Energy Moguls: FuelUp

CSCC10: Human-Computer Interaction

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Energy Moguls: FuelUp

Filling up gas is a hassle in itself. Factoring in the struggles of finding a nearby station and gauging whether the price is reasonable, the task triples in its inconvenience. As inflation rattles the economy, heightened gas prices have an immediate impact, disservicing vehicle owners and interfering with the affordability of everyday tasks. Though stations will occasionally boast lower prices, drivers are not always familiar with the areas they pass through to seek these out. FuelUp is our up and coming mobile application, an efficient platform designed to mitigate the inconvenience of keeping your tank full.

The application displays a map of all gas stations in neighbouring areas, with filters to seek pertinent information. Distance, gas prices, gases offered, average wait time, gas deals, and payments accepted are amongst the many filters available. Outside of the fuel experience, the app also monitors miscellaneous information about each station, including electric charging stations, car wash availability, memberships/credit card rewards, tire inflators, and restrooms. The app stores all of this information for each gas station in the user-specified proximity.

FuelUp targets all drivers, particularly individuals aged 16-60 who regularly operate mobile devices. The application places high emphasis on its audio features, allowing for a hands-free experience as not to distract the driver. Whether you're a traveller, a student, a commuter, or just on a drive, FuelUp can offer helpful information to augment your journey. For those who like to plan in advance, users can preprogram the gas stations that they would like to visit, export the stations to their favourite mapping app, and receive notifications when they have nearly arrived.

With FuelUp, planning a trip has never been easier. Through its user-centered design, FuelUp empowers users with its search customizations and selections, relieving the problem of finding the right fueling station suited for your needs. Furthermore, with on-the-spot gas station planning, users will no longer have to worry about not reaching their destination. Whether for travelling, economic savings, or out for a drive, FuelUp is there for you. Focus on the journey, not the limitations.

Spatial Inequality of EV charging stations (Roy, A., & Law, M.)

The goal of this study was to analyze socioeconomic factors that impact access to EV charging stations and utilize a machine-learning approach to create a deeper understanding of said factors. They then can overlay this with future charging station placements to determine if the higher inequity areas are being given greater access (Roy & Law, 2022). These results will be useful for authorities to implement new stations and aid in the widespread adoption of EVs, as that is a primary goal for mitigating climate change in many regions. While the researchers chose Orange County as the location for the study, they believe it to be applicable in other communities and states (Roy & Law, 2022). One can understand it to be applicable in Canada as well, with the country's similar levels of car dependency and climate action. The researcher's model showed that areas with the most spatial inequality for EV charging station (EVCS) placement often ended up being high density, minority-dominated, low-vehicle ownership, and low-income

communities (Roy & Law, 2022). They determined that of the high inequity areas, 9% were predicted to see high density EVCS placements, and 50% were predicted to have medium density placements (Roy & Law, 2022, p. 18). In all, the data-driven approach taken was successful in showing that future placements of EVCS in Orange County were for the most part taking the right approach and placing them in areas that are in greater need of higher density.

How do Consumers Respond to Gaslong Price Cycles (Byrne, D. P., Leslie, G. W., & Ware, R.)

In "How do Consumers Respond to Gasoline Price Cycles", researchers Byrne, Lesilie, and Ware investigate the relationship between volatile gasoline price and canadian consumers. Conducted in Ontario, Canada, the article analyzes the underlying causes of daily gasoline price dispersions, attributing the main factor of price variance to competition and coordination between large gas distributors such as Esso and Shell (Byrne et al., 2015). Through competition, gas distributors engaged in price cutting to obtain a market advantage, increasing the level of price dispersions (Byrne et al., 2015). Afterwards, the act of price restoration would occur; a gradual increase in gas prices coordinated between distributors (Byrne et al., 2015). From their investigation, the researchers analyzed and evaluated the responses of consumers using GasBuddy, the "most popular gas reporting website in North America" (Byrne et al., 2015, p.116). As a result, the data indicated that there would be a gradual 6% increase of responses during times of competition, where the levels of price dispersions were at their highest, with responses peaking at a 7% increase during the first 2 days of price restoration, then drastically decreasing afterwards (Byrne et al., 2015, pp. 132, 136). Evidently, the article demonstrates a demand by consumers to respond to gas price fluctuations and understand when gas prices are at their lowest.

Rationalization of Retail Gasoline Station Networks in Canada (Eckert, A., & West, D. S.)

This paper provides an insight on the rationalization process of the retail gasoline industry in Canada, based on market conditions and independent hypotheses (Eckert & West, 2005). Eckert and West explain how market conditions can impact competition, resulting in potential fewer choices for consumers, and increased market concentration. However, it is important to note that stations with consumer-attractive characteristics (e.g convenience stores, car washes, longer operating hours, and multiple pumps) are less likely to shut down (Eckert & West, 2005). National data is included that addresses the changes in volume shares and percent of stations in major Canadian urban areas showing that these dynamics can have implications for pricing, market competition, and consumer access to gasoline stations.

