Know-Wait

TEAM AVOCADO
Team Members

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Problem Statement

- Many people have limited time to get food in their busy schedule.
- They have no way to know how long they will be waiting for fast food.
Customer Base

We will be using ODU as a test case for our prototype

Customers

- Students and Faculty
- Made for Android phones

Fast Food Services

- Panda Express
- Subway
- Chick-fil-a
- Starbucks
Problem Characteristics

Lines for Panda Express and Subway, for example, can reach 30 people or more

The wait can be up to 30 - 45 minutes long

Lines can go from non-existent to packed in a matter of minutes

If a chain runs out of a certain food, the line will slow down causing a longer wait.
Problem Flow Diagram

Students/staff looking for food

They choose between the Webb center or Broderick for food

They are lucky and the lines are short
Or
They are unlucky and the lines are long

The customer leaves happy and is on time to their next event
Or
The customer leaves unhappy and hungry
Solution Method

1. Background subtraction removes unwanted elements from the video feed.
2. Produces “silhouettes” of new elements (people) in the image.
3. Silhouette movement is tracked and wait time estimate is calculated.
4. The program only stores images for comparison and deleted afterwards.
Requirements

HARDWARE

Food Chain:
• Raspberry Pi 3
• Infrared Camera
• Internet connection – preferably Ethernet
• Server machine

Consumer:
• Android phone

SOFTWARE

Food Chain:
• Linux based server machine

Consumer:
• Android OS
Solution Flow Diagram

1. Students/Staff are looking for food.
2. They don’t know if they should choose between the Webb center or Broderick for food.
3. They open up the know wait app and are given the wait times at all the food chains.
4. They are short for time and choose where to go based on the wait times.
5. The customer leaves happy and is on time to their next event.
Major Functional Component Diagram

User
Students and Faculty
Access the Mobile Application

Mobile Application
Provides users with content

Server
Sends data to user

Camera/Pi
Collects data
Sends data to server
## Competition Matrix

<table>
<thead>
<tr>
<th>Competitors</th>
<th>Live constant data</th>
<th>Mobile Application</th>
<th>Fast food services</th>
<th>Video base data collection</th>
<th>Show Food Chain Menu</th>
<th>Give average time</th>
<th>Reserve tables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Know-Wait</td>
<td>x</td>
<td>x</td>
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Application Framework
Website Map
# User Roles

<table>
<thead>
<tr>
<th>Administrator:</th>
<th>Consumer:</th>
<th>Restaurant:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add/Remove restaurants</td>
<td>Log in to Android Application</td>
<td>Enable/Disable device</td>
</tr>
<tr>
<td>Do remote maintenance</td>
<td>Check estimated time</td>
<td></td>
</tr>
</tbody>
</table>
Technical Risks
Consumer Risks
References

Camera picture: https://openclipart.org/tags/CCTV


People Picture: https://pixabay.com/en/computer-user-icon-peolpe-avatar-1331579/


Info on Google popular times: https://support.google.com/business/answer/6263531?hl=en