Integrated Data-driven Storytelling (JOUR4046)

As an advanced level core course of the Data and Media Communication Concentration, this course aims to integrate knowledge and skills of data-driven storytelling in the field of media and communication. Special focus will be placed on the industrial production process of all aspects of techniques, including searching, collecting, analysing, interpreting, and visualizing data from various sources.

The design and aesthetic components in the data-driven storytelling process will also be covered. In additional to the traditional teaching learning activities, such as class demonstrations, individual assignments, collaborative projects and guest lectures, the course will also adopt the case study approach and perform reverse-engineering on classic and cutting-edged data-driven storytelling examples. Critical reflection on the overuse and abuse of big data and relevant ethical and legal controversies will be addressed as well. By the end of the semester, students are expected to produce a data-driven narrative project, such as, but not limited to, data-driven journalistic report, data visualization layouts, data-driven business analysis, and computational social science research reports.

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Teaching Time & Venue:	Tuesday 18:30 – 21:20 CVA205

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Module 1 - How to Tell Story with Data in Agile Software Development 1. Going digital and computational: Data narrative in a big data world 2. Trends in STEM education, business analytics, digital humanities and computational social science leading to paradigm shift in knowledge creation 3. Post-truth and fake news: implications for data narrative 4. Front-end and back-end integration for full stack software development 5. Introduction to agile software development in the context of narrative production

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Module 2 & 3 - Introduction to the Python Flask Framework

1. Introduction to **Python Flask Framework**

    a. Quick review of the **HTTP** protocol and basic structure of a web app
    b. Set up a free **PythonAnywhere** account
    c. Upload Python codes to **PythonAnywhere**
    d. Understanding basic Flask directory structure
    e. **HTML/CSS** templating

2. Connecting **JavaScript based Front-End** to **Flask Back-end**

    a. Review of data structures in Python and JavaScript for effective data transfer through **JSON**
    b. Mapping visual model to data model through the **MVC** framework.
    c. **RESTful API** for creating web service end-points
    d. Resources access and authentication consideration
    e. Demonstration of JavaScript libraries for data visualisation

Module 4 & 5 - Design Thinking and Computational Thinking for Problem Solving and Story Telling

1. Journalist as problem solver and story teller
2. What is design thinking? How can it be used in problem solving and narrative development?
3. What is computational thinking? How can it be used in problem solving and narrative development?
4. From journey map to story map and data map
5. Elements of UX and their integration into narrative development

Module 6 - Basic Setup of a Cloud Database

1. Introduction to **Airtable** as a cloud database for managing linked tables and views
2. Creating **Airtable** tables, views, teams, and forms.
3. Embedding **Airtable** views and forms inside web pages
4. The **Airtable API** and import and export of data in **Airtable**
5. Building formula in **Airtable** for advanced data treatment

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Module 7 - Digital Tools for Data Visualisation

1. Ben Fry's 7 Stages of Data Visualization
2. Sources of Data in a Big Data world: **Open Data**, **IoT**, social media/web **API** and Scraping
    a. What is **XML/JSON**?
    b. **Open Data** and **IoT**
    c. Web scrapping with **ParseHub**
    d. **CSV**, **XML** and **JSON** converters
3. Data cleanup with **OpenRefine** during in-class exercise
4. Storing scrapped and cleaned-up data into **Airtable**
5. Data aggregation through **Airtable**
6. Data visualization demonstration in **Datawrapper.**

Module 8 - Lead Development in News Narratives

1. How can data narrative change 5W2H in story development?
2. Creating powerful leads with data narrative and visualisation
3. Types of leads and how they can be enhanced with data narrative
4. The inverted pyramid using infographics and data visualisation
5. Don't lie with statistics: Beware of selective attention and other bias
6. Use and verification of data and data sources throughout lead and story development

Module 9 - Virtual DOM, Component Development and Data Binding in React

1. Use **JSX** and **React components** for front-end development
2. Properties, events and states for **virtual DOM** updates and screen rendering
3. Component communication and component life cycle for data binding
4. Integrating React components into a **Flask RESTful API** framework
5. Integration with **Airtable** for building a database enabled web app
6. React and Flask for full stack app development in M/DL

Module 10 - Essentials of Data Visualization

1. Basic Chart types, UI components and their use
2. Psychology principles for visual perception and visualisation
3. Elements of visualisation: Framework + visual encodings + annotations
4. Major visual encoding attributes
5. Choosing the right encoding scheme to suit narrative purpose

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Module 11 - Responsive Web Design 1. Responsive web design through media queries, proportional layouts, and adaptive images. 2. Form factor consideration across contexts of use 3. Choosing the right visuals for mobile, tablet and desktop/laptop display. 4. Image production for cross-platform adaptation 5. Testing for cross-platform consistency and compatibility
Module 12 - Web Analytics for Tracking Users and Increasing Traffic 1. Introduction to **Google Analytics**, **Tag Manager**, and **Google Optimize** and how they work together to serve an **A/B test**. 2. Understand basic user acquisition metrics 3. Search Engine Optimisation (SEO) and keyword strategy development using **Google Search Console** 4. Use of **UTM codes** for tracking campaigns and web traffic sources. 5. Conversion tracking for analysing realisation of business goals 6. From users to subscribers: the importance of membership
Module 13 Final Presentation 1. Final presentation

