

Human-Robot Interaction and Autonomous Systems

AI 616

Master of Science in Artificial intelligence

Prepared by Dr. Khaled Eskaf

Lecture :Intro





1-Khaled Eskaf: Assistant Professor of Intelligent System.

2-Ph.D. in Computer Science from the University of Salford in the UK.

▪ **Academic Experience:**

3-held several academic positions in Middle East, UK, and Canada.

4-served as assistant professor, department head of the Faculty of Computing and Information Technology at several universities.

▪ **Research Focus:**

5-Researcher in AI, machine learning (ML), deep learning (DL), and robotics

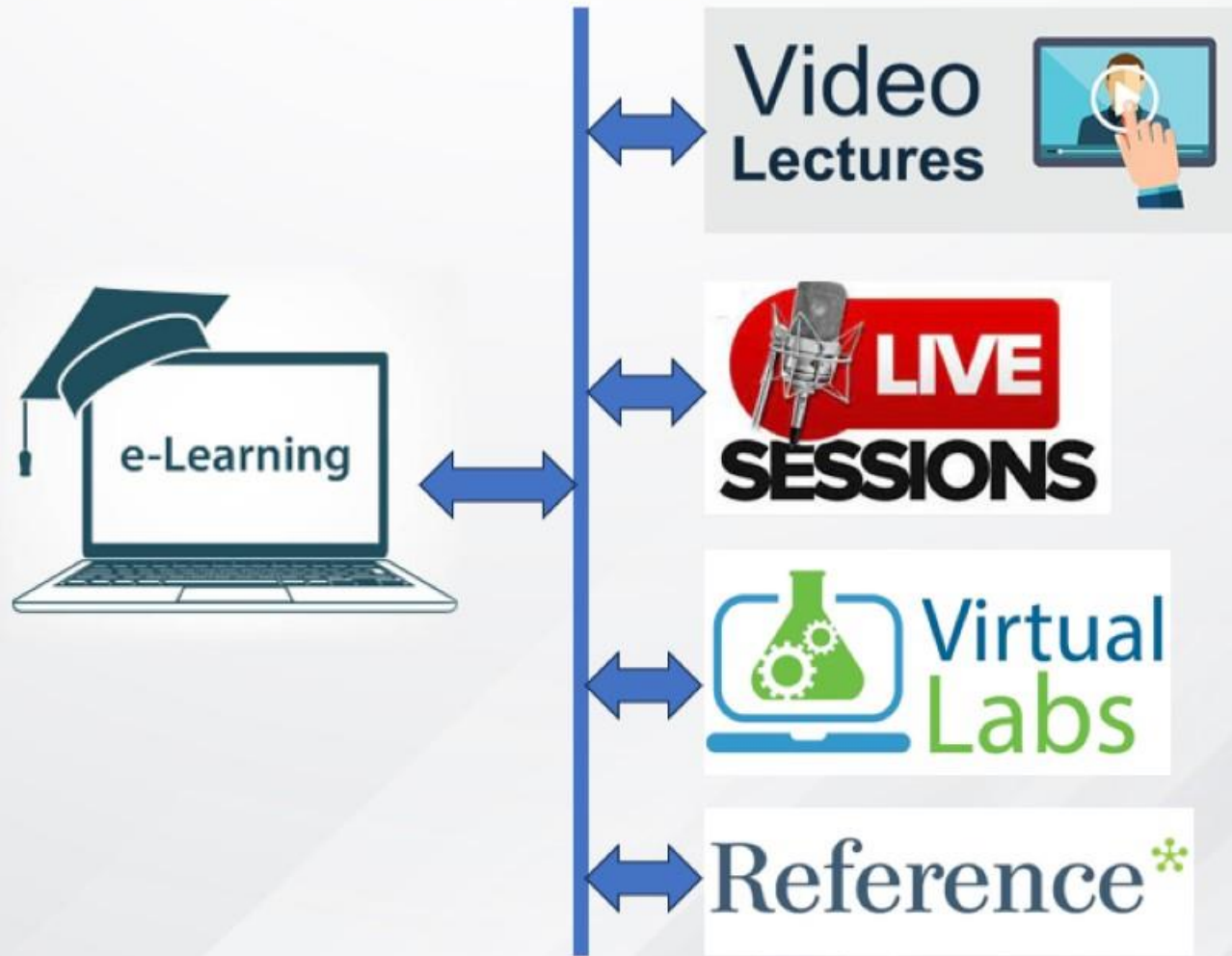
6-Applies intelligent systems in medical fields and climate change

• **Work Experience:**

7- Over 20 years of experience in education at universities and colleges.

8- working in MILA as mentor for graduate students in Canada, and teaching computer science courses and robotics.

9- International Expert Judge for robotics competitions, First Robotics-Canada and MakesX Mbot Robotics competition.



