IEEE Computational Intelligence Society Distinguished Lecturer Program

Speaker: Sanaz Mostaghim, Otto-von-Guericke Universität Magdeburg, Germany

Inviting Chapter: IEEE Computational Intelligence Society Thailand Chapter

Date: 14 June 2022

Number of Participants: 81 People

Lecture Title: Recent Advances in Swarm Intelligence and Swarm Robotics

Abstract:

Topics Covered in this talk:

- Fundamentals of swarm intelligence algorithms and optimization Collective learning and decision-making
- Control mechanisms for self-organized systems using the environment (isomorphic and non-isomorphic transformations)
- Swarm and evolutionary robotics

In the past decades, we witnessed a large improvement of autonomous systems. Today, such systems are everywhere and enable us to handle complex problems in industrial and scientific applications.

However, they also pose new challenges for the development of algorithms to design and control them such as the large amount of such systems which are able to communicate with each other and hence produce a large complex system. Looking at nature, biological systems solve complex tasks using decentralized and simple structures.

In this talk, we aim to give an overview into such nature-inspired algorithms such swarm intelligence and describe their applications in autonomous systems. Swarm intelligence is a collective learning process which can lead to a self-organized system of simple individuals, which together create a global emergent behavior.

One advanced application of swarm intelligence is in the area of swarm robotics in which simple small robots can collectively learn to achieve some predefined complex tasks. In this talk, the algorithms of swarm intelligence are presented, analyzed and compared.

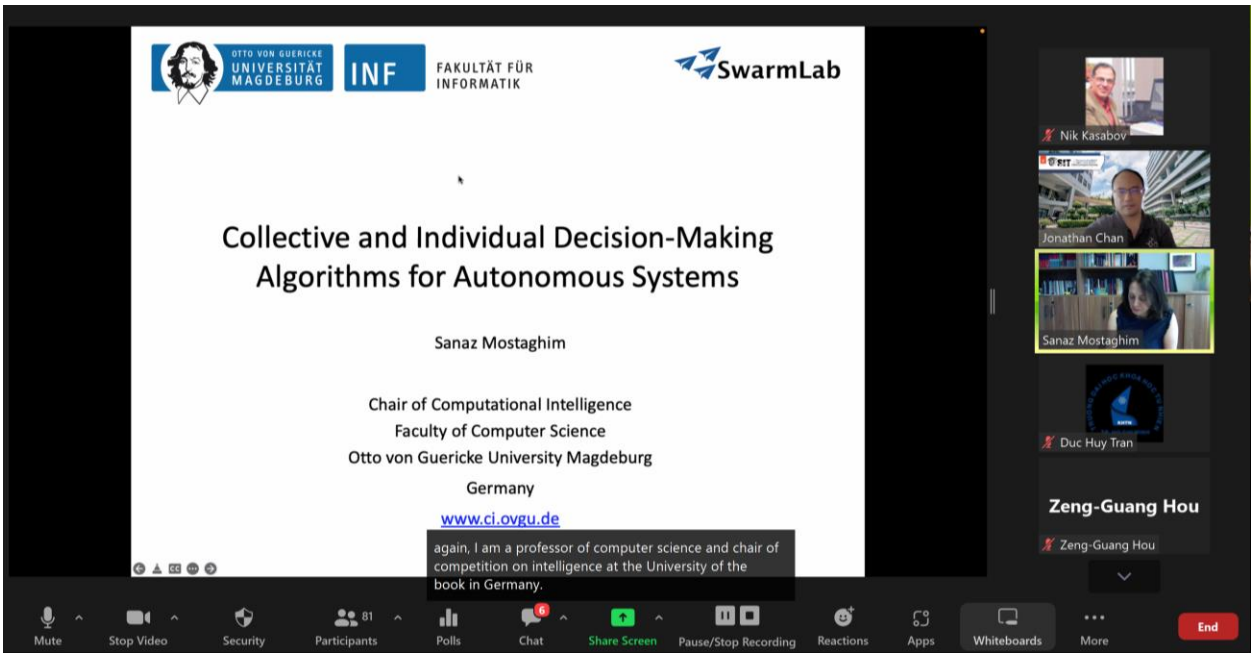
Website: https://deeplearningandaiwinterschool.github.io/#program

Tentative program - All times are given in ICT time (UTC+7)

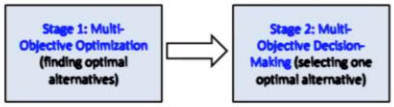
Day 1: Tue 14 Jun | Day 2: Wed 15 Jun | Day 3: Thu 16 Jun | Day 4: Fri 17 Jun | Day 5: Sat 18 Jun

