2019 봄학기

소셜 네트워크 데이터마이닝과 분석

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시간 월요일 오후 2:00 ~ 4:50

장소 83-601

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수업 개요 소셜 컴퓨팅(social computing)과 라지데이터 분석(large data analysis) 등이 커뮤니케이션 분야에서도 중요한 이슈로 부상함에 따라 컴퓨터공학을 전공하지 않은 연구자들도 소셜 네트웍 시스템의 기술적, 구조적 특성을 이해할 필요가 있다. 이 수업에서는 스크립팅 프로그래밍 언어인 파이썬(Python)을 사용하여 컴퓨터 프로그래밍의 기초를 학습하고, 웹 기반 기술(web technology), 데이터베이스 등의 관련 기술에 대한 학습을 통해 실제로 소셜 네트워크 데이터를 수집하고 분석하는 방법을 배운다.

강의내용

1. 파이썬을 이용한 기초 프로그래밍
2. 웹 기반 기술(web technology)
3. 소셜 데이터 마이닝(social data mining)을 통한 데이터 분석

교재 (참고 서적)

- CodeCademy: Learn Python
- CodeCademy: Learn HTML & CSS
- 파이썬 라이브러리를 활용한 데이터 분석 (Python for Data Analysis)
- 기타 필요한 교재/논문 등은 강의 중 제공

수업진행 계획

1주 (3/4) Introduction to Social Computing

- What is Social Computing?
- What is Computer Programming?
- Why use Python?
- How to install Python on your computer.

2주 (3/11) Python Crash Course 1

- Python Basics
- Using Github

Topic 1: Social Computing Background 1

- Anderson (2008), The End of Theory: The Data Deluge Makes the Scientific Method Obsolete, Wired
- Wee et al. (2018), The influence of depression and personality on social networking, Computers in Human Behavior.

3주 (3/18) Python Crash Course 2

- Python Basics
- Visualizing Data with Python

Topic 2: Social Computing Background 2

- Wellman (2001), Computer Networks as Social Networks, Science.
- Lazer et al. (2009), Computational Social Science, Science.

4주 (3/25) Data Analysis Using numpy and pandas 1

- Numpy Basics

Topic 3: Socialogical Concepts

- Granovetter (1973), The Strength of Weak Ties, American Journal of Sociology.
- Granovetter (1983), The Strength of Weak Ties: A Network Theory Revisited, Sociological Theory.

5주 (4/1) Data Analysis Using numpy and pandas 2

- Pandas Basics

Topic 4: SNS & Internet 1

- Kraut et al. (1998), Internet paradox. A social technology that reduces social involvement and psychological well-being?, American Psychologist.
- Kraut et al. (2002), Internet Paradox Revisited, Journal of Social Issues.

6주 (4/8) Visualizing Data

- Python Visualization

Topic 5: SNS & Internet 2

- Ginsberg et al. (2008). Detecting influenza epidemics using search engine query data. Nature.
- Goel et al. (2010). Predicting consumer behavior with Web search. PNAS.
- Lazer et al. (2014). The Parable of Google Flu: Traps in Big Data Analysis. Science.

7주 (4/15) Text Analysis Using NLTK & KoNLPy

- Analysis English texts using NLTK
- Analysis Korean texts using KoNLPy

Topic 6: SNS & Internet 3

- De Choudhury et al. (2010), Inferring relevant social networks from interpersonal communication, WWW.
- Adamic & Glance (2005), The Political Blogosphere and the 2004 U.S. Election: Divided They Blog, LinkKDD.

8주 (4/22) Web Technology & Social Data Mining 1

- Understanding web structure
- Web-crawling using BeautifulSoup

Topic 7: Twitter & Facebook 1

- Bollen, Mao & Zeng (2011), Twitter mood predicts the stock market, Journal of Computational Science.
- Marcus et al. (2011), Twitinfo: aggregating and visualizing microblogs for event exploration, SIGCHI.

9주 (4/29) Web Technology & Social Data Mining 2

- Twitter data crawling using Twitter API
- Data crawling using OpenAPI
- Advanced web-crawling (JSON, Selenium)

Topic 8: Twitter & Facebook 2

- Quercia et al. (2011), Tweets from Justin Bieber's heart: the dynamics of the location field in user profiles, SIGCHI.
- Burke & Kraut (2014), Growing closer on facebook: changes in tie strength through social network site use, SIGCHI.

10주 (5/6) Data Visualization with Tableau

- Visualization Workshop

11주 (5/13) Advanced Text Analysis Topics & Machine Learning 1

- TF-IDF
- Word2Vec
- Supervised Learning
- Unsupervised Learning

Topic 9: Analysis Methods-Case Studies 1

- Gilbert & Karahalios (2009), Predicting tie strength with social media, SIGCHI.
- De Choudhury, Counts & Horvitz (2013), Predicting postpartum changes in emotion and behavior via social media, SIGCHI.

12주 (5/20) Advanced Text Analysis Topics & Machine Learning 2

- LDA
- Sentiment Analysis
- Using ML APIs: Google Cloud, MS Azure etc.

Topic 10: Analysis Methods-Case Studies 2

- Gilbert & Karahalios (2009), Widespread Worry and the Stock Market, AAAI.
- Kramer at al. (2014), Experimental evidence of massive-scale emotional contagion through social networks, PNAS.

13주 (5/27) Team Meeting

14주 (6/3) Team Meeting

15주 (6/10) Final Presentation (Final Paper Submit)

과제 및 평가 Coding Assignment: 주어진 코딩 문제를 제출

- Assignment 1: 2 CodeCademy course complete (5+5 points)
- Assignment 2: Python coding exercise (10 points)
- Assignment 3: Data cleanup exercise (10 points)
- Assignment 4: Text Analysis Using NLTK & KoNLPy (10 points)
- Assignment 5: Data crawling (15 points)

Paper Review: 매주 2~3개의 페이퍼를 읽고 A4 두페이지 이내로 요약하여 제출

- Paper Review: 2 points per paper

  * 페이퍼 리스트는 바뀔 수 있습니다. 바뀌는 경우 미리 공지합니다.

Final Project: 주제를 잡고 데이터를 수집, 분석하여 페이퍼 제출 (팀과제)

- Team Project: Data Analysis Project & Paper (70 points)
- Peer Review: 30 points

Absence Policy:

```
if 3 <= absent < 5:
    grade = "C+" #starting grade
elif absent >= 5:
    grade = "F"
```