CASA dissertation plan submission form

Please use your UCL information (e.g. email)

Email address *

ucfncjc@ucl.ac.uk

First Name *

Cheyne

Last Name *

Campbell

Student Number *

19068262

Select your programme *

MSc Smart Cities and Urban Analytics

Potential supervisor. Note, academics have different capacity for supervision. *

Duncan Wilson

Have you contacted this supervisor *

- (●) Yes
- ( ) No

Do you have a 2nd choice supervisor *

Maarten Vanhoof

Are you planning to collaborate with a partner or apply for an advertised project (listed below) *

- (●) Yes
- ( ) No
- ( ) I've found my own partner

What project are you applying for *

Learning from frequent walkers with Farzaneh Bahrami

If you have your own partner, who are they

Smart Growth America (if above doesn't work out)

If you have picked a partner or listed project what makes you suitable for their project (100-200 words)

I am applying to this project because I am very interested in research that is aimed at facilitating active travel, specifically walking and walkability. Last term, I chose to focus my GIS final assessment on evaluating the walkability of residences in Charlotte, North Carolina (my hometown) based on the existing sidewalk network. During this project and the literature review process, I became familiar with many of the challenges surrounding walkability and pedestrian research, and I am hoping to explore some of these further through my dissertation. As someone from a United States suburb who has also lived in several cities, I believe in the potential of increased capacity for active travel to help mitigate climate change, improve economic conditions, increase the health of citizens, and create more interesting, enjoyable places. I am excited to engage with this topic over the upcoming months.

Have you read the mark scheme on Moodle *

- [x] Yes

Have you read the dissertation handbook on Moodle before completing the rest of this form *

- (•) Yes

What is the proposed title of your project (insert industry title if selected industry project) *

Farzaneh Bahrami

What is the proposed research question - see handbook *

Can crowdsourced mobile phone data offer accurate, usable information about pedestrian volumes and / or routes in the suburban United States? If so, how can crowdsourced mobile phone data be implemented to provide insights about the ability of form-based coding to encourage active travel in the United States?

What are your proposed objectives - see handbook *

1. Consider past studies that used crowdsourced mobile phone data to determine pedestrian networks / routes / volumes and consider how these studies validated their findings.

2. Additionally, investigate the history of and prior qualitative / quantitative research on the benefits of form-based coding.

3. Select case study locations in the United States, specifically places that have enacted form-based coding as an alternative to conventional zoning regulations. For each of these locations, analyze the capacity of crowdsourced mobile phone data - exact source(s) yet to be determined - to offer information about pedestrian movements by considering data availability, limitations, comparisons to other metrics where available, etc.

4. Where it is determined that crowdsourced data provides accurate, useable information, attempt to use this data to assess changes in pedestrian routes / volumes before and after form-based coding was enacted. This will involve visualization techniques and network analysis or another method, yet to be determined.

5. Produce a series of recommendations or a framework that local governments can use to quantitatively assess and present the impact that the transition to form-based codes has on pedestrian activity and active travel in the relevant area.

Provide 400-500 words of background for the research *

A persistent challenge in the field of walkability research is obtaining accurate, detailed data about pedestrian movements while protecting individual privacy. Techniques involving video analysis, sensors, WiFi and Bluetooth traces, mobile phone apps, crowdsourcing, and credit card data have all been proposed, each with their own distinct pros and cons (Leeson et al. 2014; Guan, Keith, and Hong, 2019). Larger cities have the freedom and finances to explore even more novel approaches to active travel data collection and infrastructure, such as Arup's FlexKerbs proposal for London (Claris, Peck, and Khaku, 2018). However, small towns require simpler, less expensive solutions for collecting, understanding, and implementing pedestrian data. Crowdsourced mobile phone data represents a potential solution for these contexts, as these devices are everywhere, and the collection of this data requires no investments in new infrastructure (Leeson et al. 2014). Thus, this research will investigate if crowdsourced mobile phone data can offer accurate, usable information about pedestrian volumes and / or routes in the suburban United States, where there is a great need for increased walkability but limited funding for other pedestrian counting / monitoring technologies.

If this study finds that crowdsourced mobile phone is a viable option for collecting pedestrian data, a subsequent objective of this research will be to determine how this data can be visualized and analyzed to evaluate the effectiveness of walkability initiatives in the suburban United States. An emerging method for increasing walkability in such areas is transitioning from conventional zoning regulations to form-based coding. Form-based coding is an alternative to conventional zoning, in which land is regulated according to function; form-based coding instead focuses on the physical form of buildings with the intention of avoiding the sprawl-related problems caused by single-use zoning (Parolek, Parolek, and Crawford, 2008). Due to the relatively recent emergence of the concept of form-based coding and challenges surrounding data availability, there has been little research on the subject to date (Talen, 2013). Smart Growth America (SGA) is currently conducting research on the economic benefits of form-based coding, and as walkability has various economic benefits (Litman, 2003; Speck, 2018), the research proposed here could potentially fit in with SGA's objectives as well.

