MICHIGAN STATE UNIVERSITY

Alpha Presentation

FIBRE: Fabric Identification Based Recommendation Engine

The Capstone Experience

Team Herman Miller

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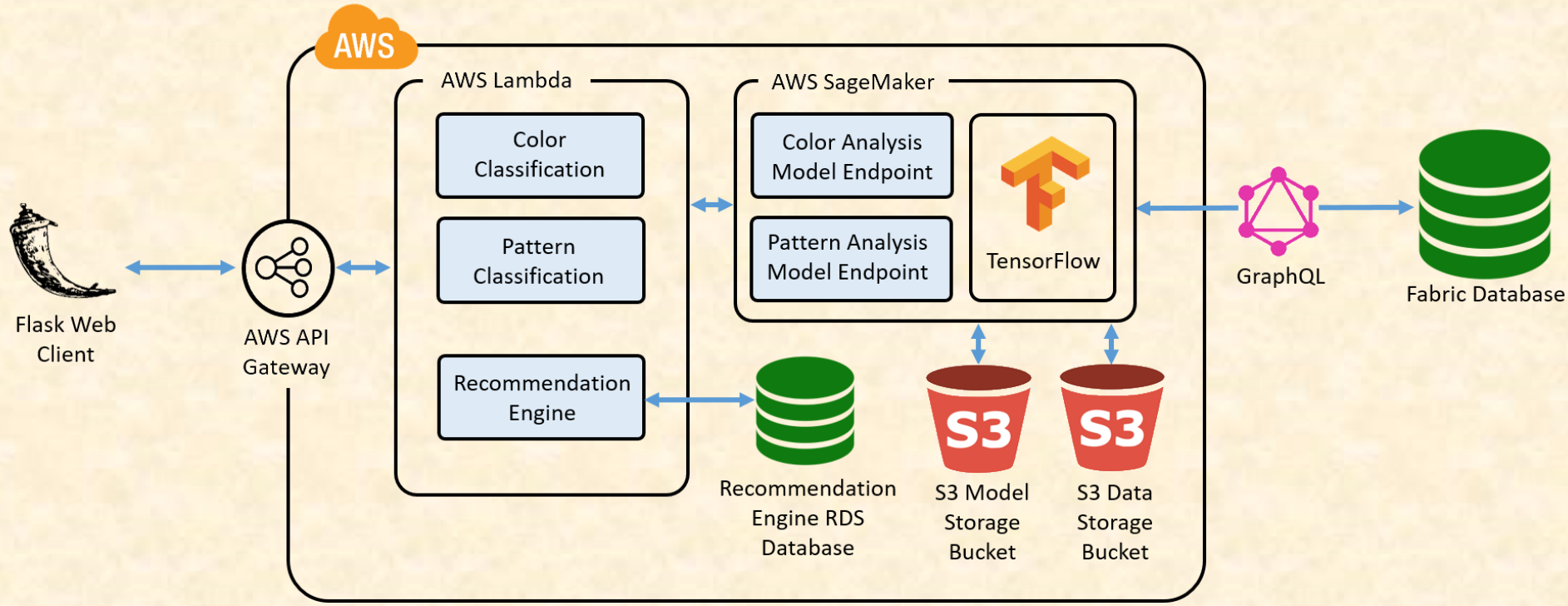
From Students…
…to Professionals

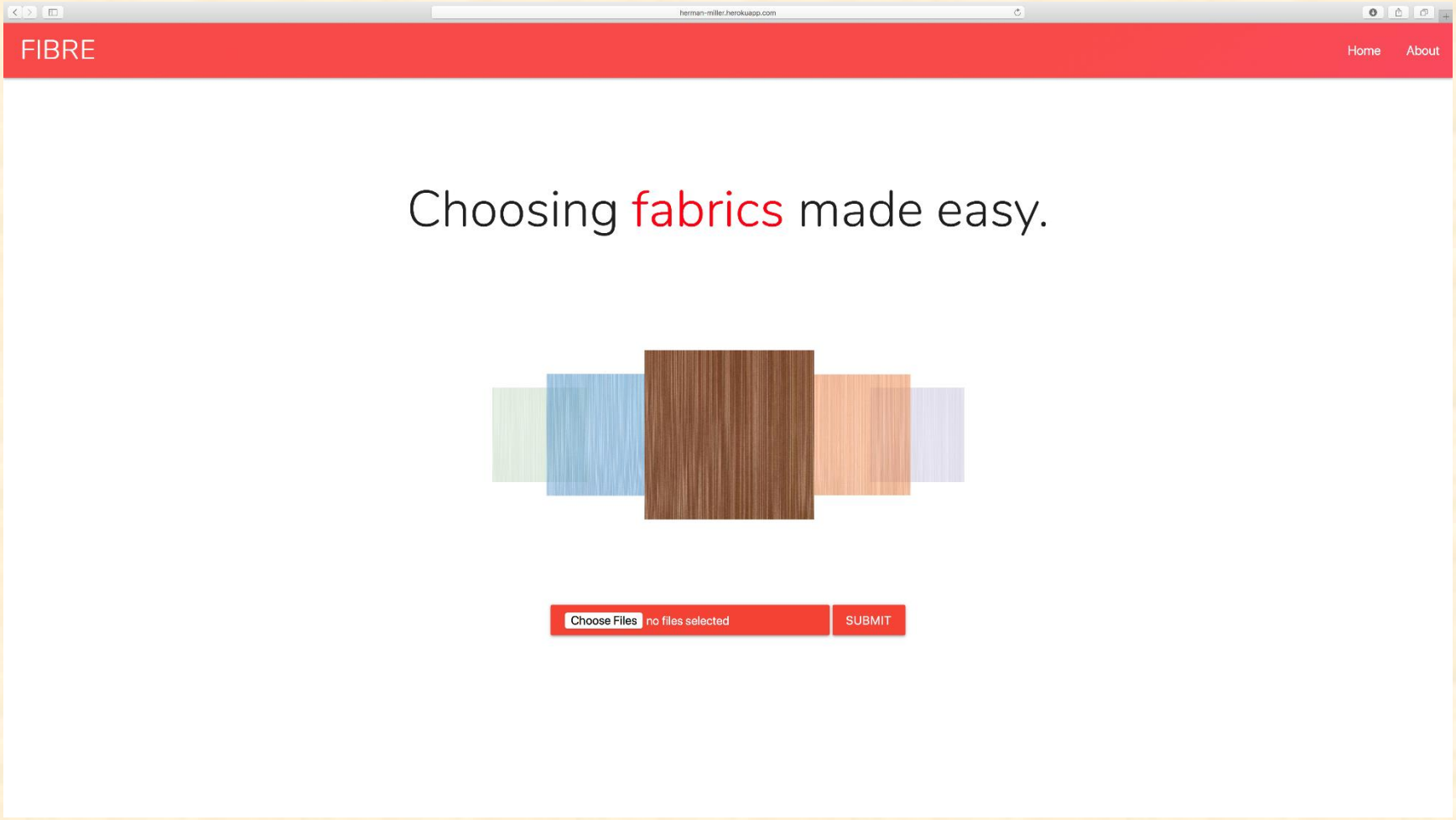
Project Overview

- FIBRE is an AI system, composed of a classification and recommendation engine.
- The classification component uses deep learning and computer vision models to objectively classify fabrics.
- The recommendation engine correlates any fabric a customer may submit with Herman Miller fabrics.

