



Contour

The right fit for you

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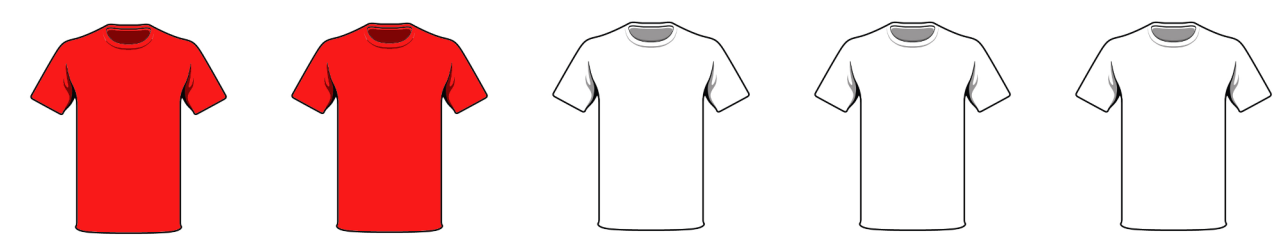
Advisor: Alex Wong

Background

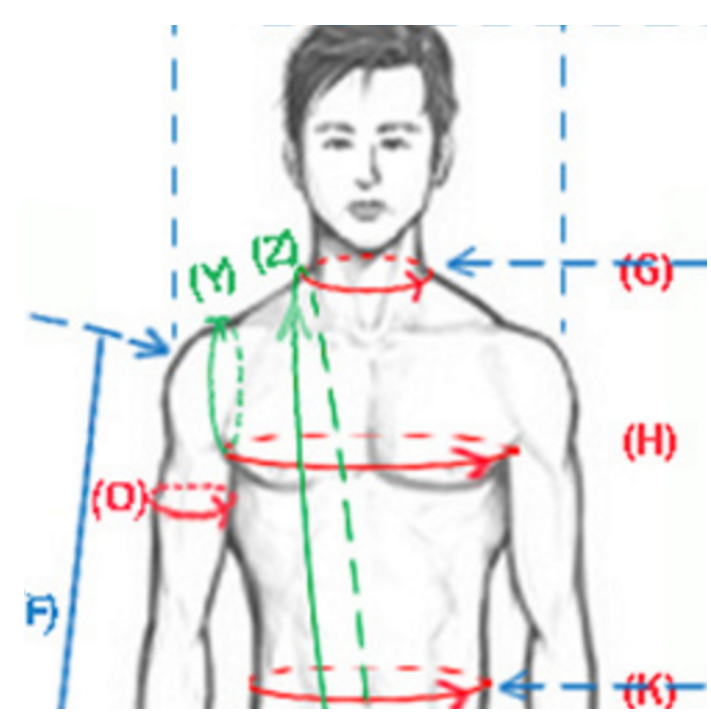
Customers are hesitant to buy clothes online, unsure if purchased clothes will fit [1]

Packaging and delivery account for **54%** of the overall environmental impacts of online shopping [2]

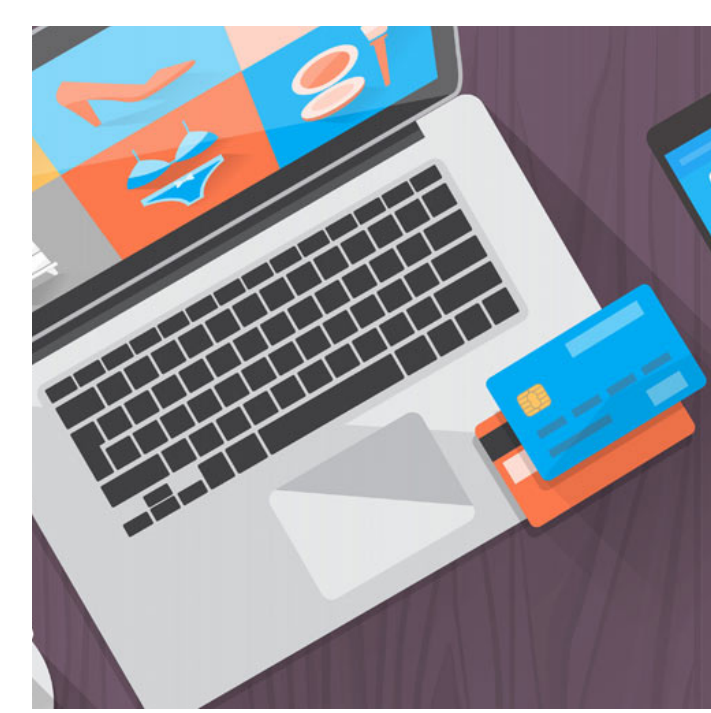
40% of all clothes purchased online are returned [3]



