

Human Al

SYLLABUS

VU Amsterdam Summer School

July 6, 2024 – July 20, 2024





Any general questions for the Summer School support team? Contact amsterdamsummerschool@vu.nl.



Course Details

You can recycle the information that can be found on the webpage to fill in the following sections. Please bear in mind that the syllabus is a key element of the course that helps students to decide whether this course is appropriate for them and can really help them when deciding to join. Make sure to be as detailed as possible.

Title	Human Al
Coordinator(s)	Prof.dr. Jan Treur
Other lecturers	
Study credits	3 ECTS
Form(s) of tuition	On campus,
Approximate contact hours	60
Approximate self-study hours	15

Teaching staff (in order of appearance)

Prof.dr. Jan Treur

Course description

Human processes of all kinds are complex and adaptive. Mental, social, and health-related processes can all change and adapt over time with human behaviour. Mental processes can change as a result of learning, social interactions can evolve over time, and health-related processes are susceptible to change too. This course will present theories and findings from a wide range of disciplines, including various branches of cognitive, social, health and neuroscience, to gain insight into underlying mechanisms of human processes that can be exploited in human AI modeling and simulation. The various scientific theories form a factual basis for modelling the processes. We can understand these often adaptive mechanisms through causal relations and causal pathways, which form adaptive dynamical systems that we can model as networks. Using this theoretical framework and the software provided, students can easily simulate a variety of scenarios. During the second week, students will carry out activities that may lay the foundations for a publication that can be finished later on. This course introduces a network-oriented modelling approach based on adaptive networks. This approach is useful for modelling dynamical systems for social interactions and mental and health-related processes. These network models cover the



dynamics of causal effects, changing causal connections and excitability or sensitivity thresholds. Higher-order adaptiveness is another topic covered in the course, which includes the role of metaplasticity and the extent to which plasticity occurs in mental or neural processes.

Learning objectives

Assignments and Assessment

The course includes 7 Assignments in the first week and a Final Assignment in the second week. Assessment will be based on these assignments on a 50/50 basis for the first week and second week.

Provisional reading list

Chapters from the following two books on the topic (from the 2016 book, chapters 2, 3, 7, 11; from the 2020 book 2 chapters 1, 2, 3, 4, 6, 7, 9); in addition, some papers:

Treur, J. (2016). Network-Oriented Modeling: Addressing Complexity of Cognitive, Affective and Social Interactions. Springer Publishers. Within the university freely downloadable at http://link.springer.com/book/10.1007/978-3-319-45213-5. Table of Contents with links to abstracts and slides per chapter: https://www.researchgate.net/publication/305930006

Treur, J. (2020). Network-Oriented Modeling for Adaptive Networks: Designing Higher-Order Adaptive Biological, Mental, and Social Network Models. Springer Publishers. Within VU or UvA freely downloadable at: https://link.springer.com/book/10.1007/978-3-030-31445-3. Table of Contents with links to abstracts and slides per chapter: https://www.researchgate.net/publication/334576216

