

MICHIGAN STATE  
UNIVERSITY

# Alpha Presentation

FIBRE: Fabric Identification Based Recommendation Engine

The Capstone Experience

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Fall 2018



*From Students...  
...to Professionals*

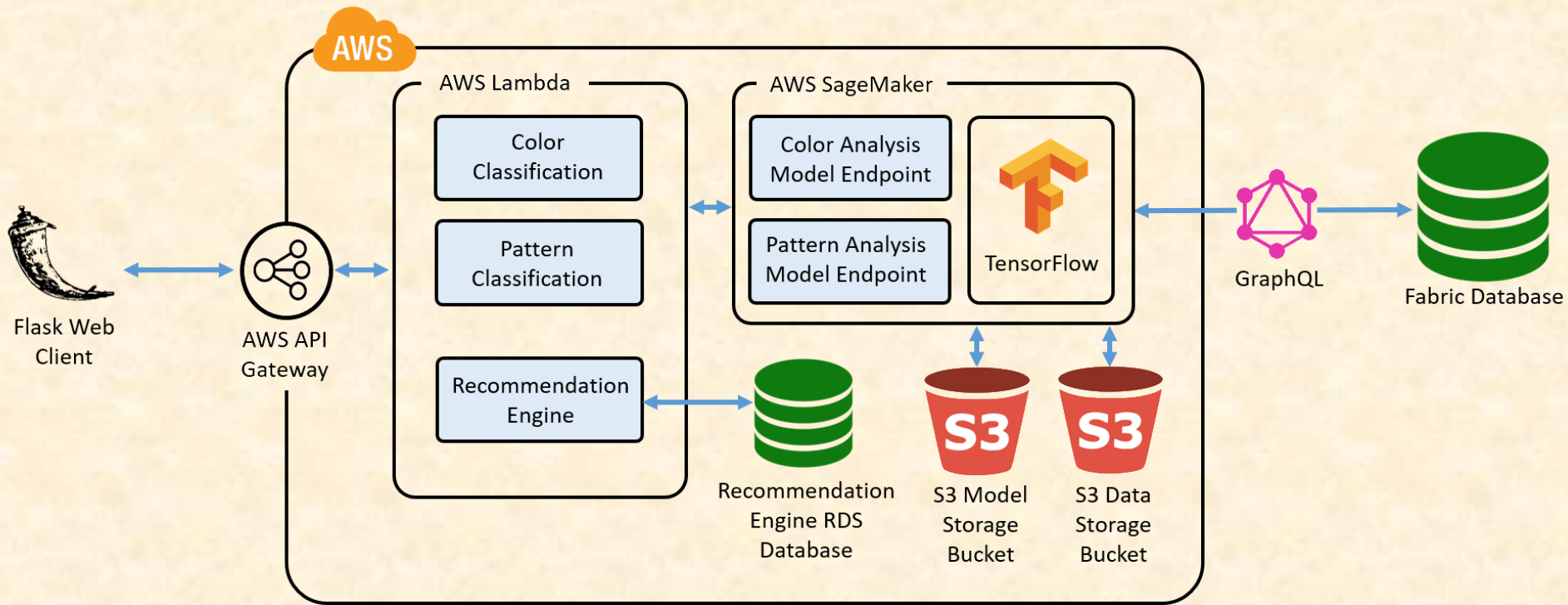
# Project Overview

