

計算社會學  
**Computational Sociology**  
Spring 2026  
National Taiwan University

Instructor: Chen-Shuo Hong 洪晨碩(研究室 414 , 02-3366-1262 , cshong@ntu.edu.tw)

Class: Friday 2, 3, 4 週五 9:10-12:10

Office hours: by appointment 另約時間

E-mail: cshong@ntu.edu.tw; Office: 414

### **COURSE DESCRIPTION**

Computational sociology (or computational social science, CSS) is an emerging interdisciplinary field that combines big data, computational methods, and social science. This upper-level course aims to introduce this field. In this semester, we will focus on “LLM-powered AI agents,” which leverage large language models (LLM) with automation to carry out tasks. Students will learn to explore this tool to ethically enhance social science research, investigate human behavior and social phenomena, and solve real-world social problems. In addition to overview of the field, there are two modules. The first module will involve using AI agents to collect various big data sources, including media and machine data. The second module will introduce data analysis, particularly applying AI agents in text analysis. No programming background is needed. Students will need to use AI agents as their final collaborative or independent projects.

### **COURSE OBJECTIVES**

At the conclusion of this course, you should:

1. Be familiar with LLM-powered AI agents that are increasingly used in social science research.
2. Understand how to apply LLM-powered AI agents to answer research questions regarding human behavior and social phenomena or solve real-world social problems.
3. Be able to assess computational sociology work critically.

### **REQUIREMENTS FOR THIS CLASS**

Please read this syllabus carefully to familiarize yourself with the expectations of this class. There is required textbook for this class; it is freely available online. The remaining reading materials are research articles that will be posted to NTU COOL. Students are required to complete the readings before the class. While this course is about empirical investigations that apply the computational sociology approach, students should be aware that some contents will be abstract and theoretical. This class will include a mix of student-led discussion and demos. Your class participation, group discussion, and final research projects will be important for your success. We primarily use n8n, a workflow automation platform, in class. NTU’s computer and information networking center (C&INC/計中) provides many useful resources. For n8n installation, please refer to

[https://www.cc.ntu.edu.tw/chinese/epaper/home/20250620\\_007304.html](https://www.cc.ntu.edu.tw/chinese/epaper/home/20250620_007304.html).

Required textbooks:

1. Salganik, Matthew J. 2017. *Bit by Bit: Social Research in the Digital Age*. Princeton, NJ: Princeton University Press. Open review edition. <https://www.bitbybitbook.com/>.

### **ATTENDANCE POLICY:**

Each class will be led by students. I will begin with an overview of the topic to help orient our discussion. ***I expect every student to attend, to be well prepared, and to participate in every class session.*** It is crucial for students to learn the materials via discussion. Accordingly, in-class attendance is a minimum requirement for your grade. All absences require communication with the instructor. If you do not contact the instructor about your absence, it will impact your participation grade by 5 points per unexcused absence. You may miss 1 week of classes with the permission of the instructor. More than 1 absence during the semester will impact your participation grade by ½ a letter grade per additional absence. If you miss more than 3 classes, I highly recommend you withdraw from this class. It is understandable that students might need to miss a class for personal or family reasons. However, because class attendance is mandatory and you would need to take responsibility for presenting your notes about the readings, you should request an exemption.

### **GRADING:**

This course is designed to help students gain hands-on experience in applying computational sociology and the key to success in developing a “collaborative” learning space. As a result, you should actively participate in group activities. Students may play different roles according to the assigned tasks. Some will lead the discussion or present n8n demos, while others share their memo with relevant additional materials. Depending on the number of students, you should expect to lead at least one session and one demo throughout the course. For final projects, both collaborative and independent projects are welcome, and I recommend that you gain collaborative skills that are increasingly common in this field. I highly recommend you use two homework assignments to develop your final project rather than build it from scratch.