Scope



Phase One
Acquire User Measurements



Phase Two
Integrate Measurements into Online Shopping

18 - 35 year olds: **52%** of online clothes shoppers [4]
Males only, to reduce body type variability
Only neck, chest, and waist measurements needed

Objectives

Phase One

- Max of **5%** measurement error, **95%** of the time
- Max of 5 minutes to obtain measurements

Phase Two

- Comply with data privacy regulations
- Maintain a user profile
- Implement a rating/feedback system
- Inexpensive for end user
- Allow non-baggy clothes during measurement
- Compatible with existing online retail systems

Impacts

Lower pollution from returns

Detailed trend and preference data

Increase ease of access

Retailer Contact

Contacted 40 different retailers, clothing returns cited as a major source of revenue loss

Customer Contact

Surveyed 60 online shoppers. **85%** had problems with fit. Fisher test found strong correlation between fit and satisfaction

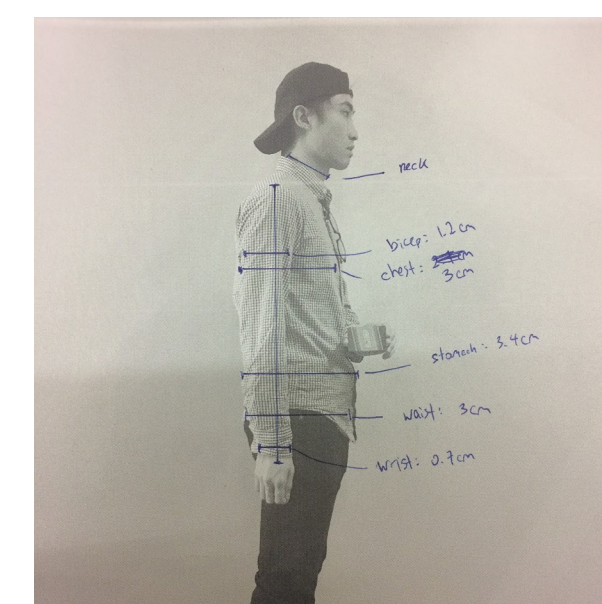
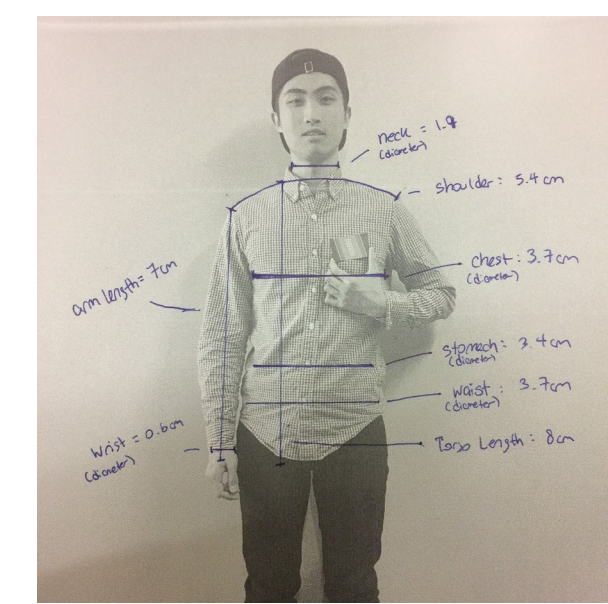
Phase One Low-Fidelity Testing

