Workshop Proposal

(1) Team Members

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(2) Intended Learning Outcomes (for Service Recipients)

By the end of the workshop, learners will be able to:

A) Understand the concepts of A.I., machine learning, and their applications in daily life;

B) Understand the issues related to data bias in machine learning;

C) Understand how A.I. object recognition technology can be applied for social goods;

D) Apply Mind+ and basic trigonometric functions in designing flying routes of their drone (calculate distance and angle);

E) Understand ethical issues of A.I.

(3) Detailed Lesson Plan (12-hour workshop) for Days 1 to 4

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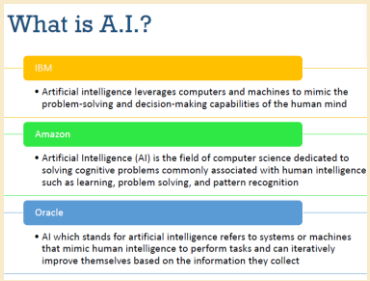
Date	Topic	Learning Activities & Objectives	ILOs	Duration	Materials Needed	Evaluation Plan
Day 1	Ice-breaking	1) Two truths and a lie - For trainers and learners to know one another	/	5-10 mins	PPT	/
	Workshop & Competition Overview	1) Pre-survey - For trainers to understand how well learners know about A.I., trigonometry, and programming 2) Workshop schedule for each day 3) Introduction to the competition arrangement 4) Kahoot! quiz - Emphasize the workshop schedule and competition arrangement to make sure that all learners remember clearly	/	10-15 mins (4'+2'+2'+4')	Pre-survey, PPT, and Kahoot!	Kahoot! (100% correct)
	Artificial Intelligence	1) YouTube Video: What is Artificial Intelligence? (About 5' 30'') https://www.youtube.com/watch?v=2ePf9rue1Ao - Summarize the contents of the video on PPT - Introduce concepts of A.I. on PPT  2) True or False questions: Is it an example of AI? - (Ask directly) show 10 examples on PPT, and let learners decide whether each of them is an example of A.I. (8T and 2F), and give answers with explanations 3) YouTube Video: A.I. fools human - Google assistant calling a restaurant for a reservation (About 1') https://www.youtube.com/watch?v=-RHG5DFAjp8 - Summarize potential risks due to rapid A.I. technology changes on PPT after video	A	20-25 mins (9'+10'+3')	Videos and PPT	True or False (90% correct)
	10-min Break					

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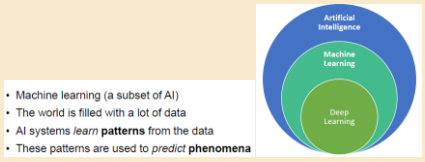
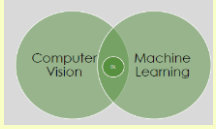
	Machine Learning (Part 1)	1) YouTube Video - What is Machine Learning? (About 2'20'') https://www.youtube.com/watch?v=f_uwKZIAeM0 - Summarize the contents of the video on PPT - Introduce concepts of M.L. on PPT  2) Quick Draw https://quickdraw.withgoogle.com - Let learners feel how a machine learns and think about how to teach a machine better 3) Cats vs. Dogs (manual identification) - Show 10 examples on PPT let learners identify unique characteristics of each kind of object (5C and 5D), and lead them to summarize the way humans learn - Summarize differences between how humans and machines learn on classifying objects on PPT 4) Google Teachable Machine - Show 8 sample pictures, and let learners train the machine to recognize cats and dogs. Give them 4 test pictures, and let them use the machine to identify them. 5) Introduce 7 steps in M.L. on PPT 6) YouTube Video - Top 10 Applications of Machine Learning (About 5'20'') https://www.youtube.com/watch?v=HKcO3-6TYr0 - Summarize the contents of the video on PPT	A	40-45 mins (5'+5'+10'+10'+5'+7')	Videos, PPT, and Laptop with Webcam	Classify cats and dogs (90% correct)
	Wrap-up (Optional)	1) A.I. game https://code.org/oceans	A	0-10 mins	PPT	/
Day 2	Machine Learning (Part 2)	1) Introduce the relationship between A.I., M.L., D.L., and computer vision on PPT 	A	15-20 mins (5'+6'+6')	PPT	/

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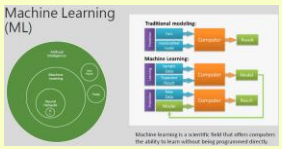
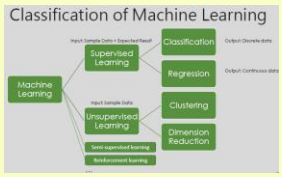
		2) Introduce the difference between traditional modeling and M.L. on PPT  3) Introduce the classification of M.L. on PPT 				
	Data Bias	1) Example through a game https://www.survivalofthebestfit.com/ 2) YouTube video - AI: Training Data & Bias (About 2'40'') https://youtu.be/x2mRoFNm22g - Summarize the contents of the video on PPT - Lead learners to think about how to improve the accuracy and introduce some techniques on PPT	B	25-30 mins (20'+8')	PPT and Video	/
	10-min Break					
	A.I. for Social Goods	1) Video example - PeopleLens (About 1') https://www.microsoft.com/en-us/research/blog/peoplelens-using-ai-to-support-social-interaction-between-children-who-are-blind-and-their-peers/ 2) Summarize the contents of the video with other examples on PPT  3) Leave some guided questions about the presentation for learners	C	About 5 mins (1'+2'+2')	Video and PPT	/
	Object Recognition	1) Introduce structures and functions of Huskylens 2) Show how to train Huskylens to learn step by step and then in one trial; show how to use Huskylens to recognize different kinds of objects 3) Let learners try by themselves and instruct them if they need help until they can finish the whole process in one trial independently	C	35-40 mins (5'+8'+20'+5')	PPT and Huskylens with Webcam	Finish the process in one trial and reflect the accuracy independently

