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| **TSC Category** | Development and Implementation | | | | | |
| **TSC Title** | Pattern Recognition Systems | | | | | |
| **TSC Description** | Develop and apply intelligent pattern recognition systems and techniques to analyse data and derive useful hidden patterns to solve problems | | | | | |
| **TSC Proficiency Description** | **Level 1** | **Level 2** | **Level 3** | **Level 4** | **Level 5** | **Level 6** |
|  |  |  | **ICT-DIT-4026-1.1** | **ICT-DIT-5026-1.1** |  |
|  |  |  | Analyse data by deriving useful hidden patterns in the data, select and apply the most suitable pattern recognition techniques to solve problems and develop pattern recognition systems | Develop intelligent systems using machine learning techniques |  |
| **Knowledge** |  |  |  | * Pattern recognition and machine learning techniques * Types of and steps in solving pattern recognition problems * Supervised learning and unsupervised learning * Data pre-processing with labelled and unlabelled data * Methods of pattern recognition using component analysis and dimension reduction * Deep neural networks for vision recognition problems * AI Ethics | * Pattern recognition and machine learning techniques * Neural networks, modelling and design * Deep neural networks and deep learning * Convolutional neural networks, architecture and applications * Recurrent neural networks, architecture and applications * Hybrid and ensemble approaches to problem solving * AI Ethics |  |
| **Abilities** |  |  |  | * Model applied problems as pattern recognition tasks * Identify suitable pattern recognition techniques to solve the given problems * Solve classification and prediction problems with labelled data * Solve clustering and anomaly detection problems using unsupervised learning techniques * Assess and compare alternative pattern recognition methods for given tasks * Design and train deep neural network models for machine learning systems * Analyse the results and suggest the possible improvement | * Assess and compare the suitability of advanced pattern recognition and machine learning techniques across a range of problem domains * Apply deep learning and other advanced machine learning techniques to solve problems * Solve temporal sequential problems using recurrent neural networks * Build intelligent systems using deep learning and other advanced pattern recognition techniques * Design and implement signal processing methods using machine learning * Design and implement signal processing methods for signal processing tasks * Evaluate the performance of signal processing |  |
| **Range of Application** |  | | | | | |