Post Purchase Tailoring

2D Body Scanning

Image Recognition

75% favoured



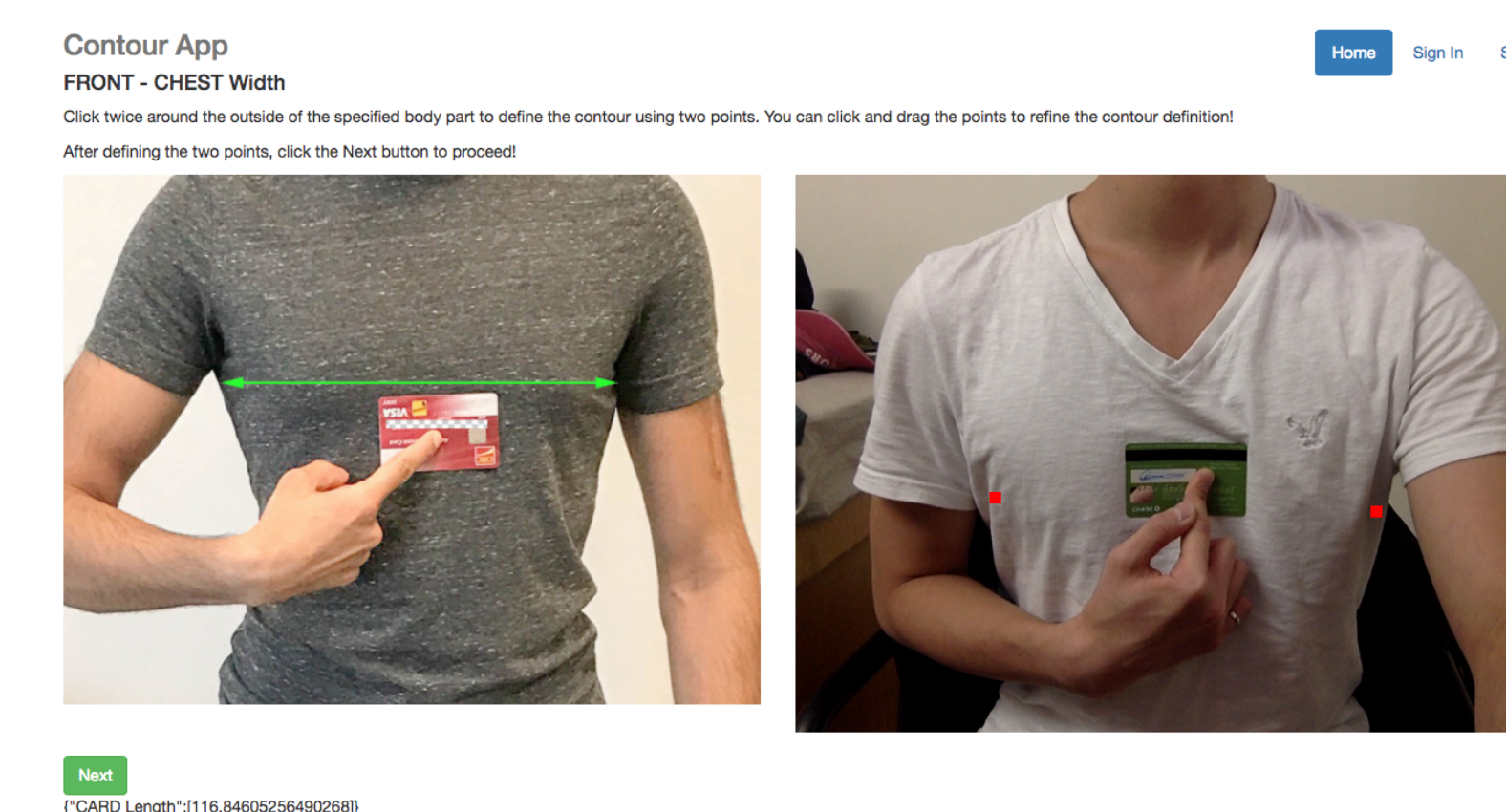
Manual Testing

Model body segments as ellipses
3 users, credit card as scaling tool
Error ranged between **1%** and **14%**