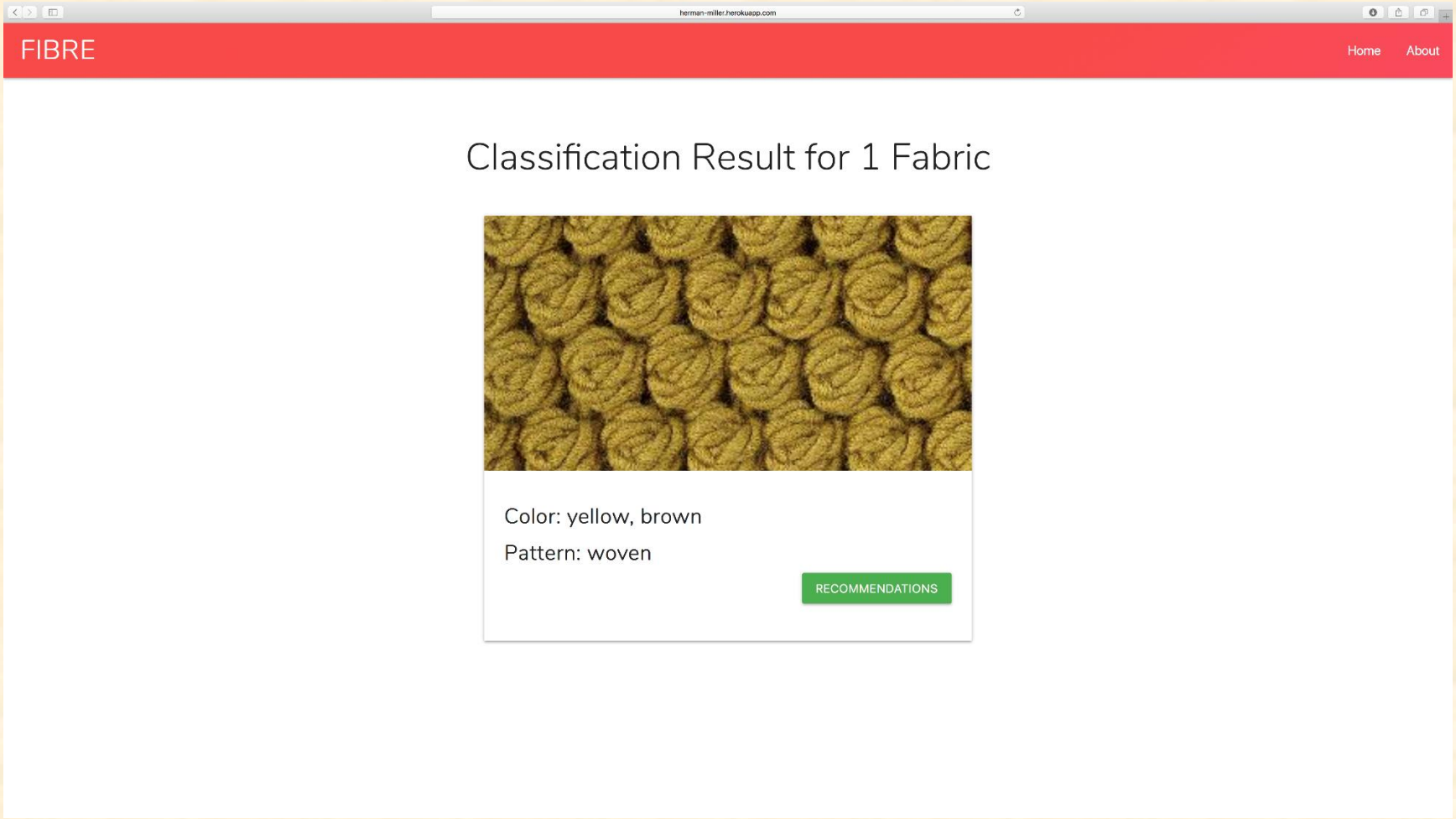
System Architecture



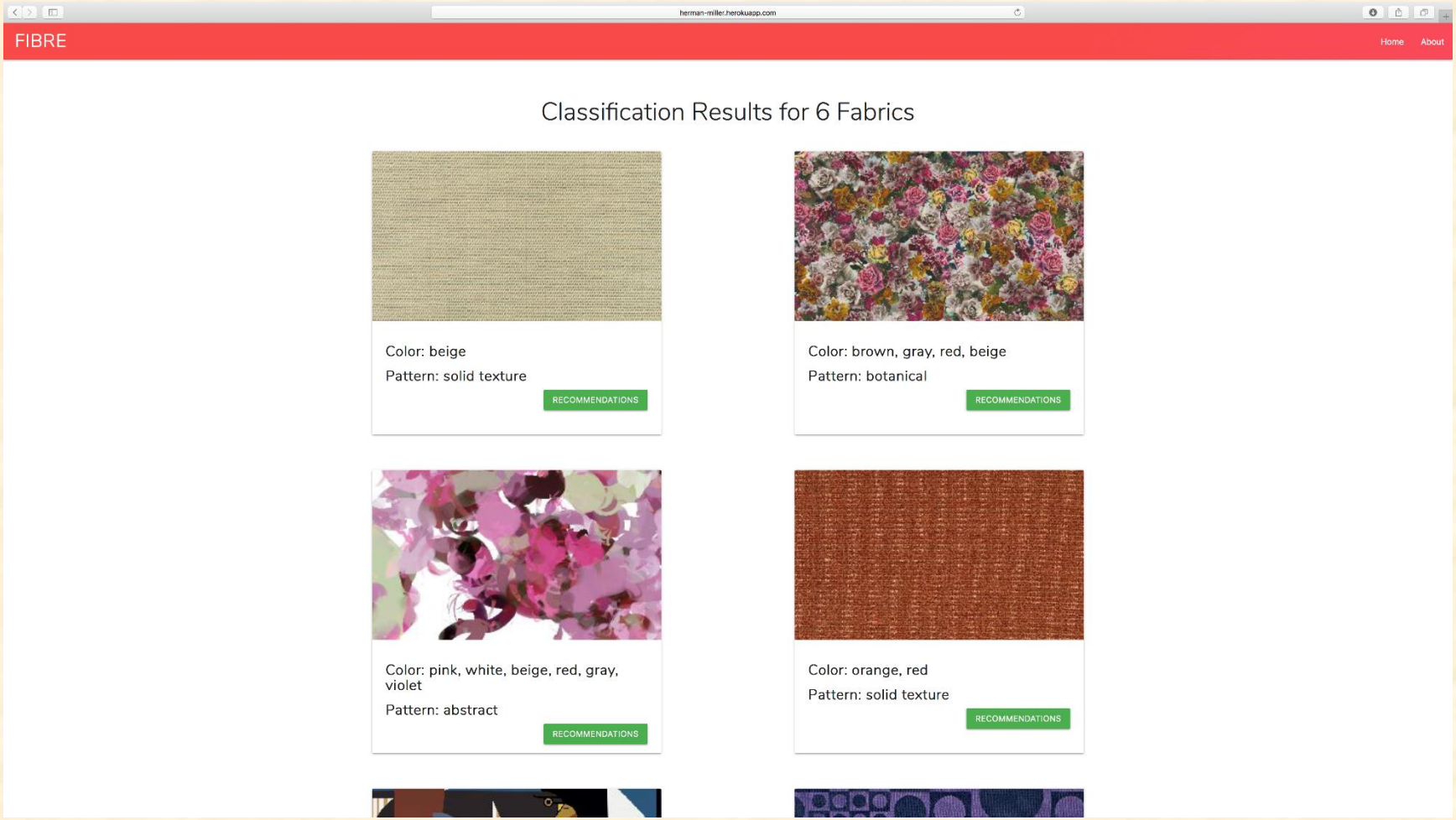