Provide a 300-500 word methodological outline *

The first objective of this research is determining the accuracy and usefulness of crowdsourced mobile phone pedestrian data in suburban contexts. I intend for my methodology to develop significantly as my preliminary research continues, but here are some initial ideas: (1) This research could construct pedestrian networks from several sources of crowdsourced mobile phone data and compare these networks to each other. Due to the inherent difficulties of collecting this kind of data, a potential problem will likely be figuring out how to successfully validate the crowdsourced data if there is nothing to compare it to. Comparing crowdsourced pedestrian data sources to each other could lead to interesting insights about which sources are useful and which are not. (2) This research could also compare the pedestrian networks with other available statistics, such as Walk Score, time use survey data, or even Google Street View images to try and evaluate if the information gleaned from mobile phones makes sense or corresponds logically.

The second objective of this research is to investigate if crowdsourced mobile phone data can be used to evaluate the effectiveness of form-based coding to facilitate and encourage walkability. This process would involve comparing historical pedestrian network data (if possible) to see how the pedestrian network has changed as a result of the form-based code. I am interested in producing an approachable visualization of the results that local governments or advocacy groups could use to better understand the results of form-based coding as it pertains to walkability.

I realize there may be significant feasibility issues with this methodology, and I fully intend to iron these problems out in the upcoming weeks.

List the sources of data you are considering using *

Strava (https://labs.strava.com/), MapMyWalk API (http://gethealth.io/tracker/2016/10/17/mapmywalk-api-integration-and-gethealth-api/), Instagram API, or something of the like.

Are you planning on conducting any field work *

- ○ Yes
- ◉ No
- ○ Maybe

If yes or maybe, outline which UCL forms you will need to submit. Consult: https://www.ucl.ac.uk/safety-services/a-z/off-site-working

Not applicable.

Do you think you will need UCL ethics committee approval at this stage. Follow the link within the dissertation handbook. More information on ethics will be provided in a later lecture. *

- ○ Yes
- ○ No
- ◉ Not sure yet, might do
- ○ Not sure yet, but don't think so

What ethical considerations will consider within your research, even if you don't need formal approval (100-200 words) *

Ethical considerations will include properly anonymizing the mobile phone data that I use, to ensure that individuals cannot be identified. Data privacy concerns will also likely be discussed at length within the paper itself, as this is an important consideration to take into account while using such data sources, even if well intentioned. While the data can be used for the public good to inform policy and design choices that facilitate safer and better walkability, collecting and analyzing detailed pedestrian route data comes with ethical implications relating to privacy, freedom, and surveillance. These concerns will need to be balanced and addressed in this research project.

Are you aware of the penalties for poor academic practice or academic misconduct. Consult the UCL academic manual, Chapter 6, section 9. *

- ◉ Yes

Have you joined the slack dissertation channel *

- (●) Yes

Do you have access to the CASA0004/0010/0012 Moodle page *

- (●) Yes
- ( ) No

Are you aware of the submission deadlines of 5pm 24th August for the digital version on Moodle and 5pm 1st September for the hard copies in the CASA office *

- (●) Yes

Bullet point (or list) an action plan for March for this project *

- Conduct more research on using crowdsourced mobile phone data for pedestrian research, and methodologies that have been used in the past.

- Decide on a data source (or sources).

- Decide on case study locations.

- Figure out how exactly I am going to validate the crowdsourced data.

Do you have anything else to add

If I am unsuccessful in my application, my Plan B project will likely remain the same or similar to my Plan A proposal, which is why I've given very similar answers below.

Bibliography for Background

Claris, S., Peck, H. & Khaku, F.K. (2018). 'FlexKerbs: Evolving Streets for a Driverless Future'. Arup.
Guan, C., Keith, M. & Hong, A. (2019). 'Designing Walkable Cities and Neighborhoods in the Era of Urban Big Data'. Urban Planning International.
Leeson, A., Alvarez, P. & Ghosh, S. (2014). 'Understanding How Big Data and Crowd Movements Will Shape the Cities of Tomorrow'. European Transport Conference.

Litman, T.A. (2003). Economic Value of Walkability. Transportation Research Record, 1828(1), pp. 3–11.

