

Technical Report

Harnessing Data and Application Development for Food Waste Reduction  
(Technical Report)

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## Technical Thesis

The food waste epidemic in the United States is a topic that is heavily discussed, but has yet to be entirely resolved. Food waste produces an array of negative effects: environmental harm, emission of methane and harmful gases, water waste, and decreased biodiversity. There are also social aspects of food waste that are harmed by non-action, such as redistribution. Therefore, countries around the globe have strived to reduce food waste with technical management techniques and education but have fallen short, exhibited by data analysis. Although food waste as a whole has not been entirely resolved, some countries and states offer systematic techniques that Charlottesville can implement to see significant changes. California, Italy, and China have made an effort to reform cultural standards as well as governmental systems to make an effective change. These changes are based upon the intent to remain established and propagate to future generations; a temporary solution will not suffice. ICT tools and applications have been proven effective in providing information and communication platforms between stakeholders of food waste.

It is therefore essential that an efficient form of productive technology and data acquisition, used by smarter cities that Charlottesville, is implemented in our city to facilitate reduction in food waste. We must explore the similarities and differences between Charlottesville and these smarter cities to extract technology, and paired social efforts, that will work with our city's social climate, political system, and technological state.

The technical topic I will present involves data acquisition, data analysis, and mobile/web applications. There are different ways to gather data in today's society: surveys, community outreach, and existing data aggregation are just some of many examples. Integrated into a central application, information can serve as a primary source to track Charlottesville's progress, display community information, and receive input from various social groups. There are many companies that have devised advanced software to combat the 1.6 billion tonnes of food that is wasted globally every year. Drawing from these large scale software applications, Charlottesville can scale down an application that combats our city's food waste.

Primarily, the web/mobile application could serve as an informational site for community members. "Ugly" produce is consistently wasted due to its imperfect aesthetic. Local farmers cannot sell produce that does not appeal to the masses. Consumers will not pay the same amount for a dented apple as a perfect one. Therefore, the software can serve as a Charlottesville marketplace for producers and suppliers that have physically flawed food, of equivalent nutritional value, that would otherwise go to waste. This is just one of many examples in which a software application can connect Charlottesville suppliers with consumers in need of cheaper produce, or simply to sell produce that is going to be wasted.

Next, large scale suppliers such as supermarkets cannot entirely predict whether food will be bought and consumed before its expiration date. However, these suppliers record their stock and often put soon to be expired products on display at a decreased price. With access to local supermarket and supplier data, a web application could consume the data and systematically notify community members when store products are going to expire soon. This would also allow

lower income groups to buy products at a reduced cost while ensuring food does not expire and go to waste.

Lastly, the app could act as a forum for community members to connect and communicate about potential food waste. With a mobile app, a user would be able to post publicly at any time and any location. For example, a social meeting may have ordered large amounts of food as they were unable to predict the number of people attending. In the case of leftovers, the user could post about the soon to be wasted food, and give specifics about where to retrieve it. A social platform, used only for a specific topic, would allow millennials and social media users to receive real-time updates and information.

This technical approach to combating food waste does not come without its challenges. Creating the software would heavily rely on stakeholders. A non profit application would necessitate programmers who are willing to volunteer their time and effort without compensation. The application would depend on acquiring private data that may or may not be shared publicly. The technology would also need to be formatted in a simplistic way, user friendly for all ages and community members. Conclusively, there are many problems with respect to food waste that a web/mobile application can begin to solve. The app could serve as a marketplace, informational source, and social platform for various stakeholders in Charlottesville.