

Thesis Project Portfolio

Grocery Deal Hunter Application: Finding Ways to Cut Costs

(Technical Report)

Potential implications of using machine learning to supplement understaffed USCIS

(STS Research Paper)

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Sociotechnical Synthesis

The technical project is a proposal to build a mobile application called the Grocery Deal Hunter which would help consumers save money by easily being able to compare prices between grocery stores in their area. The app would send requests to MealMe's API to get data about grocery items' prices, and Google Maps API for data about distance and route from the users to the stores. The server would have distances between grocery stores stored in a database, so it can be used to calculate the distance of a complete route by connecting the internal data of distance between stores to the external Google Maps data of distance from a user to stores. Then, the system would construct the cheapest grocery list between the stores on each route, add fuel costs based on user provided miles per gallon, and display the final result to the user. This would allow grocery shoppers to effectively compare prices between stores in their area, and know the true cost of whatever they were buying.

My STS paper asks: what are the potential implications of using machine learning to supplement understaffed USCIS? The paper specifies the potential impact on three groups, the staff of the USCIS, the immigrants with pending cases, and current workers in the American economy to limit the scope of which groups might be affected. The paper primarily works in the Social Construction Of Technology (SCOT) framework, which is about how societies create technologies for a societal purpose.

The paper starts with a brief explanation of what machine learning is, and explains why machine learning could be used to reduce the backlog. However, there are ethical concerns to consider before constructing such an important system. Instead of supplying a loose checklist to follow as is the norm, I propose instilling a system of virtue ethics to make it less likely for human prejudice to influence the machine learning algorithm.

Changing nothing and keeping USCIS case processing times the same would still be bad for immigrants since many cases are costly and time dependent. Lowering the time that cases are pending or overdue would greatly help immigrants both economically and emotionally. However, the system that's meant to help immigrants might end up inadvertently harming them instead. A machine learning algorithm can only predict how the USCIS would have decided a case. So, if prejudiced or unfair decisions are used as training data, the final machine would make prejudiced and unfair decisions as well. Also, no machine learning algorithm can be perfect. There will be errors, and while they can be appealed, an appeal does not stop any action from being made based on that decision.

A reduction of the USCIS backlog by any method would allow more immigrants into the country, which can have positive and negative effects on the American economy. There would be an influx of workers, which means a boost to GDP and support for the Social Security system. However, some fear that an increase of workers would increase competition for jobs and drive wages down. The nation's increased wealth might just be funneled to rich business owners in the form of reduced wages while workers have to suffer the cost.

There are concerns that automation via machine learning could replace workers, USCIS workers in this case, but I don't think the machine learning system proposed in this paper could displace any jobs. The system is already overburdened, evidenced by the millions of cases in the backlog, meaning that workers are not able to keep up with the number of tasks. Additionally, there are many tasks which require critical thinking and social skills, which a machine learning algorithm cannot automate.