Day 1: Tue 14 Jun 2022 (ICT time UTC+7)

Time	Activity
DLAI6 Opening Remarks	
07.50 - 08.00 am.	Welcome speeches
ACM Distinguished Speaker I	
08.00 - 09.00 am.	**Speaker:** *Ronald Baecker*, University of Toronto, Canada **Topic:** What Society Must Require from AI
Academic Talk	
09.00 - 10.00 am.	**Speaker:** *Zeng-Guang Hou*, Chinese Academy of Sciences, China **Topic:** Enhancement of Engagement Based on BCI for Active Control of Rehabilitation Robots
10.00 - 10.15 am.	Group Photo and Networking
NVIDIA DLI Workshop I (Part I)	
10.15 am. - 12.30 noon	**Speaker:** *Jonathan H. Chan*, King Mongkut's University of Technology Thonburi, Thailand **Topic:** Fundamentals of Deep Learning
12.30 - 01.00 pm.	Lunch Break, Group Photo and Networking
Panel Session I	
01.00 - 02.30 pm.	**Speaker:** *Nikola Kasabov (convener), Soo-Young Lee, Zeng-Guang Hou, Taro Toyoizumi, Seiichi Ozawa, Jonathan H. Chan* **Topic:** Future deep learning machines inspired by the human brain
IEEE-CIS Distinguished Lecturer Talk I	
02.30 - 03.30 pm.	**Speaker:** *Sanaz Mostaghim*, Otto-von-Guericke Universität Magdeburg, Germany **Topic:** Recent Advances in Swarm Intelligence and Swarm Robotics
NVIDIA DLI Workshop I (Part II)	
03.30 - 05.00 pm.	**Speaker:** *Jonathan H. Chan*, King Mongkut's University of Technology Thonburi, Thailand **Topic:** Fundamentals of Deep Learning

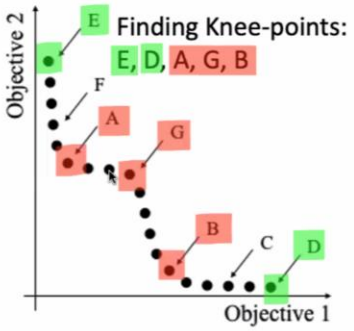


Integrating Decision-Making into Optimization



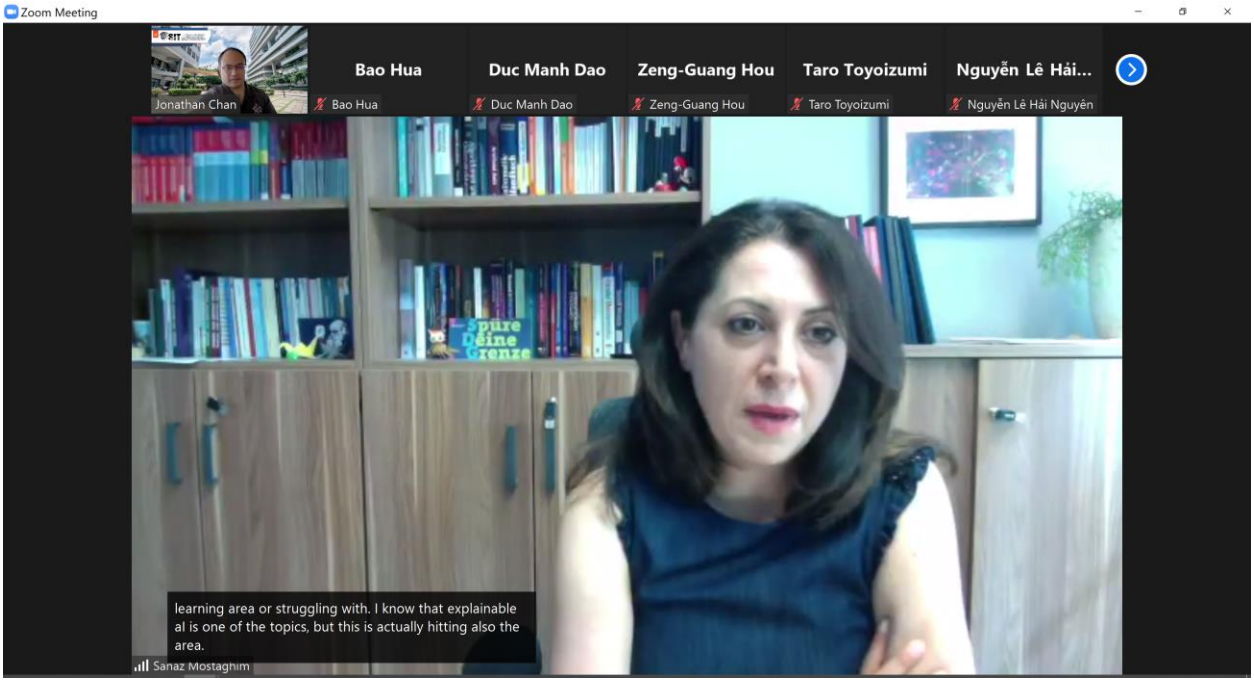
Reducing the number of alternatives helps to come up with fast decisions:

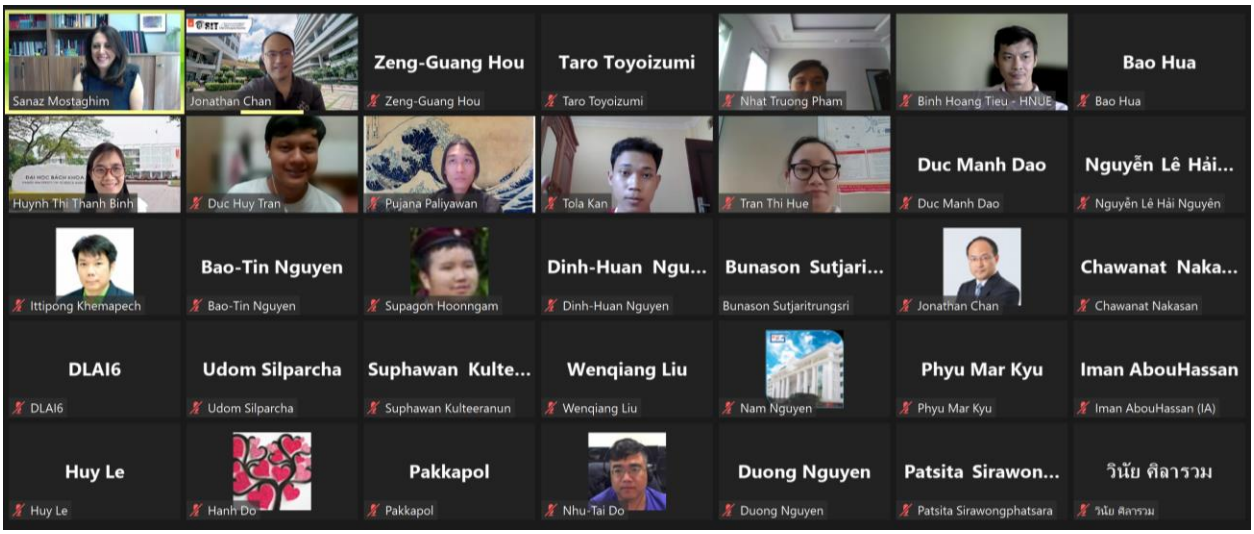
- Hick's law: "increasing the number of choices will increase the decision time logarithmically"
- Finding the decision turning points (knee-points) are the most important task and challenge



And then, then we want to also make a fast decision. So, one idea is that bendy bendy duty optimization, we do not find all the alternatives.

Ramirez-Atencia, Mostaghim and Camacho, A Knee Point based Evolutionary Multi-objective Optimization for Mission Planning Problems, GECCO 2017


Zoom Meeting
Jonathan Chan
Bao Hua
Duc Manh Dao
Zeng-Guang Hou
Taro Toyoizumi
Nguyễn Lê Hải...
Nguyễn Lê Hải Nguyên
learning area or struggling with. I know that explainable al is one of the topics, but this is actually hitting also the area.
Sanaz Mostaghim


Sanaz Mostaghim
Jonathan Chan
Zeng-Guang Hou
Taro Toyoizumi
Nhat Truong Pham
Binh Hoang Tieu - HNUE
Bao Hua
Huynh Thi Thanh Binh
Duc Huy Tran
Pujana Paliyawan
Tola Kan
Tran Thi Hue
Duc Manh Dao
Nguyễn Lê Hải...
Ittipong Khemapech
Bao-Tin Nguyen
Supagon Hoonngam
Dinh-Huan Nguyen
Bunason Sutjaritrungsri
Jonathan Chan
Chawanat Nakasan
DLAI6
Udom Silparcha
Suphawan Kulteeranun
Wenqiang Liu
Nam Nguyen
Phyu Mar Kyu
Iman AbouHassan (IA)
Huy Le
Hanh Do
Pakkapol
Nhu-Tai Do
Duong Nguyen
Patsita Sirawongphatsara
วินัย ศิลารวม