Software Prototype

15 trials, 3 manual measurements vs. 3 software measurements each

Average error within **5%** (Random Block Design), but not **95%** of the time (Binomial Test)



Phase Two Low-Fidelity Testing

Pre-Experiment Survey

Clothing fit still the biggest point of concern
90% users would trust measurements given by algorithm

Experiment 1: Mock Shopping Experience

Present clothes **without** giving user their size

vs.

Present clothes **giving** user their size



Decision time decreased from 1 min to 10 sec respectively

Experiment 2: Mock Integration Methods

Retailer-Side Integration

Chrome Extension

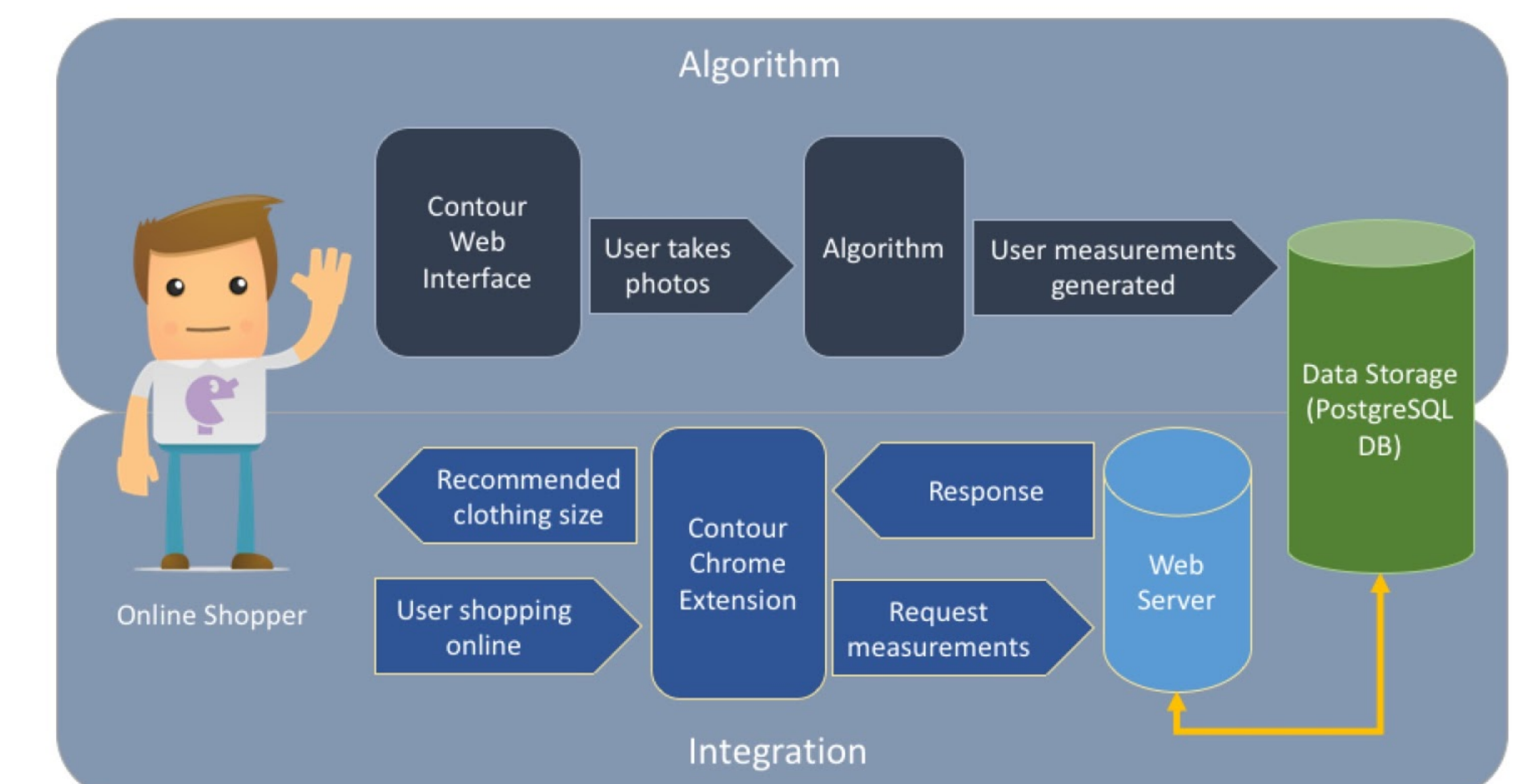
Front-End Website

85% favoured

Experiment 3: Feedback/Rating System

A feedback and rating system was implemented in efforts to combat incorrect orders and mitigate customer returns