FIBRE Fabric Upload



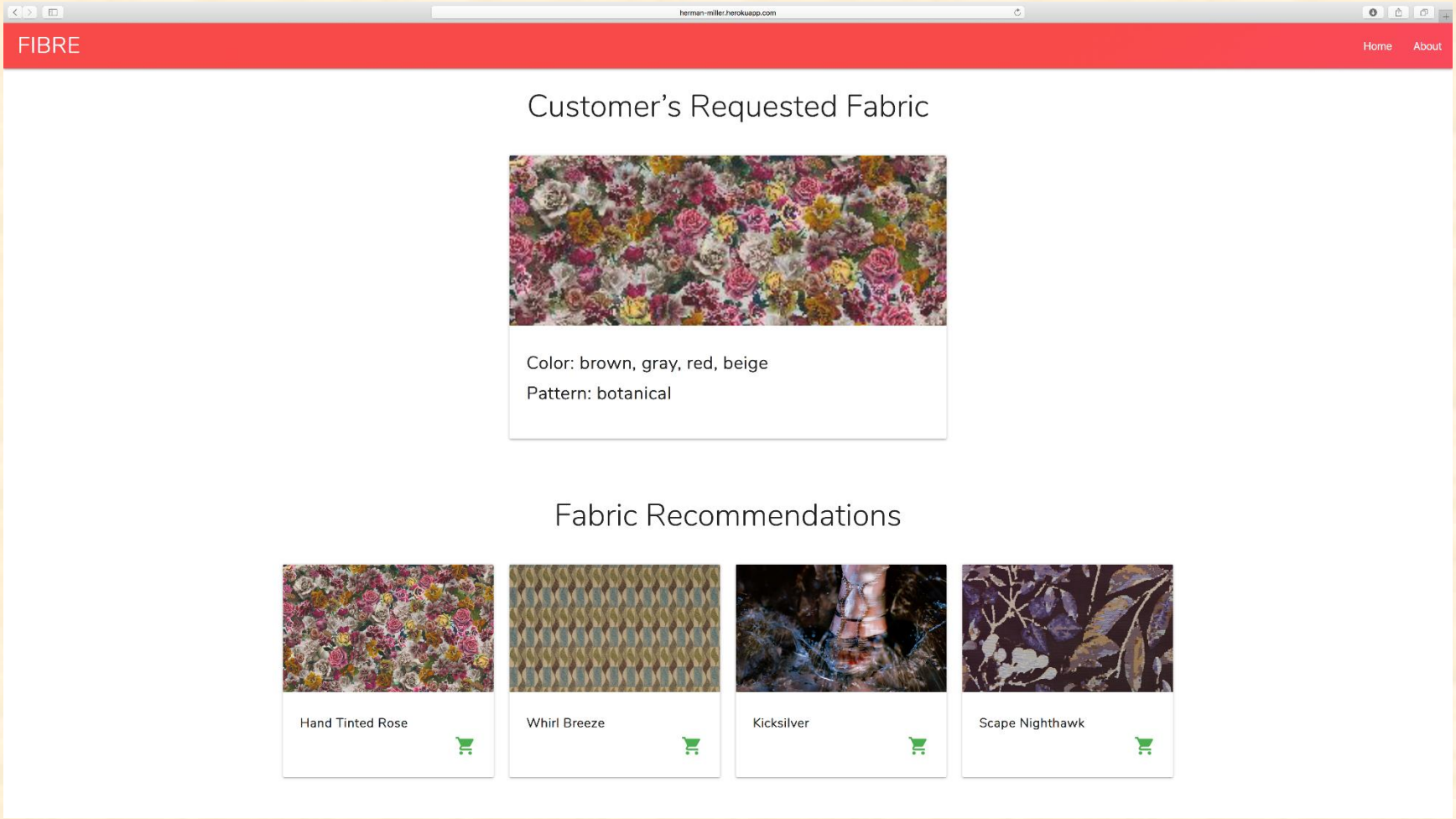
FIBRE Fabric Classification (Single)