Impact of Rising Gas Prices on Below-Poverty Commuters (Hayes, C. R.)

In the publication, Hayes and C.R. discovered that the majority of the American workforce population, 78.9% and 64.7% from above and below poverty workers respectively, commute to work through driving alone (Hayes, 2008). Furthermore, an additional 9.6% travel by car with 2

or more commuters for citizens above-poverty and 15% for below-poverty (Hayes, 2008). Specifically, below-poverty commuters, spend on average 9.2% of their income on fueling up their vehicles as gas prices rise (Hayes, 2008). The findings also show a increasing trend in the proportion of workers who choose driving alone as their primary mode of transportation (Hayes, 2008).

Online Price Search: Impact of Price Comparison Sites on Offline Price Evaluations (Bodur, H. O., Klein, N. M., & Arora, N.)

This paper examines the impact of Internet Price Comparison Sites (PCS) on consumers' price evaluations. It finds that favourable PCS retailer ratings enhance the perceived validity of prices, influencing offline price evaluations (Bodur et al., 2015, p.131). The shape of the PCS price distribution also plays a role: when ratings are similar, lower prices and more frequently appearing prices have a greater impact. However, when ratings vary, the price distribution effect only occurs if the most frequent price comes from highly rated retailers (Bodur et al., 2015, p.136). The study also shows that PCS retailer ratings have a stronger influence when consumers choose a retailer directly from the PCS search results, particularly for high-priced retailers and consumers who prioritize service over price.

References

Bodur, H. O., Klein, N. M., & Arora, N. (2015). Online Price Search: Impact of Price Comparison Sites on Offline Price Evaluations. *Journal of Retailing*, 91(1), 125–139. https://doi.org/10/1016/j.jretai.2014.09.003

Byrne, D. P., Leslie, G. W., & Ware, R. (2015). How do consumers respond to gasoline price cycles?. *The Energy Journal*, *36*(1).

Eckert, A., & West, D. S. (2005). Rationalization of Retail Gasoline Station Networks in Canada. *Review of Industrial Organization*, *26*(1), 1–25. https://www.jstor.org/stable/4220?seq=14

Hayes, C. R. (2008, October 2). Impact of Rising Gas Prices on Below-Poverty Commuters. https://www.urban.org/sites/default/files/publication/32031/411760-impact-of-rising-gas-prices-on-below-poverty-commuters.pdf

Roy, A., & Law, M. (2022). Examining spatial disparities in electric vehicle charging station placements using machine learning. *Sustainable Cities and Society*, *83*. https://doi.org/10.31235/osf.io/hvw2t

Energy Moguls - CSCC10 Agreement

Methods of communication (email, phone, texts, ...)

The group has two primary messaging platforms - iMessage group chat and Discord server.

Communication response times (email, phone, texts, ...)

All team members are expected to respond to messages over iMessaging or Discord within 24 hours.

Regular Meetings (frequency of meetings, whether all meetings are mandatory,...)

Mandatory weekly meetings will be held on Wednesdays at 2pm.

Running meetings (when, where, face-to face vs. online, who takes minutes, ...)

Meetings will be held in person at the Bladen Wing computer labs. Aaliyah will take meeting minutes and post them to the team's Discord for all team members to keep track of upcoming tasks.

Meeting preparations (whether preparation is needed, what to prepare,...)

At weekly meetings, expectations for tasks to be completed by the next week's meeting will be discussed. On the weeks where project work is due, a second meeting will be held for the week on Sunday to ensure all tasks are finalized two days in advance.

Division of work (how to divide work, who will decide who does what, ...)

After all responsibilities for each task are laid out, team members are expected to volunteer for which tasks best suit their interests and skill sets. Based on the difficulty and quantity of tasks for each stage, the distribution will also be discussed with the entire team to ensure work is allocated evenly between team members.

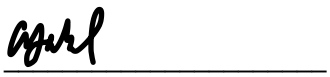
Submitting work (when to submit, who will submit, who will review the submission,...)

All team members will be responsible for looking over the final submission, and Aaliyah will submit the final copy. Final product of each stage should be completed two days before the due date to allow for room to edit and polish before final submission.

Contingency planning (what if a team member drops out, what if a team member is sick for a significant period of time, what if a team member consistently misses meetings, what if a team member is academically dishonest, ...)

Check in with individuals and gauge their situations - see if tasks can be rearranged to accommodate for any personal setbacks. If teammates continue to be unresponsive, connect with TA for next steps.

We accept these guidelines and expect to fulfill them.



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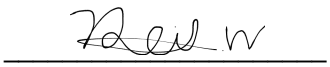
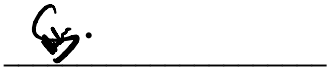
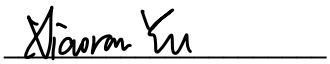


Neil Wang



Sana Alia



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