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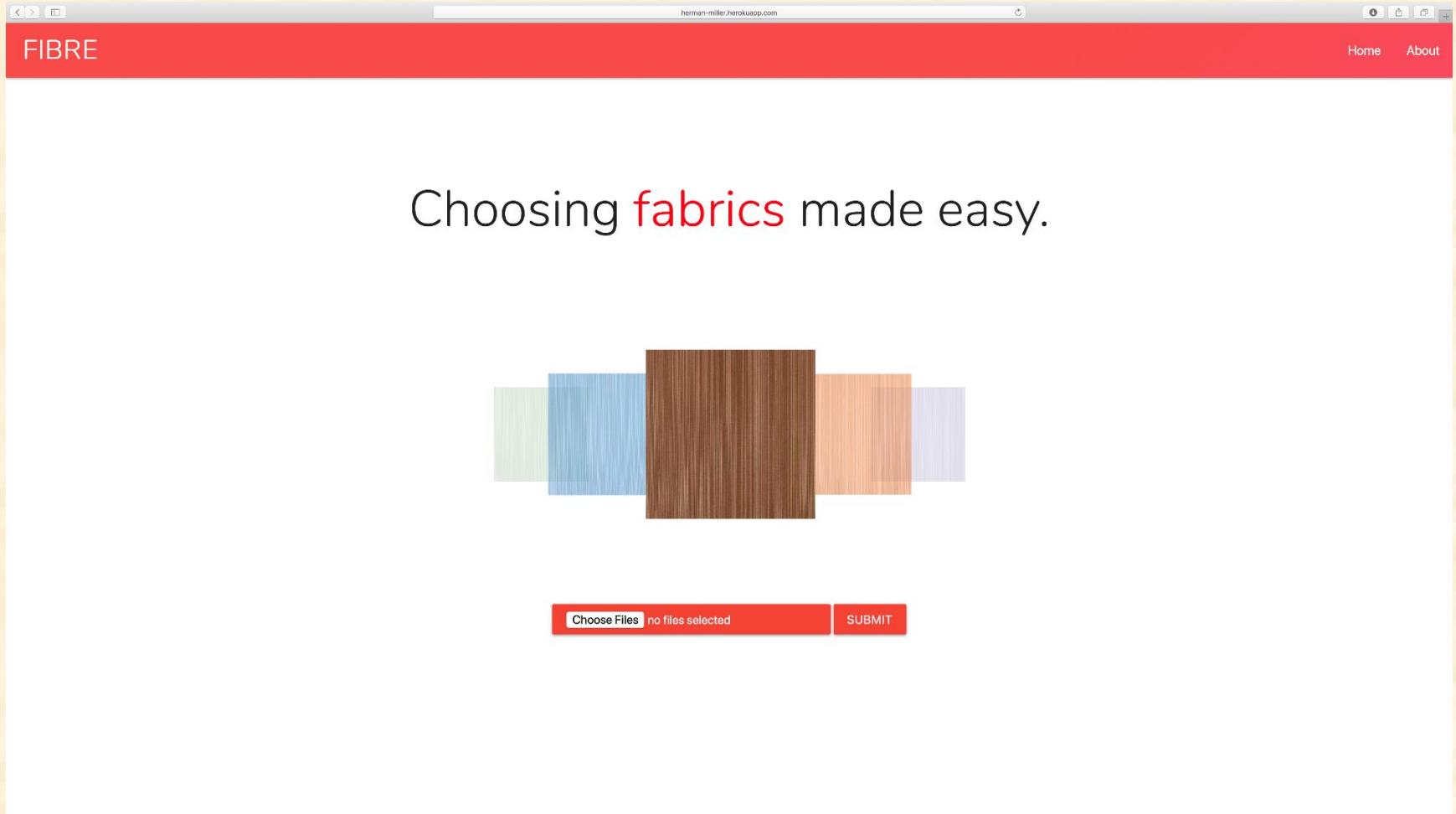
- FIBRE is an AI system, composed of a classification and recommendation engine.
- The classification component uses deep learning and computer vision models to objectively classify fabrics.
- The recommendation engine correlates any fabric a customer may submit with Herman Miller fabrics.