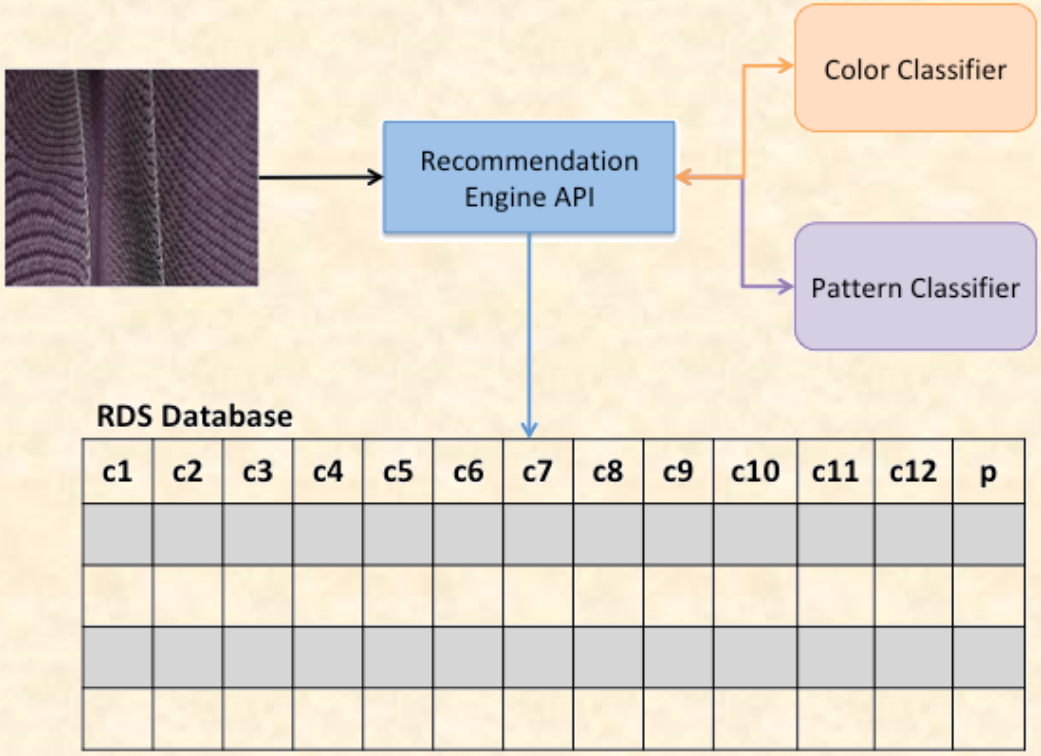
FIBRE Fabric Classification (Multiple)



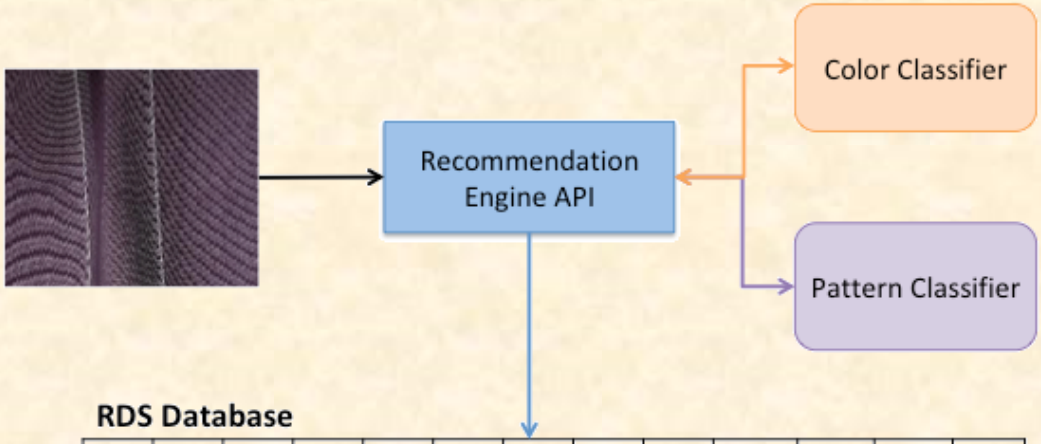
FIBRE Recommendation



Recommendation Engine



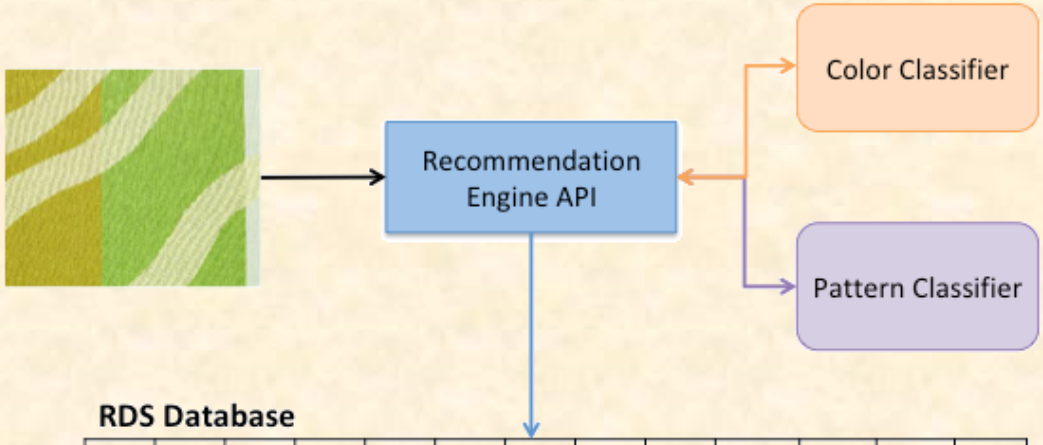
Recommendation Engine



RDS Database

c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	p
0	0.2	0	0.8	0	0	0	0	0	0	0	0	s

Recommendation Engine



RDS Database

c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	p
0	0.2	0	0.8	0	0	0	0	0	0	0	0	s
0.6	0	0.2	0	0.3	0	0	0	0	0	0	0	a

