**Module 12**

**Real-Time SSRAI with HPC CI**

**Outline:**

**Overview of Module**

**A guide to develop SSRAI project**

**A guide to use high performance computing**

**Overview of Module:**

This module is a capstone learning project and its aim is to apply learned knowledge toward building safe, secure, and reliable (SSR) artificial intelligence (AI) systems. Learners can take advantage of using high performance computing (HPC) to make their project feasible and fast. To begin, we recommend taking a few minutes to review some important concepts of last modules and then start their own project to put learned materials together.

**A guide to develop SSRAI project:**

This section of module helps you to practice well for every AI development project. For this module, you need to choose an AI-addressable problem. Every AI, machine learning based project follows problem definition, data gathering, feature definition, AI model construction, and evaluation. AI development project can be categorized as classification, regression, clustering, anomaly detection, and recommendation.

It is important to determine your project classified in which category so you can use suitable AI model and move toward your goals. If your defined problem is not tractable, try to simplify it. For example, you want to classify costumer’s reviews on a website into five levels of satisfaction. Satisfaction can be hard to measure, so you can limit the level of satisfaction to two/three class to determine if there are simpler task. Or even you can find other correlated tasks with satisfaction measurement.

The next step, data gathering involves a number of steps. Data is crucial and can significantly affect the overall performance. You can choose pre-defined and cleaned dataset or create your own dataset that is suitable for your use case by web crawling and scraping. In AI project, choosing informative, discriminating and independent variables is a crucial element. Try to find significant patterns in your data and then define features which are what your model is looking for.

In the next step think about the right ML model for your AI project. Different algorithms may be suitable for developing your project, so you need to pinpoint the best architecture for your model. The last phase is considering the model outcomes according to any possible evaluation method. Apply your appropriate evaluation methods to provide different perspective.

**A guide to use high performance computing:**

While working on this project, you will see the limitation that you reach during the process of designing and implementing algorithms for your resource-intensive tasks. You may experience a bottleneck may appears during the training of a simple model which takes hours, days, and even weeks with billion parameters on a laptop, typically without GPU.

This module’s aim is showing you that HPC are an essential to work with AI projects. Explore existing companies that give their users access to GPUs. Run your model using HPC to accelerate running time.

It is time to practice your real-time SSRAI project to reflex what have you learned from cybersecurity modules.