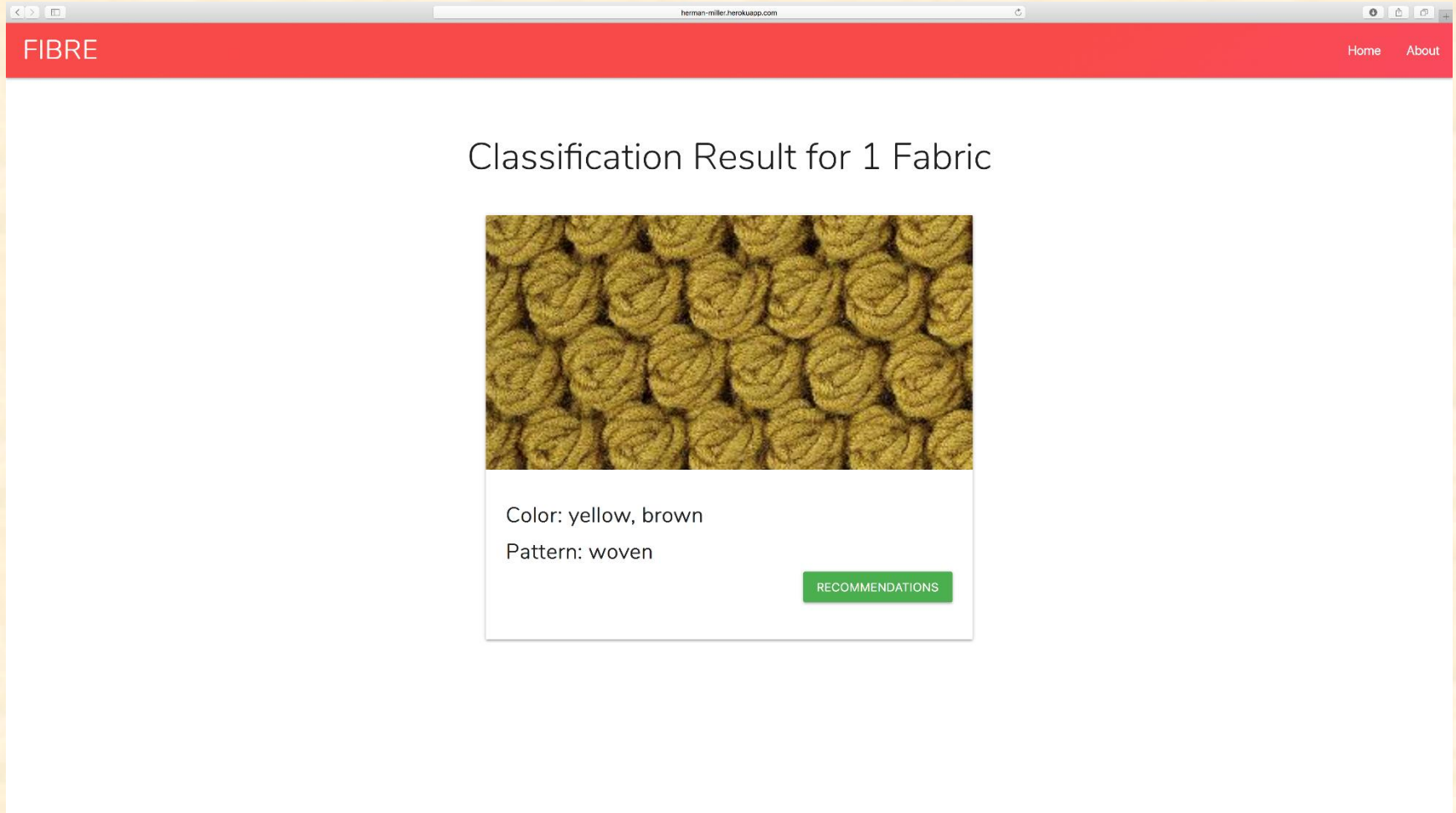
# System Architecture



# FIBRE Fabric Upload




# FIBRE Fabric Classification (Single)



The screenshot shows a web browser window with the URL `herman-miller.herokuapp.com`. The page has a red header with the word "FIBRE" on the left and "Home" and "About" links on the right. The main content area is white and features the title "Classification Result for 1 Fabric". Below the title is a square image of a yellow and brown woven fabric with a repeating knot-like pattern. Underneath the image, the text "Color: yellow, brown" and "Pattern: woven" is displayed. A green button labeled "RECOMMENDATIONS" is positioned to the right of the text.

