NUS | Strategic Technology Management Institute
School of Computing

23rd June, 2018

Raghav Prasad
BITS Pilani - Goa Campus
Goa

Dear Raghav Prasad,

**Subject: Letter of Evaluation**

This is with reference to the Global Academic Internship Programme (GAIP) conducted by Corporate Gurukul from 2nd June, 2018 to 23rd June, 2018 on **'Big Data Analytics using Artificial Neural Networks'**. The course work for internship included the following:

Programming Methodology with Python
- Overview of Python and Its Syntax
- Variables, Operators and Arithmetic Expressions
- Basic Data Structures
- Basic Input and Output
- Conditional Control Flow
- Iterative Control Flow

Introduction to Python Data Science Libraries
- Numpy
- Scipy
- Matplotlib
- Sci-kit Learn

Introduction to Data Analytics
- What is Descriptive Analytics?
- Exploratory Data Analysis
  - Data Visualisation
  - Descriptive Statistical Measures
    - Populations and Samples
    - Measures of Location
    - Measures of Dispersion
    - Measures of Shape
    - Measures of Association
  - Overview of Predictive Analytics

Introduction to Regression Analysis
- Simple Linear Regression
- Multiple Linear Regression
- Stepwise Regression
- Coding Scheme for Categorical Variables
- Problems with Linear Regression

Introduction to Classification

- Decision Trees
- Bayesian Classifier
- Logistic Regression
- Support Vector Machine
    - Separating Hyperplane
    - Maximal Margin Classifier
    - Support Vector Classifier
- Resampling Methods

Introduction to Clustering

- Affinity Measures and Partition Methods
- K-means
- K-medoids
- Hierarchical Methods

Introduction to Association

- Structure and Representation of Association Rules
- Strong Association Rules and the Concept of Frequent Itemset
- Apriori Algorithm
- FP Growth
- Time Series Analysis

Overview of ANN

- Why ANN?
- Break-through Applications with ANN
- Problems of Logistic Regression

Multi-layer Perceptron Model (MLP)

- Training MLP in Python
    - With Keras
    - On Amazon/Google GPU cloud platform

Gradient Descent Algorithm (GD)

Advanced GD algorithm

- Stochastic GD (SGD)
- Mini-batch SGD
- Momentum SGD
- RMSprop and Adam
- Application of Advanced GD and Training Techniques for MLP in Python

Difficulties of training ANN

- Poor Gradient
- Overfitting and Underfitting

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Other Training Techniques of ANN
- Random Initialization
- ReLU
- Dropout
- Data Augmentation

Convolutional Neural Networks (CNN)
- Convolution, Pooling Operations
- Popular CNN Architectures
- Applications of CNN in Python

Recurrent Neural Networks (RNN)
- Vanilla RNN
- LSTM and GRU
- Applications of RNN in Python

Your performance in GAIP was evaluated based on theoretical understanding and application of concepts in practical data analysis with **GRADE A-.**

I encourage you to further your knowledge, skills and research in the above areas and wish you the very best for a career ahead!

Sincerely

Dr. Tan Wee Kek
Strategic Technology Management Institute
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