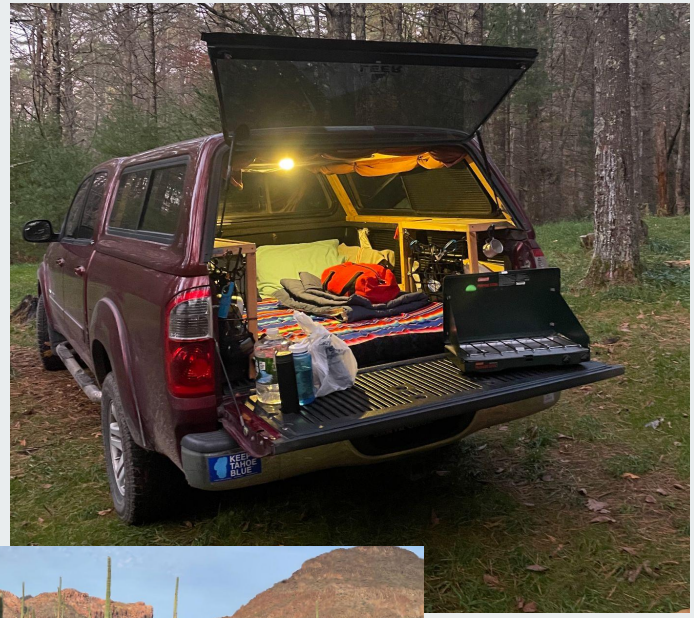
Off-grid, Mobile, PV System

For life on the road

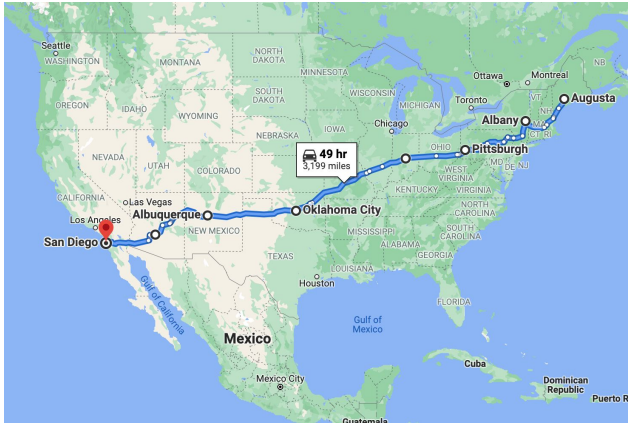
A python-based trip-planning utility



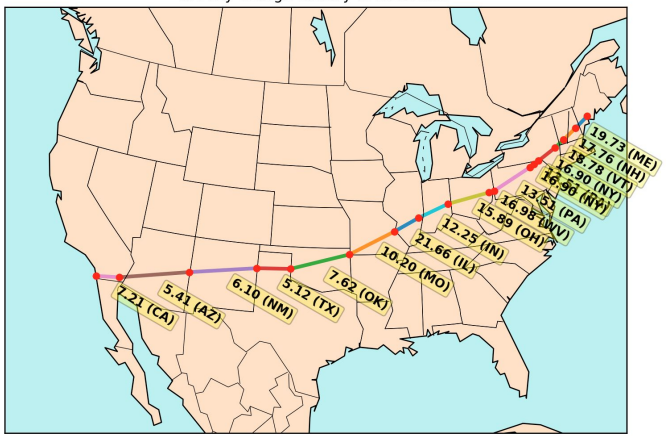
Zayne Khouja
18-883, Autumn 2021

System Certainty

- Modular code: can use on any google maps route, any specified panel, and any battery you choose
- Mapping of route to coordinates to state data is consistent and accurate
- Useful for comparing charge times between seasons

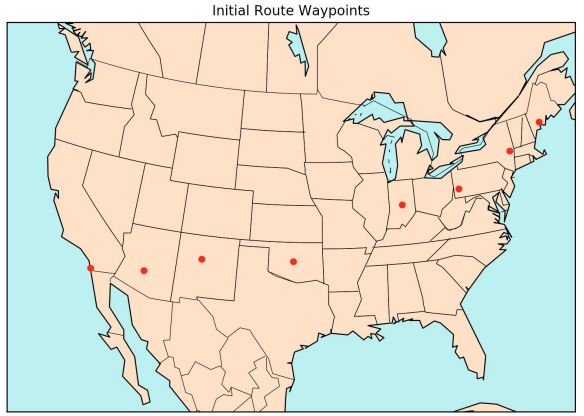


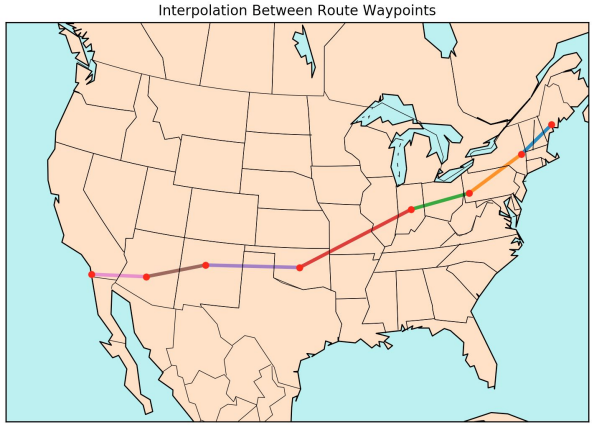
Drive time (Hours per Day) per State
to Fully Charge Battery in November



System Uncertainty & Assumptions

- Irradiance & Temperature at a per-state granularity
  - Particularly inaccurate for geographically diverse states (CA, WA, ...)
  - A more granular solution is behind a paid subscription (SoDa)
- Route between waypoints is approximated with a straight line
- Uses max irradiance in a specified month
  - No hour-by-hour accuracy
  - Does not adjust date of interest as drive goes on





JULY

Drive time (Hours per Day) per State to Fully Charge Battery in July

NOVEMBER

Drive time (Hours per Day) per State to Fully Charge Battery in November

Units: Hours per Day	CA	AZ	NM	TX	OK	MO	IL	IN	OH	WV	PA	NY	VT	NH	ME
July	2.5	2.2	2.4	2.2	2.8	2.6	2.9	2.9	2.9	2.7	3.0	3.1	3.2	3.2	3.3
November	7.2	5.4	6.1	5.1	7.6	10.2	21.7	12.3	15.9	17.0	13.5	16.9	18.8	17.8	19.7