**Proposal**

* Why did you choose the topic? (Personal / social relevance)
* What interesting insights did you gain from your preliminary research?
* What do you want to research further and how do you plan to do that?
* Using which technology? (think in terms of experiments and prototypes)

**Chosen topic**

Develop a process for the capacity analysis of roads within Brisbane’s CBD, to better equip small active transport advocacy groups in their proposals to state and local government. I want to have a particular focus on advocacy for new and upgraded bike lane infrastructure where computer vision is able to assist with the counting of bikes vs cars.

**Overall Goal**

Grass root community change – empowering small lobby groups to take data driven proposals to government (something often inhibited by a lack of capital). Its about empowering users to change decisions in city planning. Ideally this will be achieved through the development of a prototype to influence change and create better outcomes.

**Why did you choose the topic? (Personal / social relevance)**

My bachelor’s degree was in town planning and I have previously worked for three years as an infrastructure planner for the local government here in Brisbane. This has exposed me to the time and complexity of both the conceptualisation and implementation of new infrastructure projects. My experience also highlighted the lack of data driven decision making that occurs within government, often due to outdated knowledge, processes and technology.

I also believe that in a lot of ways community advocacy groups are ill equipped to actually effect change in their current states. While there are considerable groups that advocate for better infrastructure provision, the methods of analysis and presentation of information is often lacking or very unapproachable. This makes their cases much weaker, both for the presentation to government as well as the general public, in my opinion.

Ideally, by creating a process and prototype for an engaging data driven proposal, I could help empower these groups to be more effective in lobbying for the implementation of the changes that they feel is being underappreciated by the government.

**What interesting insights did you gain from your preliminary research?**

Through my preliminary research, the most interesting thing I have found is that advocacy groups lack planning expertise in their proposals to government. While they are often able to identify areas that are problematic and ways in which they would like to see their built environment improved, they lack technical skills and a methodology for actually generating a data driven analysis/report to take to the media and the government.

There is a broad range of planning theory around the importance of effective space design particularly relating to road usage, and a consideration of all modes of transport. Brisbane’s urban environment is largely built around a car centric design, with active transport options such as cycling only really considered retrospectively. This is something that is beginning to change through planning legislation, however one of the primary inhibitors to this change is community sentiment and political will. Until governments are able to justify road redesign, often taking space from motorists to provide cycling infrastructure, community sentiment is generally relatively negative towards cycling infrastructure. Furthermore, until cycling advocacy groups are better able to promote an increase in cycling infrastructure provision, there is limited political will to implement cycling infrastructure.

The perfect example of this can be seen in the new “temporary” protected bike lanes in Brisbane’s CBD. The first of its kind in the city, their introduction was marred with public backlash about the loss of traffic lanes and on street car parking ([EG1](https://www.4bc.com.au/frustration-grows-over-plans-for-bike-lane-through-city-centre/), [EG2](https://www.4bc.com.au/council-defends-brisbane-cbd-upheaval-for-significant-project/), [EG3](https://www.brisbanetimes.com.au/national/queensland/some-brisbane-cbd-parking-to-go-for-permanent-bicycle-paths-20200818-p55msm.html)).

**What do you want to research further and how do you plan to do that?**

There are few things I want to investigate further. Firstly, I want to develop a better understanding of how computer vision AI works particularly for classifying vehicles. One of the massive problems in the Brisbane planning and advocacy space is a lack of data. While there are traffic counts available for cars and bikes, these are often done using outdated technology (metal sensors in roads) and are only available where governments decide to put them. The use of a camera and an AI could dramatically reduce the cost and difficulty of small groups collecting their own data in areas that are of interest to them.

**Using which technology? (think in terms of experiments and prototypes)**

As mentioned, the key technology used would be computer vision, specifically the classification and tracking of objects (vehicles) through a space. The initial steps I have taken revolve around researching what currently already exists in the space, to see if there anything I can take guidance/inspiration from. After this I think the first steps will involve playing with computer vision AI and developing my first prototype for testing and feedback.

Below are some of the resources I have looked at for understanding what’s possible with the technology currently.

* Open CV YOLO and COCO models
  + Creating a basic image detector - <https://www.youtube.com/watch?v=O3b8lVF93jU>
  + Detecting different vehicle types - <https://heartbeat.fritz.ai/detecting-objects-in-videos-and-camera-feeds-using-keras-opencv-and-imageai-c869fe1ebcdb>
  + Counting cars example - <https://www.youtube.com/watch?v=BMq4ZebzMO8>
  + Tracking an different objects wo/count - <https://youtu.be/RFqvTmEFtOE>
  + Type of vehicle and count - <https://youtu.be/IrsZCtlDOjk>
  + YOLOv4 detection - <https://www.youtube.com/watch?v=jDwC5m7c7BU>
  + Google cloud computing - <https://cloud.google.com/video-intelligence/automl/object-tracking/docs/quickstart-console>
* IBM Maximo Visual Inspection
  + Considered training my own AI