Recommendation Engine

Recommendation Engine API

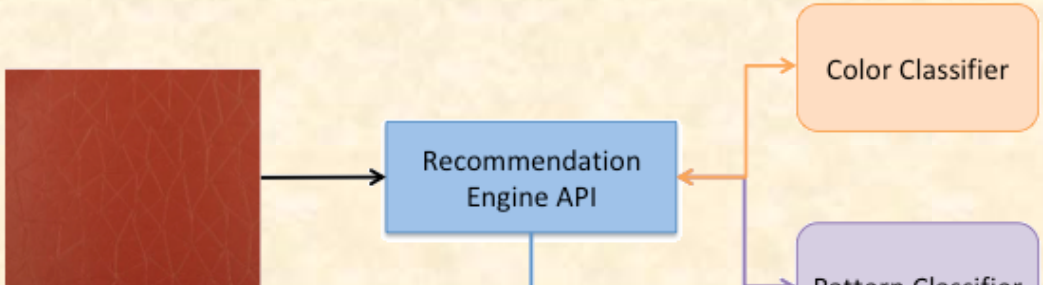
Color Classifier

Pattern Classifier

RDS Database

c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	p
0	0.2	0	0.8	0	0	0	0	0	0	0	0	s
0.6	0	0.2	0	0.3	0	0	0	0	0	0	0	a
0.3	0.1	0.1	0.3	0	0	0	0	0	0.1	0	0	a

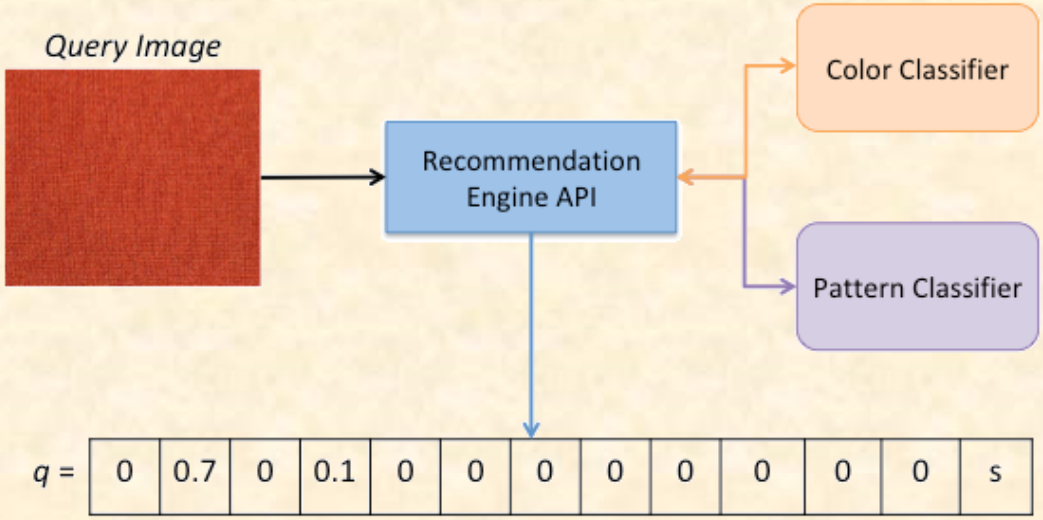
Recommendation Engine



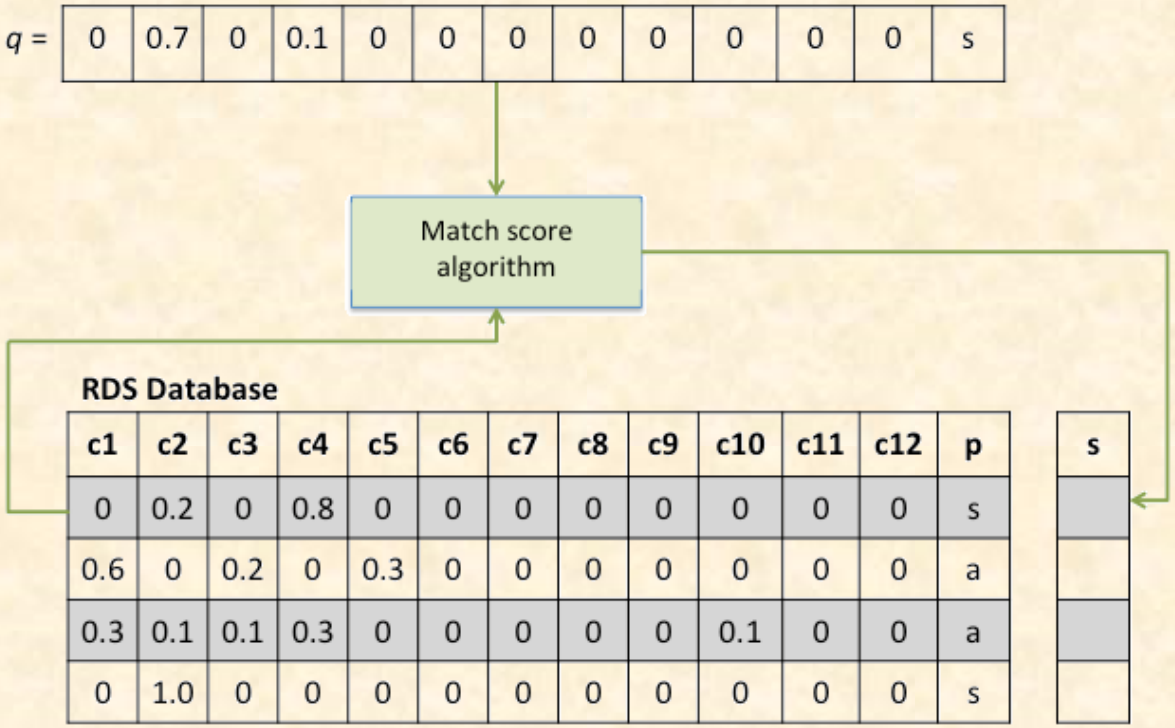
RDS Database

c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	p
0	0.2	0	0.8	0	0	0	0	0	0	0	0	s
0.6	0	0.2	0	0.3	0	0	0	0	0	0	0	a
0.3	0.1	0.1	0.3	0	0	0	0	0	0.1	0	0	a
0	1.0	0	0	0	0	0	0	0	0	0	0	s