### **Class participation and attendance (every class counts): 40%**

***If you are in the leading presenter role,*** present the required readings and lead the discussion. There is no presentation format that you should follow, but please focus on:

- What are the research questions?
- Why are these questions important (theoretical, methodological, substantive, and/or practical)?
- What data sources did the authors use?
- How did the authors collect data?
- How did the authors process the data?
- How did the authors analyze the data?
- What did the authors find?
- What questions would you like to discuss in class with your classmates?

***If you are in the leading demo role,*** present the n8n demos and lead the learning activities. There is no demo format that you should follow, but please focus on:

- What are the key components in this demo?
- Why can this tool use in social science research or solve social problems?

***If you are the participant role,*** submit your memo before **Thursday at Noon (12 PM)** because I would like to read your memo(s) before class. In this memo, I'd like you to focus on the articles and think about how you can replicate their research designs using different data sources. Accordingly, please focus on:

- All points mentioned above

- What points do you feel most convinced? Why do you feel convinced?
- What points do you disagree with? Why do you disagree?
- What other data sources do you think can be analyzed as the authors did? Discuss how you would collect data and your research designs using n8n.

### **Homework assignment and final project (60%)**

This is an important opportunity to build your CSS portfolio using the knowledge and skills you learn from this course. We will complete two homework assignments; the goal is help you get familiar with n8n and learn to collect data.

Be aware that the assigned readings might not be directly related to your projects. In most cases, you need to read additional articles for your projects.

The milestones are as follows.

- Homework assignment I (15%)
- Homework assignment II (15%)
- Presentation (15%)
- Final paper (15%)

Letter grades will be used (A+: 90-100, A: 85-89, A-: 80-84, B+: 77-79; B: 73- 76; B-: 70-72; C+: 67-69; C: 63-66; C-: 60-62, F: <=59, X: 0).

### **RESOURCES FOR FINAL PROJECT:**

The final project will be an exercise of this tool. We plan to use website to broadcast your projects (something similar to <https://scu-portfolio.web.app/#/portfolio>). I highly recommend you build your own portfolio website (e.g., <https://webflow.com/blog/student-portfolio-examples>). The final paper is currently open to any formats (e.g., <https://mhcid.washington.edu/inspire/#capstone>), and we will discuss it during the class as you get familiar with n8n. If we decide to write a paper, two useful writing resources are open to all students: NTU library (<https://www.lib.ntu.edu.tw/>) and Writing Education Center (<https://www.awec.ntu.edu.tw/>).

### **CLASS POLICY:**

- Respect others and be responsible.
- We will discuss the usage of laptops and/or smartphones in the first class. The bottom line is that you should pay attention to the discussion.
- The practicum aims to equip students with the basic data science skills necessary to conduct a final research project. However, it should be noted that the learning materials do not perfectly fit the readings. It is expected that more extra work is needed if you want to write a paper like the materials we will discuss.
- Try to be helpful during the practicum. The more you can help your classmates, the more you can learn.

### **NTU ACADEMIC REGULATION:**

Full Academic Regulations:

<https://www.aca.ntu.edu.tw/WebUPD/acaEN/UAADRules/AcademicRegulations.pdf>. Students have the responsibility of conforming in all respects to that ethic and should be aware that

academic misconduct might result in severe penalties, including a zero on the assignment in question or the entire course. Further sanctions from the provost include censure, suspension, or expulsion. Academic dishonesty includes but is not limited to: cheating, fabrication, plagiarism, and facilitating dishonesty. Since students are expected to be familiar with the Academic Regulations and the commonly accepted standards of academic integrity, ignorance of such standards by itself is not sufficient evidence of a lack of intent.

### **STATEMENT ON AI**

Following NTU AI policy, I will not prohibit using Generative AI. However, I insist that you should appropriately cite your AI tool in your work. If the generated contents include others' work, you should also use academic writing format (e.g., APA 、 MLA 、 Chicago Manual Style) to cite their work. It is your responsibility to check for any possibility of being considered academic dishonesty.

