Module 1: Writing Assignment

CS-370

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I live in the 4th largest city by population and 9th by square miles, Houston, TX. We often joke that it takes longer to figure out how to get somewhere than to get there. That is not to downplay our traffic, however. Houston is also home to the 9th worst traffic delays in the US and, yet, somehow, the largest highway, 26 lanes wide, in the world. I spend my mornings contemplating when to leave and which roads to take. Delaying a trip can result in hours of delay due to a road closure, accident, or just an un-usual traffic pattern developing. Looking at the real-time traffic maps is not usually enough as they have a lag and do not have forward looking worldview. It can be mentally taxing.

What if there was an AI that could look through my calendar, monitor the developing traffic, supplementing the seasonal traffic patterns (school days are so much worse than summer days), and alert me when to leave so I am not late to the first meeting.

To build such a system, the first item needed would be accessible live traffic data, historical traffic data, my personal calendar, and any other meta data. Other data could be the local school schedule, weather, major Holidays, major events. These data streams would require some hardware, e.g., server, that can connect to the associated APIs, retrieve the data, and store the data.

This hardware will also house the route-finding algorithms (Peter, 2017), e.g., Dijkstra’s Algorithm or A\*, a database of heuristics, and the ability to receive feedback. Afterall, this AI will need some sort of supervision as it will be quickly devalued if it suggests times that cause me to miss a meeting or sit in easily avoidable traffic (road closures). This feedback could be my GPS ant tracks, maybe the route was impossible, e.g., routing me on down a one-way, or just my travel time. The richer the feedback the more refined the heuristics could become.

The heuristics could also be augmented with an element of machine learning to classify like patterns. For example, maybe using Kirby Road in the summer is a good strategy but during the school year all those school zones cause more delays. With machine learning the heuristics could be updated, automatically, to take the time of year into account once an identifiable pattern developed. Similarly, weather might make an impact on certain road choices as Houston is prone to flooding.

Now, I am suggesting this AI for the purposes of making my life easier, but if the AI had access to other drivers, then patterns could be found quicker. The more predictions and results, *perceive-think-act* loops, the better the AI would be trained – adding more users would help accomplish this.

Of course, now that new users are being onboarded and their positions tracked ethical questions begin to arise. Data always demands security and personal data demands even more. How will the model ensure the anonymity of the user? What if the driver’s travel pattern revealed something they did not want known (BBC News, 2017)? To have access to user’s calendars there would probably need to be an installed app on the phone. This opens a potential threat vector into a user’s phone.

Another ethical issue that could arise, with a massive userbase, is routing choice. For example, most drivers tend to stick to major roads, but what if the quickest route was through a neighborhood or alley. One person using a shortcut probably will not cause issues in a neighborhood but what if this became massively scaled (Salem, 2018)? Does the app have a responsibility to prevent this? How could the heuristics be updated if a local ordinance were passed to prevent this type of travel? Would the AI have an ethical responsibility to understand and comply with local ordinances?

**References:**

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