Recommendation Engine



Recommendation Engine



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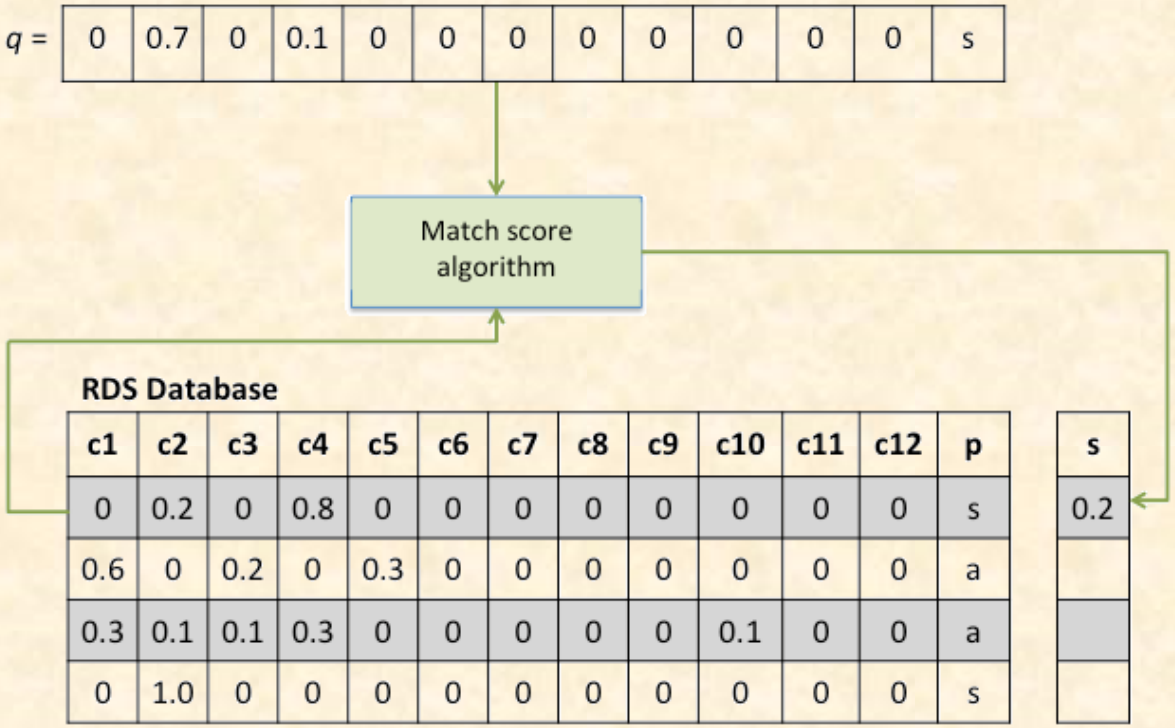

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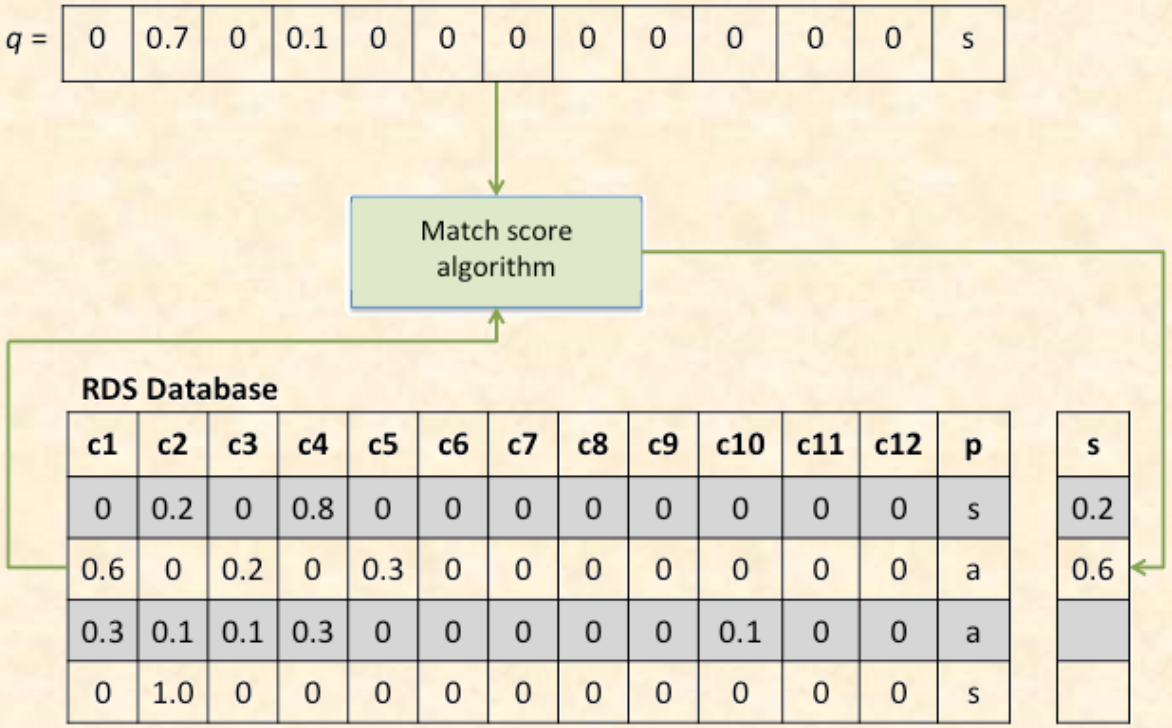