### **OTHER ACADEMIC SUPPORT**

Your success in this course is important to me. Besides resources for writing and research, there are other useful resources.

The Center for Teaching and Learning Development provides a variety of resources and supports for students, including:

- a) Academic Counseling Services: providing individual counseling and group tutoring for common courses and specialized courses by qualified peer tutors.
- b) Online Resources: providing an online archive of past exams and problem-solving skills in Calculus, Statistics, and Physics.

For more information, please contact the Division of Learning Support, Center for Teaching and Learning Development. Tel: (02)33663367 Email: [ntulscetld@ntu.edu.tw](mailto:ntulscetld@ntu.edu.tw) Location: 5th Floor, Liberal Education Classroom Building (N13 on the NTU map). Web:

<https://www.dlc.ntu.edu.tw/>

The Center for Student Well-being and Student Counseling Center provides a multi-directional approach to the well-being of our students. It offers different kinds of services, including individual counseling, group counseling and workshops, mental health surveys, and psychological assessments. Please contact them through their websites (<https://csw.ntu.edu.tw/Default.html>).

### **ACCESSIBILITY RESOURCES**

The school is committed to making reasonable, effective, and appropriate accommodations to meet the needs of students with disabilities and help create a barrier-free campus. If your disability requires accommodation, please notify the instructors as early as possible during the course so that we may make arrangements in a timely manner.

## COURSE SCHEDULE

Week (Date)	Topic	Reading	Group activities
Week 1 (2/28)	Holiday		
Week 2 (3/6)	Introduction	<ul style="list-style-type: none"> <li>Salganik, Matthew J. 2017. <i>Bit by Bit: Social Research in the Digital Age</i>. Princeton, NJ: Princeton University Press. Open review edition. Ch1 and Ch2.</li> </ul>	Install n8n
Week 3 (3/13)	Overview of Gen AI in social science	<ul style="list-style-type: none"> <li>Bail, Christopher A. 2024. "Can Generative AI improve social science?." <i>Proceedings of the National Academy of Sciences</i> 121.21: e2314021121.</li> <li>Davidson, Thomas. 2024. Start Generating: Harnessing Generative Artificial Intelligence for Sociological Research. <i>Socius</i>, 10. <a href="https://doi.org/10.1177/23780231241259651">https://doi.org/10.1177/23780231241259651</a></li> </ul>	Instructor-led demo (content summarization)
<b>Module 1: Ask AI agents to collect data</b>			
Week 4 (3/20)	Media data collection I	<ul style="list-style-type: none"> <li>Bailard Catie Snow, Tromble R, Zhong W, Bianchi F, Hosseini P, Broniatowski D. "Keep Your Heads Held High Boys!": Examining the Relationship between the Proud Boys' Online Discourse and Offline Activities. <i>American Political Science Review</i>. 2024;118(4):2054-2071. doi:10.1017/S0003055423001478</li> <li>Stuhler, O., Tavory, I., &amp; Wagner-Pacifci, R. (2026). Time and Climate Change: U.S. Media Representations of Climate Actions, Horizons, and Events (2000 to 2021). <i>American Sociological Review</i>, 0(0). <a href="https://doi.org/10.1177/00031224251403596">https://doi.org/10.1177/00031224251403596</a></li> </ul>	Instructor-led demo (text classification)
Week 5 (3/27)	Media data collection II	<ul style="list-style-type: none"> <li>Storani, Saverio, Max Falkenberg, Walter Quattrociocchi and Matteo Cinelli. 2025. Relative Engagement with Sources of Climate Misinformation is Growing Across Social Media Platforms. <i>Scientific Reports</i>, 15: 3082. <a href="https://doi.org/10.1038/s41598-025-03082-9">https://doi.org/10.1038/s41598-025-03082-9</a></li> <li>Alipour, Shayan, Alessandro Galeazzi, Emanuele Sangiorgio, Michele Avalle, Ljubisa Bojic, Matteo Cinelli and Walter Quattrociocchi. 2024. Cross-Platform Social Dynamics: An Analysis of ChatGPT and COVID-19 Vaccine Conversations. <i>Scientific Reports</i>, 14: 2877. <a href="https://doi.org/10.1038/s41598-024-53124-x">https://doi.org/10.1038/s41598-024-53124-x</a></li> </ul>	Instructor-led demo (API call and schedule trigger) + ethical issues
Week 6 (4/3)	Holiday		HW I (15%) web crawler due 4/17
Week 7 (4/10)	AI as data generator I	<ul style="list-style-type: none"> <li>Argyle, Lisa P., Christopher A. Bail, Ethan C. Busby, Joshua R. Gubler, Thomas Howe, T., Christopher Rytting, Taylor Sorensen, and David Wingate. 2023 . Leveraging AI for Democratic Discourse: Chat Interventions Can Improve Online Political Conversations at Scale. <i>Proceedings of the National Academy of Sciences</i> 120(41):e2311627120. <a href="https://doi.org/10.1073/pnas.2301162120">https://doi.org/10.1073/pnas.2301162120</a></li> </ul>	Student-led demo (用 n8n 同時從多個來源，如 RSS + HTTP Request 收集資料，展示跨平台資料)