توزيع الدرجات - 100%	الأعمال
حضور المحاضرة - حل الأسئلة المصاحبة	محاضرة مسجلة أسبوعيًا- السبت من كل أسبوع
8 درجات لكل اختبار قصير - بمجموع 80 %	اختبار قصير مصاحب للمحاضرة بشكل أسبوعي
الحضور اختياري	حلقة نقاش افتراضية أسبوعية لمناقشة محتوى المحاضرة المسجلة.
20%	الاختبار النهائي

- يتم احتساب الغياب من خلال حل الطالب للاختبار القصير المصاحب للمحاضرة المسجلة الأسبوعية، وإذا تغيب الطالب عن 4 اختبارات قصيرة يعتبر الطالب في هذه الحالة حرمان.
- آخر موعد للاعتذار عن أي اختبار قصير يكون قبل إغلاق موعد الاختبار مع إرفاق الدلائل الثبوتية لأي أعذار قهرية أو مرضية عبر نموذج الأعذار عن اختبار قصير عبر منصة SIS.
- آخر موعد للاعتذار عن الاختبار النهائي يكون قبل موعد عقد الاختبار مع إرفاق الدلائل الثبوتية لأي عذر قهري أو طبي عبر نموذج الأعذار عن اختبار نهائي عبر منصة SIS، ولن يتم احتساب أي أعذار بعد نهاية الموعد.
- يحق لإدارة الجامعة مراعاة بعض الظروف القهرية.



Learning Objectives

- **Learn Basics of Robots and People Working Together:** Get to know how robots and humans can interact and work side by side.
- **Designing How Robots Look and Work:** Discover ways to make robots that are easy to use, helpful, and safe for people.
- **Testing How Well Robots and People Work Together:** Learn to check if the robots are doing a good job and are easy for people to work with.
- **Understanding Different Kinds of Robots:** Find out about various types of robots and how much they can do on their own.
- **Classifying Robot Systems:** Learn to sort and categorize different robot systems.
- **Looking at Human Aspects:** Study how working with robots affects people's minds and bodies.
- **Using AI in Robots:** Learn how to use artificial intelligence to make robots smarter.
- **Making and Controlling Robots in Simulations:** Get hands-on experience by creating and managing virtual robots.
- **Practical Projects with Real-World Focus:** Apply what you've learned to design and test robot systems for real-life uses.



Course Outlines

Module	Content	Simulation Lab
1. Introduction to Robotics	- Fundamentals of Robot Control - Classification of Robotics - Exploration of Robot Types	- Basic Robot Control - Modeling Robot Classes - Simulating Various Robot Types
2. Advanced HRI Studies	- Introductory to Advanced Concepts in HRI	- Basic to Complex HRI Scenarios
3. Social Dynamics in Robotics	- Architectures for Social Interaction - Case Studies and History of HRI	- Social Interaction Simulations - Historical Evolution in HRI
4. Strategic HRI System Design	- Core Principles and Communication Strategies in HRI	- Designing Interfaces - Communication Protocol Simulations
5. HRI Efficiency and Effectiveness	- Metrics for Mission Effectiveness and Human Factors	- Implementing and Analyzing HRI Metrics
6. Innovative HRI System Design	- Exploring Innovative Designs and Real-World Applications	- Testing Innovative Designs - Simulating Diverse Scenarios
7. HRI System Classification	- Developing Comprehensive Classifications	- Classification Application and Case Studies
8. Human Factors in HRI	- Analyzing Ergonomics and Human Factors	- Ergonomic Simulations - Scenario-Based Human Factor Analysis
9. Robotics and AI Integration	- Theoretical Concepts and Practical AI Applications	- AI Algorithm Implementation - AI-Driven HRI Modeling
10. HRI Case Studies	- Mobile Assistive Robot Studies	- Designing and Testing Mobile Assistive Robots

Human-Robot Interaction An

Introduction

By [Christoph Bartneck](#), [Tony Belpaeme](#), [Friederike Eysel](#), [Takayuki Kanda](#), [Merel Keijsers](#), [Selma Šabanović](#) · 2020

HUMAN-ROBOT INTERACTION

An Introduction

Christoph Bartneck • Tony Belpaeme
Friederike Eysel • Takayuki Kanda
Merel Keijsers • Selma Šabanović



Webots

robot simulation

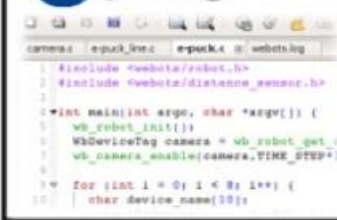
Webots is an open source and multi-platform desktop application used to **simulate** robots

<https://cyberbotics.com/>

1 model



2 program



3 simulate



4 transfer





Thank You