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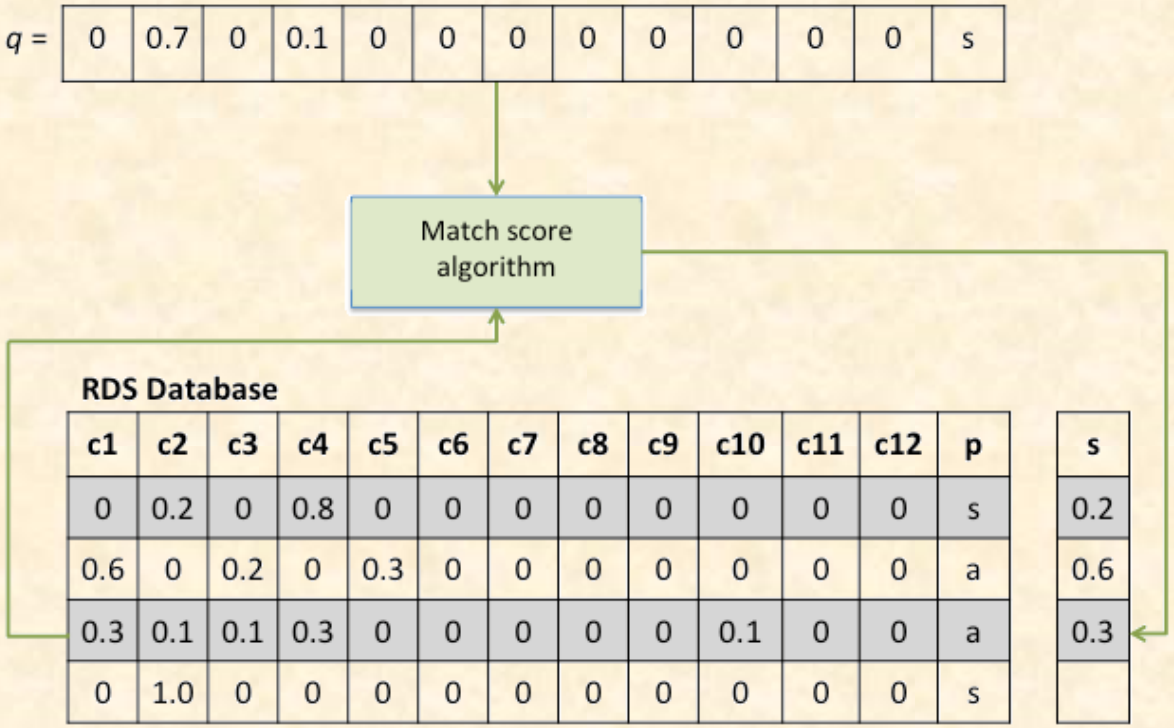
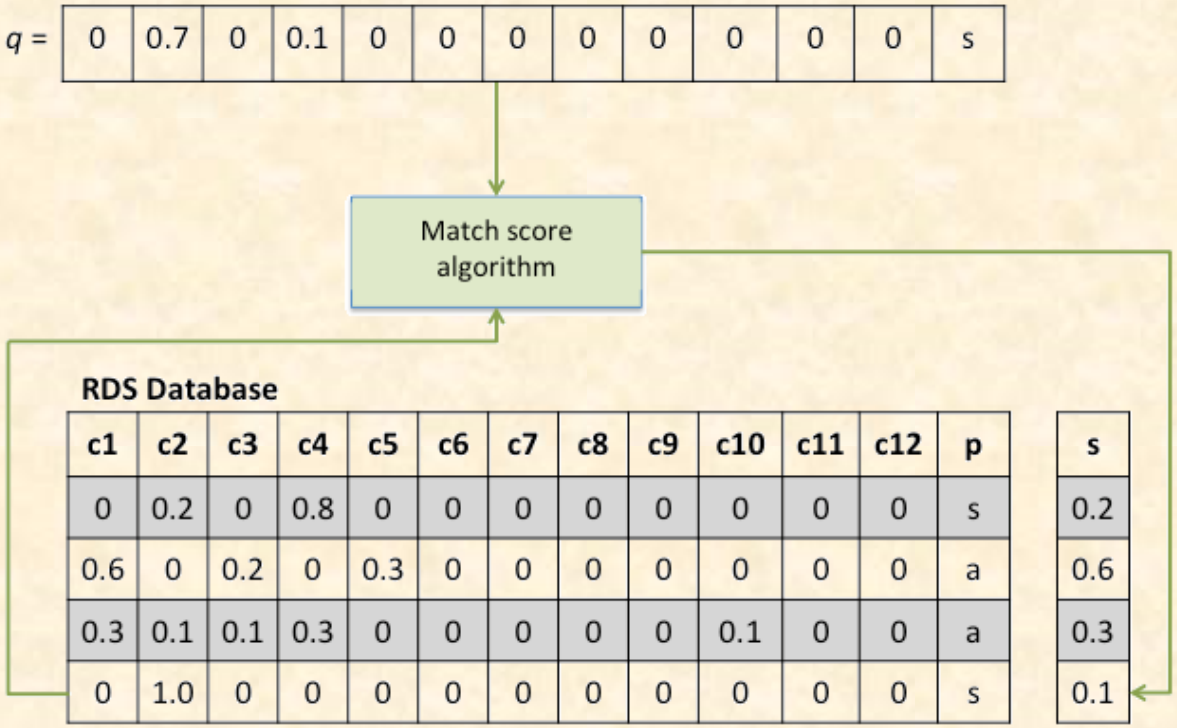