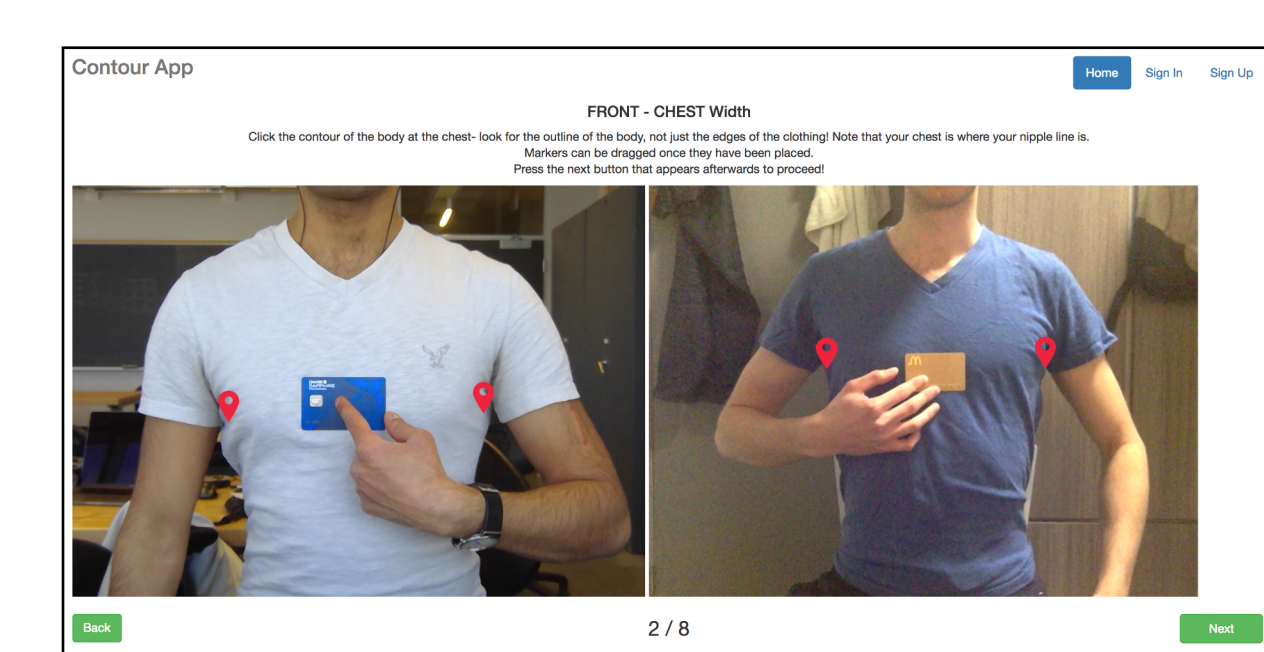
System Diagram



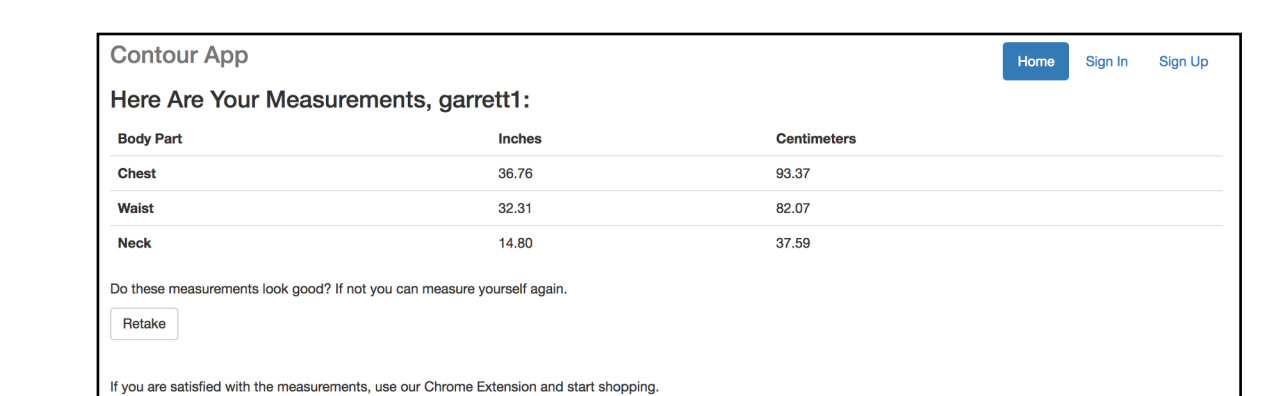
The Contour web application is powered by Flask and uses PostgreSQL for data storage. The Contour Chrome