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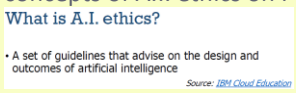
		4) Lead learners to reflect on the accuracy of recognition of Huskylens by employing the knowledge of M.L. and data bias.				
	10-min Break					
	Ethical Issues of A.I.	1) YouTube Video: Trolley problem (About 5') https://www.youtube.com/watch?v=yg16u_bzjPE&t=3s - Summarize the contents of the video with concepts of A.I. ethics on PPT  2) Simulative game - with video in it (About 45'') https://www.moralmachine.net/ 2) Lead learners to think about moral dilemmas, the mechanism of decision-making, and the reason behind it, by showing questions on PPT.	E	15-20 mins (6'+8'+4')	Video and PPT	/
	Basic Trigonometric Functions	1) Summarize concepts of the rectangular coordinate on PPT with 2 worked examples 2) YouTube Video: Basic Trigonometry (About 8'50'') https://www.youtube.com/watch?v=F21S9Wpi0y8 - Summarize concepts of basic trigonometric functions on PPT with 3 worked examples 3) Show 6 exercise questions of trigonometric functions on PPT, let learners calculate, and give answers with explanations	D	25-30 mins (5'+15'+8')	PPT and Video	Exercise questions (80% correct)
	Wrap-up (Optional)	1) A.I. exercise https://www.midjourney.com/home/	A	0-10 mins	PPT	/
Day 3	Revision 1 (Object Recognition)	1) Show how to train Huskylens to learn and recognize different kinds of objects in one trial; Let learners try to review the process, finish it in one trial, and reflect on the result independently	C	5-10 mins (2'+4'+2')	PPT and Huskylens with Webcam	Finish in one trial and reflect independently
	Revision 2 (Basic Trigonometric Functions)	1) Review basic knowledge learned and introduce the rectangular coordinate of Huskylens; Show 8 exercise questions of **trigonometric function calculations on the rectangular coordinate** on PPT, let learners calculate, and give answers with explanations	D	15-20 mins (4'+10'+4')	PPT	Exercise questions (90% correct)

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	Mind+	1) Introduce the interface, settings, and functions of 3 extensions in Mind+ on PPT 2) Introduce functions of different kinds of blocks and introduce basic knowledge of condition and loop statements on PPT	D	15-20 mins (6'+12')	Mind+ Software and PPT	/
	10-min Break					
	Mind+	3) Lead learners to drag blocks to finish programmed codes of the Huskylens and explain the meaning of each block on PPT - Show 2 exercise tasks for learners to practice resetting **names, coordinates, and colors** in programmed codes of the Huskylens 4) Lead learners to drag blocks to finish programmed codes of the drone and explain the meaning of each block on PPT - Show 2 exercise tasks for learners to practice resetting **distances, angles, and times** in programmed codes of the drone 5) Show learners how to save, load, reset, and upload the project in one trial step by step; Introduce some knowledge of debugging; Answer questions from learners in any	D	30-35 mins (12'+12'+8')	Mind+ Software and PPT	Exercise questions (100% correct)
	Preparation for Presentation	1) Describe instructions and criteria of the presentation on PPT 2) Introduce the contents they should include on PPT; Introduce the structure of "cover (1), what (1), how (1), and why (1-2)" on PPT	/	5-10 mins (3'+5')	PPT	/
	10-min Break					
	Preparation for Presentation	3) Lead learners to review concepts of A.I. for social goods and think about the topic they want to choose from the Internet resources https://www.microsoft.com/en-us/ai/ai-for-good 4) Guide learners to use Microsoft PowerPoint to do the work step by step with help to the extent; Give some tips to learners on PPT, and answer learner's questions if any 5) Show techniques of delivering a speech on PPT, and give a live demonstration to learners	C	45-50 mins (5'+ 35'+8')	PPT	/
	More Resources (Optional)	1) YouTube Video: How to Practice a Speech or Presentation (About 7'20'')	/	0-10 mins	Videos	/

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		https://www.youtube.com/watch?v=d812a7qG9Kw				
Day 4	Competition Rules	1) Explain the schedule, rundown arrangement, and general rules for two parts of the competition on PPT 2) Explain detailed settings, flows, and rules of the first part of the competition with a demo video on PPT 3) Give reminders on the measurement and setting parameters of programmed codes on PPT; Answer learner's questions if any 4) Conduct a fly trial if time and place are available	/	25-30 mins (8'+8'+6'+6')	PPT	/
	90-min On-site Investigation					
	Setting the Drone with Huskylens	1) Discuss the investigation result, and set the drone with Huskylens, answer learner's questions if any	/	10-15 mins (3'+6'+3')	PPT	/
	Tutorial of Presentation	1) Let learners practice (2 times in total), and give them some feedback advice	C	10-15 mins (5'+1'+5'+1')	PPT	/
Day 5	10-min Opening and Transit Time					
	60-min Competition of Drone Flying or Presentation					
	5-min Transit Time					
	60-min Competition of Drone Flying or Presentation					
	15-min Ending and Transit Time					

(4) References

Lecture and tutorial notes from week 2, 4, and 7 class; Competition rules; COMP2S01 subject description form