25th January 2022

HITESH GOYAL
VELLORE INSTITUTE OF TECHNOLOGY
CHENNAI

<div align="center">

**Subject: Letter of Recommendation**

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**Dear HITESH GOYAL,**

It is a pleasure to certify that you have successfully completed the module on '**Data Analytics using Deep Learning**' by Hewlett Packard Enterprise, Education Services as part of the Global Academic Internship Programme (GAIP), from 12th December 2022 to 30th December 2022.

The module consisted of the following topics:

Machine Learning vs Deep Learning
- Sample demos - When is machine learning right?
- Sample demos - When is deep learning right?
- Identifying a problem and building solution

Optimization and Tuning
- Learning rate
  - Adam Optimizer
  - Custom Optimization Functions
- Momentum
  - Speed up convergence of 1st order optimizations (Gradient Descent)
- Parameter initialization strategy
- Data normalization
- Batch normalization
- Hyperparameter tuning strategy
- GPU and Hardware acceleration
- Setting up Hardware acceleration, effect on the network and best practices

Deep Learning Project Management
- Data Engineering Fundamentals and Pipelines
- Data pre-processing techniques
- Data labelling – Manual and Automatic Process
- Benchmarking Baseline and Comparing models
- Data augmentation – Noise, Interpolation, Extrapolation, Image Data Generator
- Transfer learning
  - Types of Transfer Learning
  - Preparing model for Transfer Learning
  - Transfer learning in Action – ResNet, VGGNet

Performance Measurement

- Data Optimization Strategies, Missing Data, Subsampling and Oversampling
- Performance Management Strategies- Algorithms and Hyperparameters revisited
- Early Stopping Strategies with Back-propagation and Generalization
- Ensemble methods
  - Generating Sub-models and Aggregating into One Model
  - Bagging Models
  - Stacking
  - Step by Step Strategy for Measuring and Understanding Network Performance

AI in Law and Ethics

- The Laws and Regulations

Designing an AI solution for Scale

- With and Without Cloud
- Project Specific Pipelines

Capstone Project

- Applying deep learning to real-life use case

Your performance in GAIP is found to be **EXCELLENT.** We wish you the very best in your career ahead.

Sincerely,

Mr. Clarence Lai
Country Manager Singapore
Education Services HPE
Point Next
Hewlett Packard Enterprise

Mr. Rajesh Panda
Managing Director
Corporate Gurukul Pte. Ltd.
Singapore