extension accesses data using Ajax POST requests to generate measurements.

Designed Solution

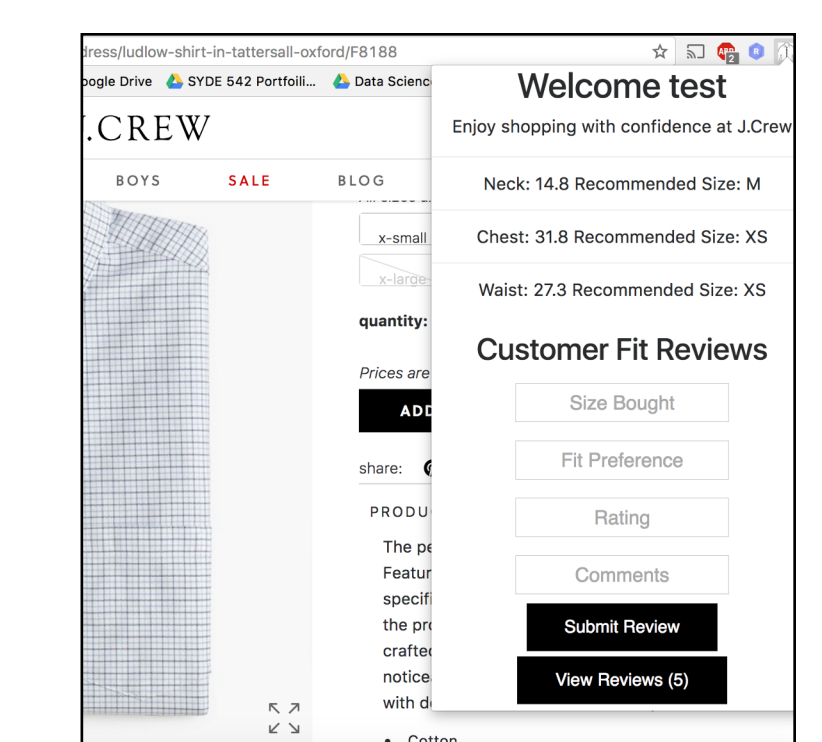
User takes photos of their body and defines measurement contours



