1, 2013, to December 31, 2018 | study mentions SVM's effectiveness in capturing stock price movement trends and neural network model used for binary classifiers. Logistic regression Used for binary classification, logistic regression helped in predicting the likelihood of a certain trend in stock prices. |  |
| A Deep Learning-Based Approach for Stock Price Prediction Using Bidirectional Gated Recurrent Unit and Bidirectional Long Short Term Memory Model | https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=9587895 | stock prices from the NIFTY-50 index | Comparative studies show deep learning models like LSTM outperform traditional methods. |  |
| STOCK PRICE PREDICTION USING LSTM,RNN AND CNN-SLIDING WINDOW MODEL | https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=8126078 | dataset includes minute-wise stock prices for 1721 companies listed on the NSE from July 2014 to June 2015 | method uses a sliding window approach to predict short-term future values of stock prices. CNN provided the most accurate predictions with the least percentage error compared to RNN and LSTM. |  |
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**Table 3 : Topic 3**

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| **Title** | **Link to the Paper** | **Understanding of the Dataset** | **Understanding the Methodology Used** | **Dataset Link** |
| Object recognition and detection with deep learning for autonomous driving applications | <https://journals>.sagepub.com/doi/pdf/10.1177/0037549717709932 | Caltech-101 for object recognitionCaltech Pedestrian dataset for pedestrian detection | uses multiple CNNs to learn local object features, applies Principal Component Analysis (PCA) to select discriminative features, and then uses SVMs for classification |  |
| Research on Object Detection Method Based on FF-YOLO for Complex Scenes | <https://ieeexplore>  .ieee.org/stamp/  stamp.jsp?tp=&  arnumber=9524623 |  The paper uses the Pascal VOC2007 dataset, which includes 5011 training images and 4952 test images across 20 object categories.   The MS COCO dataset is also used, which contains over 140,000 images across 80+ categories. | FF-YOLO (YOLO with enhanced feature-fusion) for complex scenes |  |
| Enhancing Object Detection for VIPs Using YOLOv4\_Resnet101 and Text-to-Speech Conversion Model | <https://mdpi-res>.  com/mti/mti-07-00077/article\_deploy  /mti-07-00077.pdf?  version=1690968530 | Microsoft Common Objects in Context (MS COCO) dataset | System was developed using YOLOv4\_Resnet101 for real-time object detection and recognition to assist VIPs in navigating their surroundings |  |
| Performance analysis of deep learning‑based object detection algorithms on COCO benchmark | <https://jeas>.  springeropen.com  /counter/pdf/10.1186  /s44147-024-00411-z.pdf | COCO (Common Objects in Context) dataset | study analyzed several state-of-the-art deep learning-based object detection algorithms, including Faster R-CNN, Mask R-CNN, D-RFCN + SNIP, NAS-FPN, DetectorRS, and DyHead |  |
| Improved Residual Networks for Image and Video Recognition | <https://ieeexplore>.  ieee.org/stamp/  stamp.jsp?tp=&  arnumber=9412193 |  ImageNet (main dataset)   CIFAR-10 and CIFAR-100   Kinetics-400 and Something-Something-v2 (video datasets)   COCO (object detection) | paper introduces modifications to three main components of ResNets: information flow through the network, the residual building block, and the projection shortcut |  |
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