		<p><a href="https://doi.org/10.1073/pnas.2311627120">//doi.org/10.1073/pnas.2311627120</a></p> <ul style="list-style-type: none"> <li>Y. Gao, D. Lee, G. Burtch, &amp; S. Fazelpour, Take caution in using LLMs as human surrogates, <i>Proceedings of the National Academy of Sciences of the United States of America</i> 122 (24) e2501660122, <a href="https://doi.org/10.1073/pnas.2501660122">https://doi.org/10.1073/pnas.2501660122</a> (2025).</li> </ul>	整合與 LLM 初步分類)
Week 8 (4/17)	AI tools and social science research (guest speaker: 江彥生)	<ul style="list-style-type: none"> <li>TBD</li> </ul>	
Week 9 (4/24)	AI as data generator II	<ul style="list-style-type: none"> <li>Boelaert, J., Coavoux, S., Ollion, É., Petev, I., &amp; Präg, P. (2025). Machine bias: How do generative language models answer opinion polls? <i>Sociological Methods &amp; Research</i>, 54(3), 1156–1196. <a href="https://doi.org/10.1177/00491241251330582">https://doi.org/10.1177/00491241251330582</a></li> <li>P. Pataranutaporn, N. Powdthavee, C. Archiwaranguprok, &amp; P. Maes, Simulating human well-being with large language models: Systematic validation and misestimation across 64,000 individuals from 64 countries, <i>Proceedings of the National Academy of Sciences of the United States of America</i> 122 (48) e2519394122, <a href="https://doi.org/10.1073/pnas.2519394122">https://doi.org/10.1073/pnas.2519394122</a> (2025).</li> </ul>	Student-led demo (設計一個「新聞真偽判斷」或「意見偏見偵測」prompt，用 n8n 讓 LLM 判斷內容，討論 LLM 的政治偏見與限制)
Week 10 (5/1)	Holiday		HW II (15%) transcribe interview due 5/15
<b>Module 2: Ask AI agents to analyze data</b>			
Week 11 (5/8)	LLM and qualitative analysis I	<ul style="list-style-type: none"> <li>Tai, R. H., Bentley, L. J., Xia, X., Sitt, J. M., Fankhauser, S. C., Chicas, A. M., &amp; Monahan, C. E. (2024). An Examination of the Use of Large Language Models to Aid Analysis of Textual Data. <i>International Journal of Qualitative Methods</i>, 23. <a href="https://doi.org/10.1177/16094069241231168">https://doi.org/10.1177/16094069241231168</a></li> <li>Goyanes, M., Gil de Zúñiga, H., &amp; Yoon, G. (2025). Thematic analysis of interview data with ChatGPT: Designing and testing a reliable research protocol for qualitative research. <i>Quality &amp; Quantity</i>. <a href="https://doi.org/10.1007/s11135-025-02199-3">https://doi.org/10.1007/s11135-025-02199-3</a></li> </ul>	Student-led demo (用 n8n 建構完整的「逐字稿 → 初步編碼 → 主題歸類 → 摘要輸出」自動化流程)
Week 12 (5/15)	LLM and qualitative analysis II	<ul style="list-style-type: none"> <li>Stuhler, O., Ton, C. D., &amp; Ollion, É. (2025). From codebooks to promptbooks: Extracting information from text with generative large language models. <i>Sociological Methods &amp; Research</i>, 54(3), 794–848. <a href="https://doi.org/10.1177/00491241251336794">https://doi.org/10.1177/00491241251336794</a></li> <li>Hayes, Adam S. (2025). “ ‘Conversing’ with Qualitative Data: Enhancing Qualitative Research Through Large Language Models (LLMs).” <i>International Journal of Qualitative Methods</i> 24.</li> </ul>	Student-led demo (Codebook 到 Promptbook 的轉換邏輯、如何設計可靠的 prompt)

