AERIAL IMAGERY

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# Proposal/Notes:

***[Zico]***

*This is a fun one too.  Using Google or similar tools, it's pretty easy to extract aerial images at a high resolution (Google has particularly high resolution, and is easy to query via the static maps API,*[*https://developers.google.com/maps/documentation/static-maps/*](https://developers.google.com/maps/documentation/static-maps/)*though they also do limit the number of images you can download per day).  A lot of people have begun work on predicting all sorts of things from aerial images.*

*As a few examples, using the census data from the above link, you could try to predict just about anything about a region using aerial imagery: wealth level, demographic makeup, religion, etc.  Here you'd probably want to do the "standard" trick of using deep-learning based image features, like we did with the VGG features for class, and then training a classifier to predict whatever element you're interested in.*

# Data sets:

Google's static maps API:

<https://developers.google.com/maps/documentation/static-maps/intro#URL_Parameters>

Standard API Usage limit: [Link](https://developers.google.com/maps/documentation/static-maps/usage-limits)

1. Free until exceeding 25,000 map loads per 24 hours
2. 640 x 640 maximum image resolution

# Plan of work:

1. Identify Location – Small city / Area / region
2. What to predict? *(See ideas below)*
3. Get data set for target location
4. Get images of target location
   1. Image segmentation? Overlapping images or not?
   2. Image type? Satellite / hybrid / terrain / roadmap
   3. Multiple images of same location? (Eg. Day & night)
5. Models & Algorithms *[TBD]*

# Ideas:

1. Demographic makeup (gender, age, ethnicity, income, residence, smoking status, presence of children, education level, language spoken, etc.)
   1. Video: <https://vimeo.com/198708023>

Slides: http://cgi.csc.liv.ac.uk/~frans/KDD/Seminars/ic3k2015-5-10.pdf

1. Wealth level (map poverty)
   1. <http://www.sciencemag.org/news/2016/08/satellite-images-can-map-poverty>
   2. <http://www.theverge.com/2016/8/18/12522764/poverty-measurement-satellite-algorithms-night-vs-day-imaging>
2. Religion (? Not sure)
3. Classify locations (houses, trees, river, roads, etc)
   1. <http://dsp.etfbl.net/aerial/>
4. Identify similar locations across the globe (City layout design)
5. Predict how livable a city is?
   1. <http://www.economist.com/blogs/graphicdetail/2016/08/daily-chart-14>