Course Intended Learning Outcomes (CILOs)

CILO	**By the end of the course, students should be able to:**
CILO 1	Demonstrate the significance and value of data in all kinds of stories;
CILO 2	Identify newsworthy patterns and application values in data and conceptualize clear and concise ways to illustrate patterns and trend;
CILO 3	Use data skills to visualize data and create interactive infographics;
CILO 4	Present and publish data-based news stories in front of an audience and online.

Teaching & Learning Activities (TLAs)

CILOs	TLAs
CILOs 1, 2	Through lectures, readings, case studies and tutorials, students will learn the necessary concepts and skills for data journalism.
CILOs 2, 3	Performing case study and reverse-engineering on classic and cutting-edges of data-driven storytelling reporting and projects.
CILOs 3, 4	Through class discussions, hands-on practice, and project design and implementation, as well as feedback from the instructor and the class, students will learn to apply relevant concepts and skills to data-based story-telling.

Assessment Methods (AMs)

Type of Assessment	Weighting	CILOs to be Addressed	Description of Assessment Tasks
Class participation	20%	1	Students will involve in informed and meaningful participation in class activities after completing the assigned readings and assignments prior to class.
Midterm assessment	20%	1, 3	Definition of key terms, application of concepts and case analysis will be included.
Term project presentation	10%	2, 3	Students will need to do a presentation to share what they have in their term projects. Feedback and critique can be obtained from fellow classmates and the instructor.

Term project	50%	2 - 4	Students will need to create an interactive data-based news stories for publishing online to demonstrate their ability to design and implement data-driven news stories. Both conceptual thinking and specific skills/ability will be assessed.

Textbooks / Recommended Readings

Baack, S. (2013). A new style of news reporting: Wikileaks and data-driven journalism. In B. Rambatan, J. Johanssen (Eds.), *Cyborg subjects: Discourses on digital culture*, (pp. 113-122). CreateSpace Independent Publishing Platform.

Borges-Rey, E. (2016). Unravelling data journalism: A study of data journalism practice in British newsrooms. *Journalism Practice, 10*(7), 833-843.

Boyles, J. L., & Meyer, E. (2016). Letting the data speak: Role perceptions of data journalists in fostering democratic conversation. *Digital Journalism, 4*(7), 944-954.

Coddington, M. (2014). Clarifying journalism's quantitative turn: A typology for evaluating data journalism, computational journalism, and computer-assisted reporting. *Digital Journalism*, 1-18.

De Maeyer, J., Libert, M., Domingo, D., Heinderyckx, F., & Le Cam, F. (2014). Waiting for data journalism: A qualitative assessment of the anecdotal take-up of data journalism in French-speaking Belgium. *Digital Journalism*, 1-15.

Fink, K., & Anderson, C. W. (2014). Data journalism in the United States: Beyond the "usual suspects." *Journalism Studies*, 1-15.

Gray, J., Chambers, L., & Bounegru, L. (2012). *The data journalism handbook*. O'Reilly Media.

Konrad-Adenauer-Stiftung. (2013). *Data journalism in Asia*. Media Programme Asia.
Mair, J., & Keeble, R. L. (Eds.). (2012). *Data journalism: Mapping the future*. Abramis Academic Publishing.

Meyer, P. (2002). *Precision journalism: A reporter's introduction to social science methods* (4th ed.). Boston Way, MD: Rowman & Littlefield.
Rogers, S. (2013). *Facts are sacred: The power of data*. Faber & Faber.

Parasie, S., & Dagiral, E. (2012). Data-driven journalism and the public good: "Computer-assisted-reporters" and "programmer-journalists" in Chicago. *New Media & Society*, 1461444812463345.

Thornburg, R.M. (2011). *Producing online news: Digital skills, stronger stories*. Washington, DC: CQ Press.

Schultz, J. (1998). Reviving the Fourth Estate: Democracy, Accountability and the Media. Cambridge, England: Cambridge University Press.

Wong, D. M. (2013). *The Wall Street Journal guide to information graphics: The dos and don'ts of presenting data, facts, and figures*. W. W. Norton.

Diakopoulos, N. (2015). Algorithmic accountability: Journalistic investigation of computational power structures. *Digital Journalism, 3*(3), 398-415.

Zhang, X. (2017). Visualization, technologies, or the public? Exploring the articulation of data-driven journalism in the Twittersphere. *Digital Journalism*, 1-22.

Loosen, W., Reimer, J., & De Silva-Schmidt, F. (2017). Data-driven reporting: An on-going (r) evolution? An analysis of projects nominated for the Data Journalism Awards 2013-2016. *Journalism*. online first.