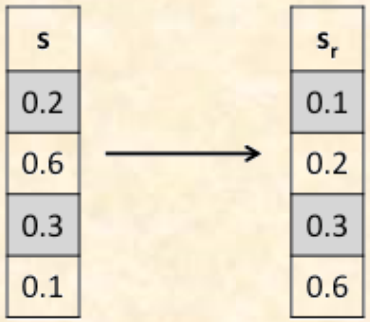
Recommendation Engine



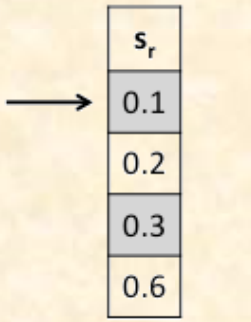
Recommendation Engine

s
0.2
0.6
0.3
0.1

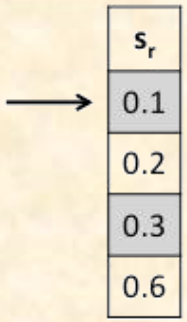
Recommendation Engine



Recommendation Engine

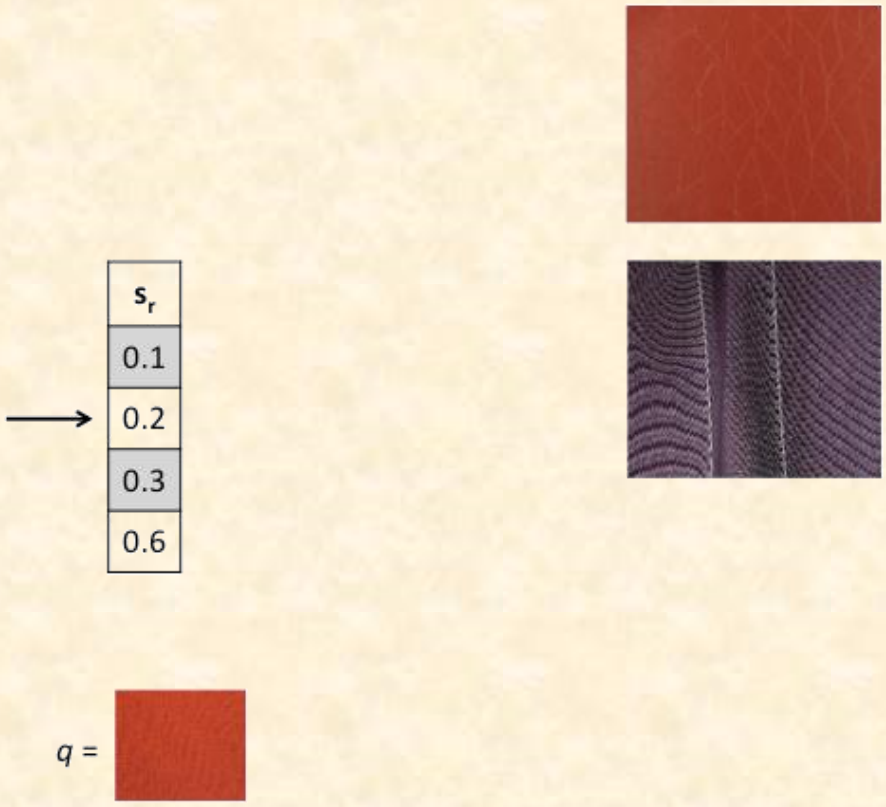


Recommendation Engine



$q =$ 

Recommendation Engine



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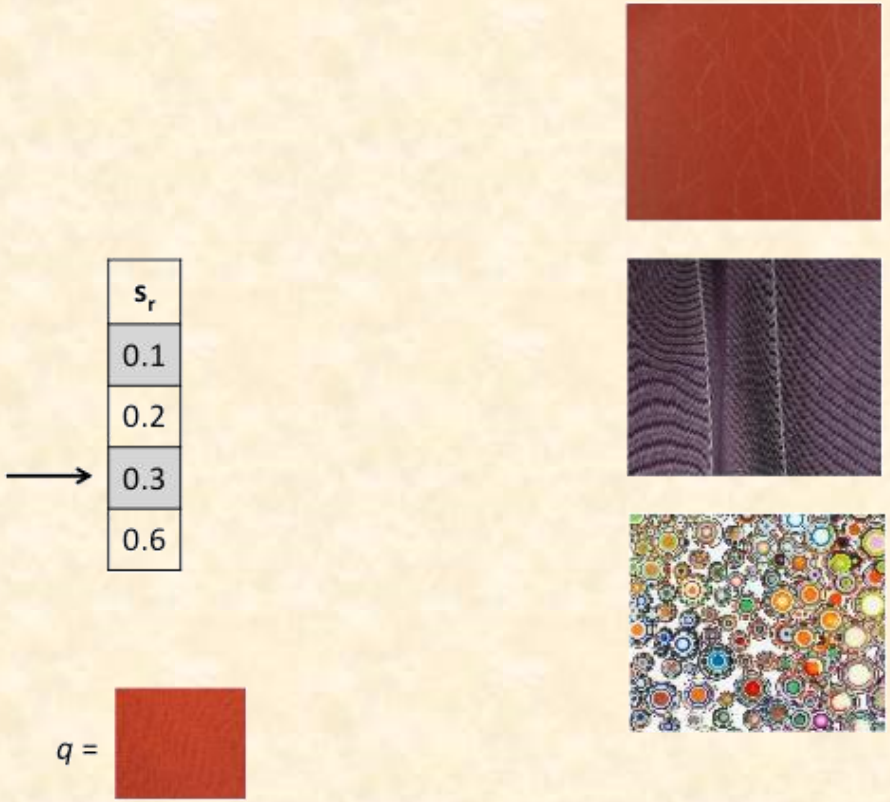

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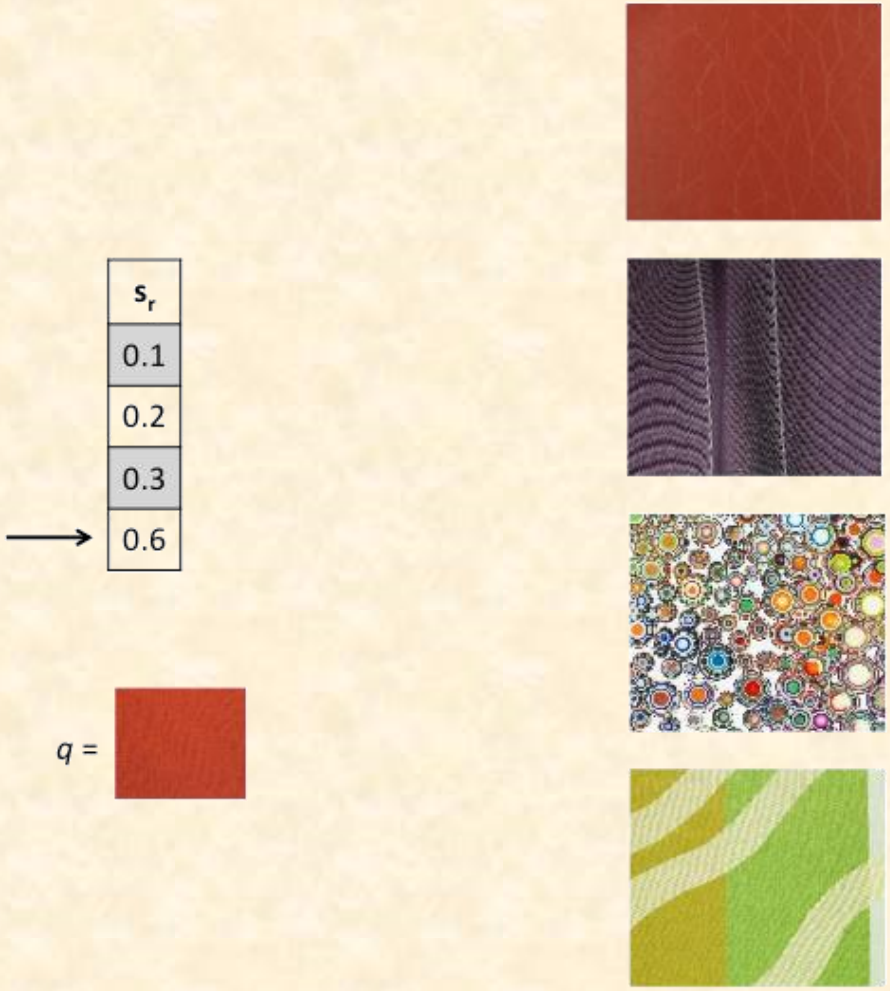

Match Score Equation

$$s = -\frac{q_n \cdot p}{2} + \sum_{i=1}^{n} q_i |e_i - q_i|$$

s = match score

q = query feature vector

e = entry in database

p = 1 if pattern match, 0 if no pattern match

n = number of color classes in query image

What's left to do?

- Conform UI to be more similar to Herman Miller's Design
- Improve UX to make frontend more user friendly
- Continue to migrate Heroku APIs and frontend to AWS
- Implement AWS Security

Questions?