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| **Module Name** | | **Data Analytics Major Project** | |
| **Assessment** | | **Assessment Element – 010 - Project Proposal** | |
| **Module Code** | | **MOD007894** | |
| **Student ID** | | **2171181** | |
| **Full Name** | | **Kokhila Shanmugam Yuvan Bharathi** | |
| **Placement Provider** | |  | |
| **Placement Supervisor** | |  | |
| **Academic Supervisor** | |  | |
| **Project Title (15 words Max)** | | | |
| **Human Identification from spoken digits using Convolutional Neural Network** | | | |
| **Project Summary (200 words)** | | | |
| Written digit recognition using the MNIST dataset is a well studied problem and has  motivated many studies involving autoencoders. In this project we will attempt to use  autoencoders to recognise spoken digits from the free spoken digits dataset (FSDD)  [[https://github.com/Jakobovski/free-spoken-digit-dataset].](https://github.com/Jakobovski/free-spoken-digit-dataset)  Our plan is to transform cleaned audio signals into spectrograms which we will then use to  train and test our autoencoder.  If the autoencoder can be trained successfully we may extend the project to make use of  our autoencoder to create a speech synthesiser that can speak digits with user selected  accents | | | |
| **Project Aim (50 words)** | | | |
| The main aim of the project is to build an autoencoder that can recognise spoken digits.  A secondary aim is to create a spoken digit synthesiser | | | |
| **Project Objectives (Outline 2 to 4 Objectives)** | | | |
| Objective 1: To clean and transform spoken digit audio signals into spectograms.  Objective 2: Design, train and test an autoencoder using the spectrograms of audio signals  from the FSDD collection.  Objective 3: Create a spoken digit synthesiser by sampling from the middle layer of the  autoencoder. | | | |
| **Methodology (200 words)** | | | |
| This project will help us to classify a person based on his digit speech using a convolutional neural network. The audio signals can be converted into spectrogram using librosa library in python. It is an imbuilt library used for processing audio files in python. We will use deep CNN Autoencoders in this project. Keras library in Tensorflow will help us to build an autoencoder with both encoder and decoder. The dataset currently has around 3000 samples, we use the test train split function provided by the sklearn library in python with a ratio of 90:10. After training the model, we feed the input data in the form of image with appropriate epochs, activation function and loss function.Then for testing the autoencoder both the training accuracy and validation accuracy can be noted and for each epoch value they can be represented in graphs for better understanding.  6) How will you tell if your autoencoder clusters digits successfully  7) How do you intend to create a spoken digit synthesiser? | | | |
| **Expected Contribution (100 words)** | | | |
| We will develop an autoencoder for converting audio files into spectrogram then generate unique digit sounds using a digit synthesiser.  They can also be used to analyse the audio signals and detect the speaker with respect to the voice.  Further, by increasing the dataset we try to generate a model which can help us to predict the accent or region of the person based on his speech.  Digit synthesiser can be used to generate sound signals and spectrogram which can be used to improve the existing dataset and help us to produce unique speech signals. | | | |
| **Ethics Course Completion Certificate** | | | |
| A blue and white certificate  Description automatically generated with low confidence | | | |
| **Stage1 Research Ethics Submission Evidence** | | | |
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| **Research Plan** | | | |
| |  |  |  |  |  | | --- | --- | --- | --- | --- | | Research Plan | hours | Evaluation  form | Timeline | | | Framework Reading | 20 | Report | 14/05/2023 | 20/05/2023 | | Initial project proposal | 20 | Report | 16/05/2023 | 20/05/2023 | | Literature survey | 55 | Report | 22/05/2023 | 10/06/2023 | | Collecting data and research papers required for the proposed topic | 5 | Report | 04/06/2023 | 10/06/2023 | | Research on the significant technology | 25 | Report | 12/06/2023 | 18/06/2023 | | Completing the project proposal sheet | 30 | Report | 01/06/2023 | 26/06/2023 | | Dataset collection for the proposed model | 10 | Code | 27/06/2023 | 28/06/2023 | | Testing the existing proposed model | 15 | Code | 28/06/2023 | 30/06/2023 | | Start Writing paper | 30 | Report | 01/07/2023 | 01/08/2023 | | Try building a neural network system | 60 | Code | 01/07/2023 | 15/07/2023 | | Try building an autoencoder | 20 | Code | 01/07/2023 | 10/07/2023 | | Train and Test data | 10 | Code | 11/07/2023 | 16/07/2023 | | Analysis and troubleshooting of problem | 10 | Code | 17/07/2023 | 22/07/2023 | | Writing thesis | 80 | Report | 01/07/2023 | 10/09/2023 | | Presentation preparation | 10 | PPT | 24/07/2023 | 26/07/2023 | | Conclude the results | 5 | PPT and Report | 08/09/2023 | 10/09/2023 | | Present the Master thesis | 5 | PPT and Report | 10/09/2023 | 13/09/2023 | | Defend Master thesis and bring weensy changes | 5 | Report | 10/09/2023 | 15/09/2023 | | Future work and updations | 10 | Report | 10/09/2023 | Future | | | | |
| **Signed and approved by:** | | | |
| **Academic Supervisor Feedback:** |  | | |
| **Academic Supervisor signature** |  | | **Date:** |
| **Placement Supervisor Feedback:** |  | | |
| **Placement Supervisor**  **signature** |  | | **Date:** |