***Open Machine Learning for Earth Observation (ML4EO) in Rwanda:***

***Developing and Implementing an Application Oriented Training***

**Program: Presence-based Training Block:**

* Module 6: Predictive Modelling Using EO Data
* Module 7: ML Workflow Best Practice
* Field Trip: Ground Truth Data Collection

**12th to 15th May 2023, Digital Transformation Centre, Kigali**

**DAY 1 – MODULE 6:**

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| 09:00 - 09:15 | Welcome / opening of workshop   * Rules & regulations (quick recap) * Intro to M6/M7, expectations & objectives | Anselme: Rules & Regs  Abrham: Expectations & objective |
| 09:15 - 09:30 | * Motivation: finish the course * Presentation on Module 10: business problems & research questions *With Mark Tyrrell, GFA* | REMOTE: Mark  Laptop connected to screen + loudspeaker |
| **INTRODUCTION TO ML WITH EO DATA** | |  |
| 09:30 – 10:00 | * Recap M5   + Submission channel will be setup on Moodle   + Participants to be graded on Ex5.2 & Ex5.5) * Informal group quiz M6 | Abrham + Yonas |
| 10:00 – 10:15 | Tea break |  |
| 10:15 - 11:15 | Lecture, Q&A: ML4EO Applications, Methods & Models  *With Dr. Philippe Rufin / Dr. Benjamin Jakimow of Humboldt-University Berlin (Germany)* | REMOTE: lecture  Laptop connected to screen + loudspeaker |
| **TRANSFER LEARNING FOR EO DATA MODELING** | |  |
| 11:15 – 12:00 | Lecture, Q&A: Use of foundational models for prediction and classification  *With Esaie Dufitimana, doctoral researcher at AIMS* | Esaie |
| 12:00 – 13:00 | Lunch break |  |
| **DATA SOURCING CONSIDERATIONS IN EO MODELING & ANALYSIS** | |  |
| 13:00 – 14:00 | **Guest Lecture**, Q&A: Open source vs. proprietary EO data  *With Kaspar Kundert, of Geo4DataAfrica* | **Mark will provide slides** |
| **EXERCISES**  *With Abrham Gebreselasie in association with CMU Africa; supported by Esaie Dufitimana & Yonas Chanie* | |  |
| 14:00 – 14:30 | Code along 1 for Exercise 1 | Abrham + Yonas |
| 14:30 – 15:00 | Exercise 6\_1 | Abrham + Yonas |
| 15:00 – 15:15 | Tea break |  |
| 15:15 – 16:15 | Exercise 6\_1 | Abrham + Yonas |
| 16:15 – 16:45 | Code Along 2 for Exercise 2: Part 1 | Abrham + Yonas |
| 16:45 – 17:00 | Daily evaluation | Anselme |

**DAY 2 – MODULE 6:**

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| 09:00 – 09:20 | * Recap of learnings of previous day * Feedback daily evaluation | Abrham + Yonas |
| **EXERCISES (CONT.)** | |  |
| 09:20 - 10:00 | Code Along 2 for Exercise 2: Part 2 | Abrham + Yonas |
| 10:00 – 10:30 | Exercise 6\_2 | Abrham + Yonas |
| 10:30 - 10:45 | Tea break |  |
| 10:45 – 12:00 | Exercise 6\_2 | Abrham + Yonas |
| 12:00 – 13:00 | Lunch |  |
| 13:00 – 15:00 | Exercise 6\_4 | Abrham + Yonas |
| 15:00 – 15:15 | Tea break |  |
| 15:15 – 16:30 | Exercise 6\_5 | Abrham + Yonas |
| 16:30 – 17:00 | Daily evaluation | Anselme |

**DAY 3 – MODULE 7:**

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| 09:00 - 09:15 | * Module objectives and program | Abrham + Yonas |
| 09:15 – 09:45 | Informal group quiz M6 | Abrham + Yonas |
| 09:45 – 10:00 | Tea break |  |
| **EFFICIENT HYPERPARAMETER TUNING FOR EO DATA MODELLING** | |  |
| 10:00 – 10:30 | Lecture, Q&A: Rationale, use cases and methods for efficient hyperparameter tuning  *With Abrham Gebreselasie, Research Associate at CMU* | Abrham + Yonas |
| **EXPERIMENT TRACKING** | |  |
| 10:30 – 11:15 | Lecture, Q&A: Introduction to experiment tracking methods and tools for machine learning  *With Abrham Gebreselasie, Research Associate at CMU* | Abrham + Yonas |
| 11:15 – 12:00 | Exercise 7\_1 (Exercise 6\_1 on Wandb) | Abrham + Yonas |
| 12:00 – 13:00 | Lunch break |  |
| **CONTINUOUS INTEGRATION / CONTINUOUS DEPLOYMENT (CI/CD) WITH ML** | |  |
| 13:00 – 13:30 | Lecture, Q&A: Introduction to CI/CD in the ML context  *With Abrham Gebreselasie, Research Associate at CMU* | Abrham + Yonas |
| 13:30 – 15:00 | Exercise 7\_2 (Exercise 6\_2 on Wandb) | Abrham + Yonas |
| 15:00 – 15:15 | Tea break |  |
| 15:15 – 16:30 | Exercise 6\_3 (Module 6 contd.) | Abrham + Yonas |
| 16:30– 17:00 | Daily evaluation | Anselme |

**DAY 4 – FIELD TRIP WITH RCID:**

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| **09:00** | * Meet at DTC * ***Please be on time as we cannot wait for latecomers!*** |
| 09:00 - 10:00 | * Drive to field trip site |
| **GROUND TRUTH DATA COLLECTION EXERCISE** | |
| 10:00 - 11:00 | GROUP 1: Data collection with respondent (interview farmer) |
| GROUP 2: Data collection with instruments |
| 11:00 - 12:00 | GROUP 1: Data collection with instruments |
| GROUP 2: Data collection with respondent (interview farmer) |
| 12:00 – 13:00 | * Return to DTC |
| 13:00 – 14:00 | Lunch |