Parolek, D. G., Parolek, K. & Crawford, K. (2008). Form-Based Codes: A Guide for Planners, Urban Designers, Municipalities, and Developers. John Wiley & Sons: Hoboken, N.J.

Speck, J. (2018). Walkable City Rules: 101 Steps to Making Better Places. Island Press: Washington, D.C.

Talen, E. (2013). 'Zoning For and Against Sprawl: The Case for Form-Based Codes'. Journal of Urban Design, 18(2), pp. 175-200.

If you are applying for an industry project you might not be successful, what is your plan B title. If you have proposed your own project or secured your own partner (that is not from the CASA list) you do not need to complete any plan B questions

Using Crowdsourced Mobile Phone Data to Learn About Pedestrian Movements in the Suburban United States

What is your plan B research question

Can crowdsourced mobile phone data offer accurate, usable information about pedestrian volumes and / or routes in the suburban United States? If so, how can crowdsourced mobile phone data be implemented to provide insights about the ability of form-based coding to encourage active travel in the United States?

What would be your plan B objectives

1. Consider past studies that used crowdsourced mobile phone data to determine pedestrian networks / routes / volumes and consider how these studies validated their findings.

2. Additionally, investigate the history of and prior qualitative / quantitative research on the benefits of form-based coding.

3. Select case study locations in the United States, specifically places that have enacted form-based coding as an alternative to conventional zoning regulations. For each of these locations, analyze the capacity of crowdsourced mobile phone data - exact source(s) yet to be determined - to offer information about pedestrian movements by considering data availability, limitations, comparisons to other metrics where available, etc.

4. Where it is determined that crowdsourced data provides accurate, useable information, attempt to use this data to assess changes in pedestrian routes / volumes before and after form-based coding was enacted. This will involve visualization techniques and network analysis or another method, yet to be determined.

5. Produce a series of recommendations or a framework that local governments can use to quantitatively assess and present the impact that the transition to form-based codes has on pedestrian activity and active travel in the relevant area.

What data would you use for the plan B project

Strava (https://labs.strava.com/), MapMyWalk API (http://gethealth.io/tracker/2016/10/17/mapmywalk-api-integration-and-gethealth-api/), Instagram API, or something of the like.

Give a brief description of the project (100 words)

A persistent challenge in the field of walkability research is obtaining accurate, detailed data about pedestrian movements. Small towns require simple, inexpensive solutions for collecting, understanding, and implementing pedestrian data. Crowdsourced mobile phone data represents a potential solution for these contexts. This research will investigate if crowdsourced mobile phone data can offer accurate, usable information about pedestrian movements in the suburban United States. If this study finds that crowdsourced mobile phone is a viable option for collecting pedestrian data, a subsequent objective of this research will be to determine how this data can be visualized and analyzed to evaluate the effectiveness of form-based coding as a walkability initiative.

Do you think you will need UCL ethics committee approval at this stage for the plan B idea. Follow the link within the dissertation handbook. More information on ethics will be provided in a later lecture.

- ○ Yes
- ○ No
- ◉ Not sure yet, might do
- ○ Not sure yet, probably not

Are you planning on conducting any field work for the plan B project

- ○ Yes
- ◉ No
- ○ Maybe

If yes or maybe, outline which UCL forms you will need to submit. Consult: https://www.ucl.ac.uk/safety-services/a-z/off-site-working

Not applicable.

What ethical considerations will consider within your plan B research, even if you don't need formal approval (50 words)

Ethical considerations will include properly anonymizing the mobile phone data that I use, to ensure that individuals cannot be identified. Data privacy concerns will also be discussed within the paper itself, as this is an important consideration to take into account while using such data sources.

ROUND 2: What project are you applying for

Choose

ROUND 2: If you have picked a partner or listed project what makes you suitable for their project (100-200 words)

ROUND 2: What is the proposed title of your project (insert industry title if selected industry project)

ROUND 2: What is the proposed research question - see handbook

ROUND 2: What are your proposed objectives - see handbook

ROUND 2: Provide 400-500 words of background for the research

ROUND 2: Provide a 300-500 word methodological outline

ROUND 2: List the sources of data you are considering using

ROUND 2: Are you planning on conducting any field work

- Yes
- No

ROUND 2: If yes or maybe, outline which UCL forms you will need to submit. Consult: https://www.ucl.ac.uk/safety-services/a-z/off-site-working

ROUND 2: Do you think you will need UCL ethics committee approval at this stage. Follow the link within the dissertation handbook. More information on ethics will be provided in a later lecture. *

- Yes
- No
- Not sure yet, might do
- Not sure yet, but don't think so

ROUND 2: What ethical considerations will consider within your research, even if you don't need formal approval (100-200 words)

Google Forms