

Digital Skills
Training
Programs at
Knowledge
Technology

**APPLIED
MACHINE
LEARNING**

- The Applied Machine Learning course is a rigorous 3-day certificate course designed for working professionals to help them apply Machine Learning to improve every aspect of human life.
- This course covers two main areas
 - Supervised Learning
 - Unsupervised Learning



KNOWLEDGE TECHNOLOGY
R E S E A R C H U N I T

| | |
|-------------------------|--|
| Course Title | Applied Machine Learning |
| Duration | 3 Days |
| Trainer | Assoc. Prof. Dr. Rayner Alfred |
| Cost | Email ralfred121@gmail.com or call 013-881-9966 for quotations |
| Max Participants | 25 |

SYNOPSIS

Our approach to this course is to teach the underlying concepts and math of Machine Learning. Going beyond the theory, our approach invites participants to go through several practical sessions, where learning is facilitated by live subject matter experts and enriched by practitioners in the field of machine learning.

LEARNING OUTCOMES

The course requires learners to work on application projects. These projects require learners to apply the Machine Learning concepts they have learned to datasets and derive inferences. These application projects are intentionally made to be challenging. We expect learners to spend substantial time and effort solving the application projects. At the end of the course, we expect learners to be able to apply Machine Learning to solve many of the business problems they face at their workplace.

JUSTIFICATION TO LEARN APPLIED MACHINE LEARNING

Machine Learning has become an entrenched part of everyday life. The books we buy, the movies we watch, the sports we follow, the driving directions we get are driven by Machine Learning algorithms. It is one of the most exciting fields of computing today. And Machine Learning practitioners are in high demand, with a shortfall of 250,000 data scientists forecast.

TOPICS LIST

- [1] Supervised Learning
- a. Regression
 - b. Bayesian Methods
 - c. Foundational Classification Algorithms
 - d. Refinements to Classification
 - e. Intermediate Classification Algorithms

- [2] Unsupervised Learning
- a. Clustering Methods
 - b. Recommendation Systems
 - c. Sequential Data Models
 - d. Association Analysis
 - e. Clustering Methods

COURSE SYLLABUS (3 DAYS)

| DAY | TOPICS COVERED | TIME |
|-------|--|------------------------|
| One | MODULE 1: REGRESSION <ul style="list-style-type: none"> ➤ Maximum Likelihood ➤ Least Squares ➤ Regularization | 9:00 am – 10:30 am |
| | MODULE 2: BAYESIAN METHODS <ul style="list-style-type: none"> ➤ Bayes Rule ➤ MAP Inference ➤ Active Learning | 11:00 am – 12:30 pm |
| | MODULE 3: FOUNDATIONAL CLASSIFICATION ALGORITHMS <ul style="list-style-type: none"> ➤ Nearest Neighbours ➤ Perceptron ➤ Logistic Regression | 2:30 pm – 4:00 pm |
| Two | MODULE 4: REFINEMENTS TO CLASSIFICATION <ul style="list-style-type: none"> ➤ Kernel Methods, ➤ Gaussian Process | 9:00 am – 10:30 am |
| | MODULE 5: INTERMEDIATE CLASSIFICATION ALGORITHMS <ul style="list-style-type: none"> ➤ SVM ➤ Trees ➤ Forests ➤ Boosting | 11:00 am – 12:30 pm |
| | MODULE 6: CLUSTERING METHODS <ul style="list-style-type: none"> ➤ K-Means Clustering ➤ E-M ➤ Gaussian Mixtures ➤ Model Comparisons ➤ Analysis Considerations | 2:30 pm – 4:00 pm |
| Three | MODULE 7: RECOMMENDATION SYSTEMS <ul style="list-style-type: none"> ➤ Collaborative Filtering ➤ Topic Modelling ➤ PCA | 9:00 am – 10:30 am |
| | MODULE 8: SEQUENTIAL DATA MODELS <ul style="list-style-type: none"> ➤ Markov and Hidden Markov Models, ➤ Kalman Filters | 11:00 am – 12:30 pm |
| | MODULE 9: ASSOCIATION ANALYSIS <ul style="list-style-type: none"> ➤ Market Basket Analysis | 2:30 pm – 4:00 pm |

TRAINER'S BIOGRAPHIES



RAYNER ALFRED

ASSOCIATE PROFESSOR OF COMPUTER SCIENCE

Certified IBM DB2 Academic Associate, Certified Tester Foundation Level (CTFL)

AREAS OF SPECILIZATION: Advanced Machine Intelligence, Data Analytics, Data Mining, Information Retrieval, Artificial Intelligence, Machine Learning, Knowledge Discovery

ADDRESS: Knowledge Technology Research Group, Faculty of Computing and Informatics, Universiti Malaysia Sabah, Jalan UMS, 88400 Kota Kinabalu, Sabah.

CONTACT: Mobile: 6013-881-9966, eMail: ralfred@ums.edu.my

Rayner Alfred is an Associate Professor of Computer Science at the Faculty of Computing and Informatics, Universiti Malaysia Sabah in Malaysia that focuses on Data Science and Software Engineering programmes. He leads and defines projects around knowledge discovery, information retrieval and machine learning that focuses on building smarter mechanism that enables knowledge discovery in structured and unstructured data. His work addresses the challenges related to big data problem: How can we create and apply smarter collaborative knowledge discovery and machine learning technologies that bridge the structured and unstructured data mining and cope with the big data problem.

Rayner completed his PhD in 2008 looking at intelligent techniques using machine learning to model and optimize the dynamic and distributed processes of knowledge discovery for structured and unstructured data. He holds a PhD degree in Computer Science from York University (United Kingdom), a master's degree in computer science from Western Michigan University, Kalamazoo (USA) and a Computer Science degree from Polytechnic University of Brooklyn, New York (USA) where he was the recipient of the *Myron M. Rosenthal Academic Achievement Award* for the outstanding academic achievement in Computer Science in 1994. He has authored and co-authored more than 100 journals/book chapters and conference papers, editorials, and served on the program and organizing committees of numerous national and international conferences and workshops.

Rayner is currently a member of IEEE, a Certified Software Tester (CTFL) from the International Software Testing Qualifications Board (*ISTQB*), and a certified IBM DB2 Academic Associate (IBM DB2 AA). He leads the Advanced Machine Intelligence (AMI) research group in UMS and he has led several projects related to knowledge discovery and machine learning on Big Data. Rayner is also the recipient of the Research Fellow at Japan Advanced Institute of Science and Technology (JAIST), Japan. He is also the recipient of multiple GOLD awards at national and international research exhibitions in Data Mining and Machine Learning based solutions (Face Recognition and Knowledge Discovery), that include International Trade Fair Ideas in Nuremberg, Germany (iNEA2018) International Invention Innovation Competition in Toronto, Canada (iCAN 2018), Seoul International Invention Exhibition in Seoul, Korea (SIIF 2010). He has secured RM6,931,433.00 worth of project grants. Some of his project researches include biometric authentication using face recognition, building security based on plate number recognition using deep learning, sentiment analysis for Malay and English in measuring public opinion, news-news correlation trending, machine learning algorithm-based solution for predicting diseases in health care, smart monitoring using an ensemble based face recognition system and smart information management and retrieval to name a few.