Measurements are presented to user and are stored in database

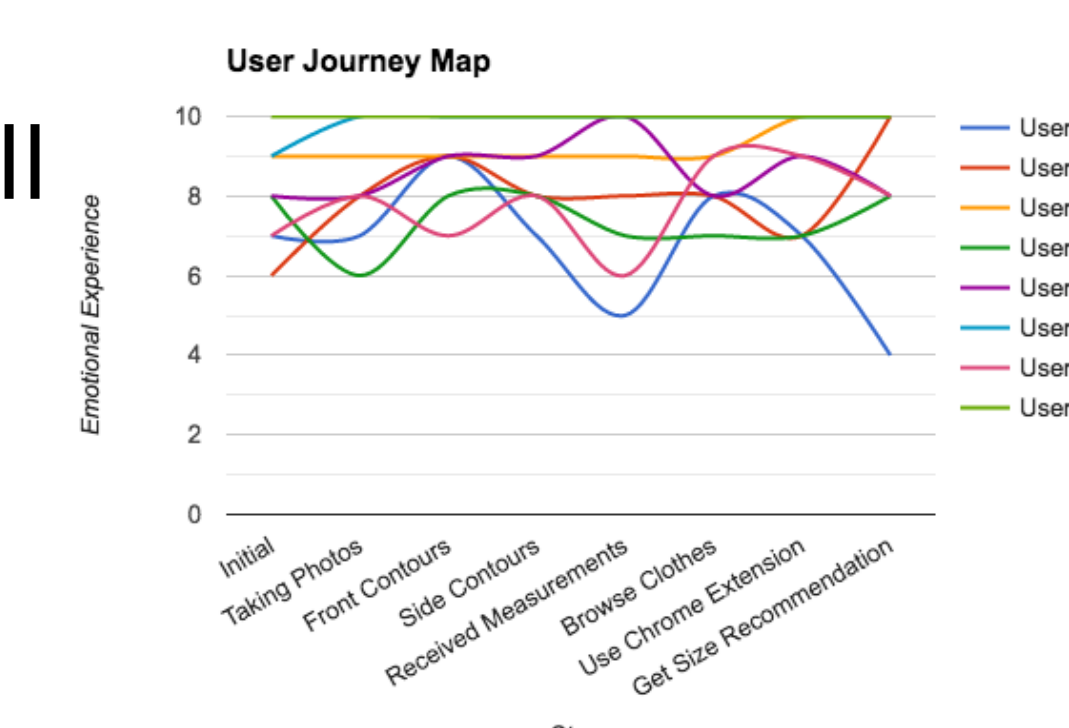


Chrome extension provides recommended size with just one click!



End-to-End Testing

- Users were satisfied with all stages of use
- System satisfied all requirements except the consistency requirement



[1] Hyejeong, K., Darrhori, M.L., 2010. 'The Relationship of Body Related Self-Discrepancy to Body Dissatisfaction, Apparel Involvement, Concerns With Fit and Size of Garments, and Purchase Intentions in Online Apparel Shopping'. Clothing & Textiles Research Journal 28(4): 239-254
 [2] Weber, C., Hendrickson, C., Jaramillo, P., Matthews, S., Nagesant, A., Nealer, R., 2011. 'Life Cycle Comparison of Traditional Retail and E-commerce Logistics for Electronic Products: A Case Study of buy.com'. Carnegie Mellon University.
 [3] Edwards, J.B., McKinnon, A.C., Cullinane, S.L., 2009. 'Comparative analysis of the carbon footprints of conventional and online retailing - a "last mile" perspective'. International Journal of Physical Distribution and Logistics Management 40, 103-123.
 [4] E-Commerce: Evolution or Revolution in the Fast-Moving Consumer Goods World? Rep. Nielsen, Aug. 2014. Web. 12 Mar. 2017.