

IM350-15 Scaling Data and Societies

26/27

Department

Centre for Interdisciplinary Methodologies

Level

Undergraduate Level 3

Module leader

Ching Jin

Credit value

15

Module duration

10 weeks

Assessment

100% coursework

Study location

University of Warwick main campus, Coventry

Description

Introductory description

Big data technologies involve scaling-up — scaling up quantities of data, scaling up data infrastructures, scaling up data management, and scaling up the number of participants in a given technological system. This module provides an understanding of the technical, methodological and conceptual changes in the new forms of thinking, research and engineering required for understanding and working with scalable socio-technical systems. Beginning with the question of what 'scale' is in general and how data-based transformations redefine the limits of scale, the module presents students with a series of different 'lenses' through which the impact of scale manifests itself differently across contemporary data spaces, including hands-on laboratory exercises. By the end of the module, students will have gained knowledge and a greater appreciation of the impact of big data on research in socio-technical systems at various scales and, conversely, the multiple ways in which the concept of scale is driving developments in big data.

[Module web page](#)

Module aims

This module introduces students to the conceptual, methodological, and practical foundations of scalable data across human, social, natural, and technical systems. It explores how increasing the

volume and complexity of data collection, processing, and interaction can subtly reshape system behavior—giving rise to new patterns, relationships, and structural shifts across domains ranging from individual decision-making to societal coordination and natural phenomena. Students will engage with the conceptual, technical, and methodological aspects of big data analysis at multiple scales. The module also provides hands-on experience and helps students develop practical skills in distributed data processing, network analysis, crowd-based forecasting, and blockchain technologies. Through these activities, students will build both theoretical understanding and applied competencies for analyzing and managing data at different scales, with relevance to data management, analysis, and digitally mediated social life.

Outline syllabus

This is an indicative module outline only to give an indication of the sort of topics that may be covered. Actual sessions held may differ.

Session 1: Conceptualising Scale

This session introduces the key concepts and methodologies of the module relating to the issue of scale.

Session 2: Distributed Systems and Distributed Data

This session introduces the distinction between centralized, decentralized, and distributed communications and data systems.

Session 3: Computing in the Cloud

This session introduces students to the shift from Big Data to cloud computing, as instantiated in technologies such as Apache Spark and Stream processing.

Session 4: Blockchain and Society

This session discusses the origins of money; digital cash; distributed ledgers; forensic analysis of blockchains; and the sociology of the blockchain industry.

Session 5: Networks at Scale

This session interrogates the notion that networks and network thinking are everywhere in an age of big data. We explore how networks expand and what properties they can exhibit.

Session 6: Individuals and/as Crowds

This session examines the ways in which big data analytics operates on, affects and shapes populations and, secondarily, individuals.

Session 7: Prediction at scale

This session explores big data and algorithmic analytics, which are increasingly used for predicting the social world, e.g. group behaviour, financial markets or the spread of disease.

Session 8: Scaling Time

This session explores the ways in which time and temporality play a role in contemporary big data processes and analytics.

Session 9: Assessment workshop

This session supports students in the development of their essay plans

Learning outcomes

By the end of the module, students should be able to:

- Demonstrate the ability to identify and communicate key concepts and techniques related to scalable data systems, including their technical foundations and real-world applications.
- Demonstrate the ability to understand the role that scale plays across research, industry, and society, and to consolidate understanding of how big data influences these domains.
- Demonstrate the ability to describe, at a primary level, how technologies such as distributed data processing and blockchain systems function within scalable ecosystems.
- Demonstrate the ability to recognize and reflect on the current societal, ethical, and cultural considerations that arise from the use of scalable technologies in data-rich environments.

Indicative reading list

[Reading lists can be found in Talis](#)

Research element

- Exhibiting the capacity for critical thinking, methodological reflection and analysis;
- Being able to apply critical research and enquiry skills;
- Taking responsibility for one's own learning and development;
- Effectively use research tools and resources

Interdisciplinary

-Appreciate the value of different disciplinary approaches and perspectives.

-Build confidence and competence in interdisciplinary thinking, especially in understanding the various ways scale impacts data and societies.

-Communicate ideas effectively across different formats and to audiences from diverse disciplinary backgrounds.

International

- To appreciate the local, regional, national, and global issues that permeate the issue of scale;
- To appreciate the global reach that issues of scale have in different parts of different societies.

Subject specific skills

- Methodological skills in evaluating the implementation of big data analytics in socio-technical systems;
- Practical skills in using advanced big data technologies as implemented in distributed data processing systems, such as the cloud;

- Conceptual and methodological skills in combining different disciplinary approaches to big data in contemporary society;
- Conceptual skills in understanding different disciplinary approaches and perspectives on big data in society in relation to their subject specialism.

Transferable skills

- The ability to communicate with peers and academics within and outside of one's primary discipline;
 - The practical and technical ability to use research software and digital resources;
 - Collaborative skills to work in mixed-competency teams to complete methodological and practical exercises;
 - Academic writing skills and the ability to account for individual and group-based analytical processes;
 - Skills to articulate arguments orally, in writing and visually, supported by reading and research;
 - Practical Skills to manage time to meet deadlines as an individual and team member;
 - Analytical skills to connect theoretical ideas with methodological and practical applications.
 - Ability to solve problems creatively, specifically as these relate to the roles of scale in data and societies.
 - Being a self-motivated and independent learner
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Study

Study time

Type	Required
Lectures	9 sessions of 1 hour (6%)
Seminars	9 sessions of 1 hour (6%)
Practical classes	9 sessions of 1 hour (6%)
Private study	48 hours (33%)
Assessment	70 hours (48%)
Total	145 hours

Private study description

Independent learning throughout the term.

Costs

No further costs have been identified for this module.

Assessment

You do not need to pass all assessment components to pass the module.

Assessment group A

	Weighting	Study time	Eligible for self-certification
Assessment component			
Essay	100%	70 hours	Yes (extension)
Select a topic (either from the given list or of the student's own choosing, in consultation with and approved by the module convenor) and critically analyse a complex issue relating to scaling data.			
Reassessment component is the same			

Feedback on assessment

Written feedback on summative work.

Before that, students will complete two formative components to support the development of their final essay:

Essay Proposal – A short written outline (approximately one page) that presents the intended topic, argument, and structure of the final essay.

Slide Presentation – A brief presentation using one or two slides to visually communicate the core idea of their essay to the class or tutor.

These activities are not formally assessed but will receive feedback from the module convenor to help students refine their arguments and structure before submitting the final essay.

Availability

There is currently no information about the courses for which this module is core or optional.