Course Schedule

See the added Excel file



Books 1: Network-Oriented Modeling				Note that most areas contain hyperlinks to books, slides, additional materia			
Book 2: Network-Oriented Modeling for Adaptive Networks				If clicking does not work, open Edit h	yperlink and copy the link to your brov		
Open the ToC of these books to get clickable links to the chapters							
We	ek	8-jul	8-jul	9-jul	9-jul	10-jul	10-jul
Room		Monday Morning	Monday Afternoon	Tuesday Morning	Tuesday Afternoon	Wednesday Morning	Wednesday Afternoon
week 1	lecture times	10:00 - 10:30 lecture	12:30 - 13:00 lecture	8:30 - 9:00 lecture	12:30 - 13:00 lecture	8:30 - 9:00 lecture	
subject and texts	subject and slides	Lecture 1: Introduction: Network-Oriented Modeling	Lecture 2: Designing Mental and Social Network Models	Lecture 3: The Role of Emotions in Mental Processes	Lecture 4: From Mental Processes to Social Processes	Lecture 5: Adaptive Network Models by Using Self-Models	Excursion
	texts	Book 2 Ch 2. Ins and Outs of Network-Oriented Modeling	Book 1 Ch 2. A Temporal-Causal Network Modeling Approach	Book 1 Ch 3. How Emotions Come in Between Everything	Book 1 Ch 7. Emergence of Shared Understanding and Collective Power	Book 2 Ch 1. On Adaptive Networks and Self-models	Book 2 Ch 4. Modeling Higher-Order Network Adaptation
		Book 2 Ch 9. A Modeling Environment for Network Models	M1. Cyclic network of sheep	M2. A world of individuals	M3. From attraction between individuals to collective power	Book 2 Ch 3. Modeling Network Adaptation using Self-models	Book 2 Ch 9. A Modeling Environment for Adaptive Network Models
exercising times		10:30 - 12:00 practical session	13:00 - 14:45 practical session	9:00 - 12:00 practical session	13:00 - 15:30 practical session	9:00 - 12:00 practical session	
	subject	Assignment 1: Minitutorial for the Nonadaptive Matlab Template	Assignment 2: Mental Network simulation for a soap scenario	Assignment 3: A Mental Network for emotion regulation	Assignment 4: A Social Network model: simulation of contagion	Assignment 5: Designing an Adaptive Mental Network Model	Excursion
Room	NU-4B43	15-jul Monday Morning	15-jul Monday Afternoon	16-jul Tuesday Morning	16-jul Tuesday Afternoon	117-7-2023 Wednesday Morning	17-jul Wednesday Afternoon
week 2	exercising times	8:30 -15:30 Supervised group work	8:30 -15:30 Supervised group work	8:30 -15:30 Supervised group work	<u> </u>	8:30 -12:30 Supervised group work	<u> </u>
	subject	Final Project Assignment	Final Project Assignment	Final Project Assignment	Final Project Assignment	Final Project Assignment	Excursion

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11-jul	11-jul	12-jul	12-jul
Thursday Morning	Thursday Afternoon	Friday Morning	Friday Afternoon
8:30 - 9:00 lecture	12:30 - 13:00 lecture	8:30 - 10:00 lecture	12:30 - 13:00 lecture
Lecture 6: Evolutionary Network Models and Strange Loops	Lecture 7: Network Models Using Adaptive Internal Mental Models	Lecture 8: Analysis of Behaviour of Network Models	Lecture 9: What remains
Book 2 Ch 7. Modeling Higher-Order Adaptive Processes in Evolution	On Dynamics, Adaptation and Control of Internal Mental Models	Book 2 Ch 12. Analysis of a Network's Emerging Behaviour	Final Assignment
Book 2 Ch 8 Self-Modeling Network Models with a Strange Loop.	Examples of publications based on Final Assignments	Book 1 Ch 14. Who Are You?	Final Assignment
9:00 - 12:00 practical session	13:00 - 15:30 practical session	10:00 - 12:00 practical session	13:00 - 15:30 practical session
production of the production o		production	15100 15100 practical session
Assignment 6: Designing an Adaptive Social Network Model	Assignment 7: Designing a Second- Order Adaptive Network Model for Organisational Learning: How to Organise a Party	Final Project Assignment: choice of a topic	
Assignment 6: Designing an	Assignment 7: Designing a Second- Order Adaptive Network Model for Organisational Learning: How to	Final Project Assignment: choice	
Assignment 6: Designing an Adaptive Social Network Model	Assignment 7: Designing a Second- Order Adaptive Network Model for Organisational Learning: How to Organise a Party	Final Project Assignment: choice of a topic	Final Project Assignment
Assignment 6: Designing an Adaptive Social Network Model 18-jul	Assignment 7: Designing a Second-Order Adaptive Network Model for Organisational Learning: How to Organise a Party	Final Project Assignment: choice of a topic 19-jul	Final Project Assignment 19-jul Friday Afternoon