

NUS SCALE Youth Programme FUTURE SERIES

Summer/Winter On-Campus Camp
for Aspiring Youth Age 15 - 18



NUS SCALE Youth Programme Artificial Intelligence and Machine Learning Fundamentals

This 1-week youth programme is specially curated for pre-university and high school students in Grades 10-12, to introduce Artificial Intelligence and Machine Learning and their applications to the young generation of talents. AI and Machine Learning are the most disruptive technology of the future, since they can dramatically increase the operational performance of different businesses, as well as they explore new areas and will change our society and business models. Therefore, knowing how they work and what they are is a must for the next generation of experts.

Over the course of these lectures, participants will gain an understanding of what AI and Machine Learning actually are, and the basic principles behind them. From these fundamentals, they will then be provided with an overview of the current AI/Machine Learning trends, and their applications in modern businesses.

At the end of the course, the participants will:

- Build a solid foundation to enable participants to further develop their AI skillset over the course of their training and careers.
- Equip themselves with the basic skills and knowledge to allow them to identify opportunities to improve their personal and business performance through AI.

Target Audience and Pre-Requisites

Who should attend?	Pre-University and high school students in Grade 10 - 12, with an interest in exploring AI and its applications. The course is not restricted to STEM students, as the material will cover the basics of AI/Machine Learning through advanced applications.
Programme	Participants are expected to be able to read, write and communicate in English, as the programme will be conducted in English.
Pre-requisites	There are no subject-matter-specific prerequisites to attend this programme. The minimum age requirement is 15 years old, at the start of the programme.

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Lesson Overview

	Topics
Session 1	<p>Introduction to AI</p> <ul style="list-style-type: none"> - Introduction to AI - A brief review of AI history - AI applications: State of the art - AI, Machine Learning and Deep Learning - Future of AI
Session 2	<p>AI Principles</p> <ul style="list-style-type: none"> - AI approaches - Logic - Machine learning - Deep learning <p>Discussion on Mini Project</p>
Session 3	<p>Machine Learning</p> <ul style="list-style-type: none"> - Introduction – Example - Hands-on Workshop: Orange - ML Approaches
Session 4	<p>Machine Learning Case Studies and Application</p> <ul style="list-style-type: none"> - Clustering - Function Estimation - Classification, KNN - Hands-on Workshop: Orange
Session 5	<p>Mini Projects Presentations and Team Feedback</p>

Case studies will follow the division of the course into two principal components:

1. Introduction to AI: Case studies will cover examples to demonstrate the underlying basic principles and methodologies
2. Introduction to Machine Learning: Case studies will be in the form of real-life applications of Machine Learning in real-world data classification.