

412 Food Rescue / CMU Machine Learning Department

Executive Summary

Community Partner

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Background

412 Food Rescue (412FR) is a nonprofit based in Pittsburgh, Pennsylvania. The mission of 412FR is to prevent surplus food from entering the waste stream. The organization does so by running a technology platform to allocate food donations to communities in need. For this engagement, we partnered with the Carnegie Mellon University Machine Learning Department (CMU MLD) to continue development on a decision aid to help 412FR dispatchers make quicker and more informed donation allocations.

Project Description

Project Opportunity

412FR faces a problem with its manual donation allocation process, which can be tedious, time-consuming, and unfair to recipients. In particular, some recipients receive several donations within one week while others don't receive anything for months. To carry out their work, 412FR dispatchers spend lots of time dealing with various types of reference files and memorizing recipient features such as location, food preference, and time of last donation received.

At the start of the semester, we were handed an initial decision aid riddled with many problems such as a lengthy load time, a complicated user interface, and outdated database models. This was a prototype used for research purposes at CMU MLD. Our project opportunity was to make this system a deployable product for 412FR. This meant making the interface more efficient, easy to use, and maintainable.

Project Vision

To make the decision aid a deployable product, we wanted to improve every aspect of it. With regards to engineering, we wanted to reduce the load time of the system from 25 seconds to around 10 seconds and restructure the code and database models for maintainability purposes. On the design front, we wanted to simplify the interface to make it more usable for 412FR dispatchers. Finally, looking at opportunities for analytics, we wanted to create a dashboard to house visualizations of the system's simulation results. This would serve as a useful tool for convincing 412FR to deploy the system and supporting claims on a research paper published by CMU MLD.

Project Outcomes

People: Learned about 412FR's dispatching and administrative needs in the donation allocation process. Juggled requests from the 412FR product manager, needs of the 412FR dispatchers, and demands from CMU MLD to create a product that pleases all stakeholders.

Process: Held regular meetings with CMU MLD, attended periodic conferences with 412FR, and adhered to an agile methodology to deliver tasks on a weekly basis.

Technology: Developed and helped deploy the MVP of the decision aid. Built a web application dashboard for system performance evaluation. Implemented methods to track user interaction metrics on the interface for A/B testing purposes.

Project Deliverables

- The MVP of the decision aid system, compatible with 412FR's latest codebase
- Google Analytics and Google Tag Manager Code for metric tracking
- R Shiny web application containing interactive graphs and statistical results

Recommendations

With our decision aid embedded into the live 412FR admin site, 412FR managers should organize workshop sessions to help their dispatchers learn how to use our system. Also, their software contractors can leverage our data collection infrastructure to track user interactions and make changes to the system based on the collected data.

Student Consulting Team

Christina Chou served as a data analyst. She is a junior majoring in Information Systems with a second major in Statistics and Machine Learning. She will be interning at BCG Gamma this summer and is looking forward to a career in software engineering and data analytics.

Aiden Lee served as a software engineer. He is a junior majoring in Information Systems with a minor in Computer Science. He will be interning at Climate Corp this summer and is looking toward a career in software engineer.

Calvin Lui served as a project manager. He is a junior majoring in Information Systems with minors in Statistics, Human-Computer Interaction, and Business Administration. He will be interning at Microsoft as a Program Manager this summer.

Anna Yuan served as a software engineer and designer. She is a junior majoring in Information Systems and Human-Computer Interaction. She will be interning at Zillow Group as an iOS Developer this summer and is looking forward to a career in user experience design.