		<p><a href="https://doi.org/10.1177/16094069251322346">https://doi.org/10.1177/16094069251322346</a></p> <ul style="list-style-type: none"> <li>(optional) Ibrahim, E. I., &amp; Voyer, A. (2025). Qualitative research with LLM chatbots: Technological reflexivity for interpretative technology. <i>Qualitative Research</i>, 26(1), 133-159. <a href="https://doi.org/10.1177/14687941251390794">https://doi.org/10.1177/14687941251390794</a></li> </ul>	
Week 13 (5/22)	LLM as annotator I	<ul style="list-style-type: none"> <li>Gilardi, Fabrizio, Meysam Alizadeh, and Maël Kubli. 2023. "ChatGPT Outperforms Crowd Workers for Text-Annotation Tasks." <i>Proceedings of the National Academy of Sciences of the United States of America</i> 120(30):e2305016120. <a href="https://doi.org/10.1073/pnas.2305016120">https://doi.org/10.1073/pnas.2305016120</a></li> <li>Törnberg, P. (2024). Large language models outperform expert coders and supervised classifiers at annotating political social media messages. <i>Social Science Computer Review</i>. <a href="https://doi.org/10.1177/08944393241286471">https://doi.org/10.1177/08944393241286471</a></li> </ul>	Student-led demo (挑選 20-30 則貼文，設計分類 prompt，如議題分類、立場判斷，用 n8n 批次標注，計算與人工標注的一致性)
Week 14 (5/29)	LLM as annotator II	<ul style="list-style-type: none"> <li>Ter-Mkrtychyan, Ani V. and Marshall A. Taylor. (2024). An empirical mapping of environmental protection and conservation nonprofit discourse on social media. <i>Nonprofit and Voluntary Sector Quarterly</i>, 53(3). <a href="https://doi.org/10.1177/08997640231202459">https://doi.org/10.1177/08997640231202459</a></li> <li>Ornstein, J. T., Blasingame, E. N., &amp; Truscott, J. S. (2025). How to train your stochastic parrot: Large language models for political texts. <i>Political Science Research and Methods</i>, 1–18. <a href="https://doi.org/10.1017/psrm.2024.64">https://doi.org/10.1017/psrm.2024.64</a></li> </ul>	Student-led demo (在 n8n 設計一個分類環境或政治文章的 prompt，展示如何加入背景脈絡提高準確度，同時呼叫 Gemini + Claude 比較結果)
Week 15 (6/5)	Final presentation		Final project presentation (15%)
Week 16 (6/12)	Final paper		Final paper (15%) due 6/12

**\*The professor reserves the right to make changes to the syllabus, including due dates and presentation dates. These changes will be announced as early as possible.**