FIBRE Home About

Classification Result for 1 Fabric







Color: yellow, brown  
Pattern: woven

[RECOMMENDATIONS](#)

# FIBRE Fabric Classification (Multiple)

The screenshot displays a web browser window with the URL `herman-miller.herokuapp.com`. The page has a red header with the text "FIBRE" on the left and "Home About" on the right. The main content area is titled "Classification Results for 6 Fabrics" and contains a grid of six fabric samples. Each sample is presented in a white card with a green "RECOMMENDATIONS" button. The first four cards are fully visible, showing the following details:

Image	Color	Pattern
	beige	solid texture
	brown, gray, red, beige	botanical
	pink, white, beige, red, gray, violet	abstract
	orange, red	solid texture


The bottom two cards in the grid are partially cut off by the bottom edge of the screenshot.

# FIBRE Recommendation

The screenshot shows a web browser window with the URL `herman-miller.herokuapp.com`. The page has a red header with the word "FIBRE" on the left and "Home" and "About" links on the right. The main content area is titled "Customer's Requested Fabric" and features a large image of a floral fabric. Below the image, the text reads: "Color: brown, gray, red, beige" and "Pattern: botanical". Underneath this is a section titled "Fabric Recommendations" which displays four smaller fabric samples in a row. Each sample is in a white box with a green shopping cart icon at the bottom right. The samples are: "Hand Tinted Rose" (a floral pattern), "Whirl Breeze" (a geometric pattern), "Kicksilver" (a dark, abstract pattern), and "Scape Nighthawk" (a dark, leafy pattern).









FIBRE Home About

## Customer's Requested Fabric

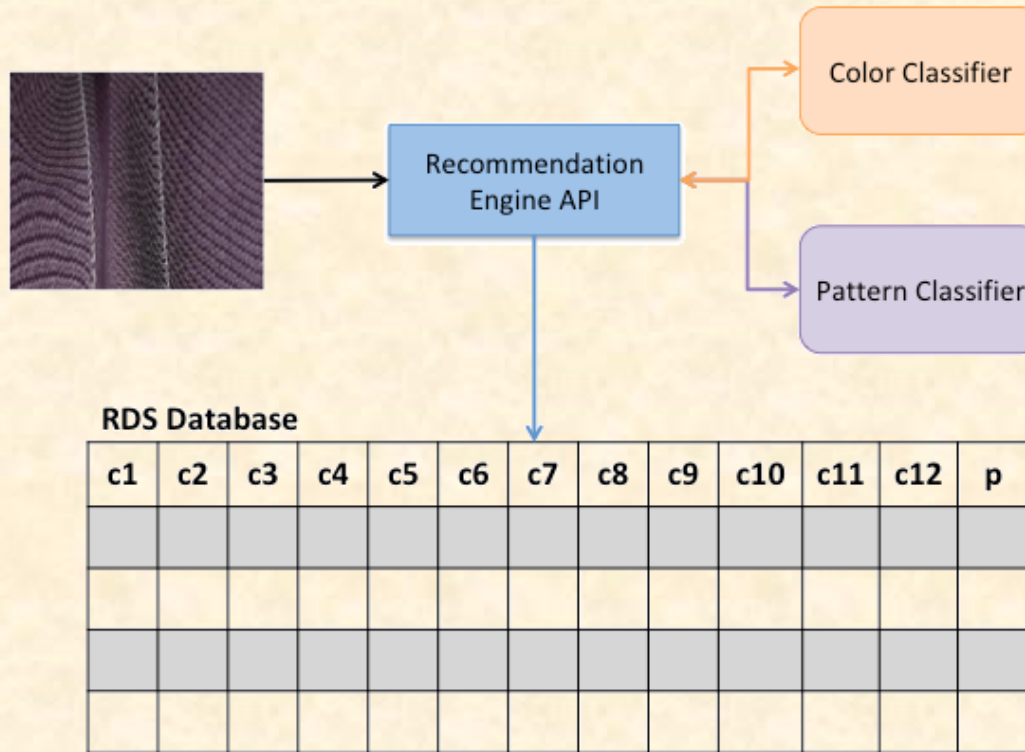


Color: brown, gray, red, beige  
Pattern: botanical

## Fabric Recommendations

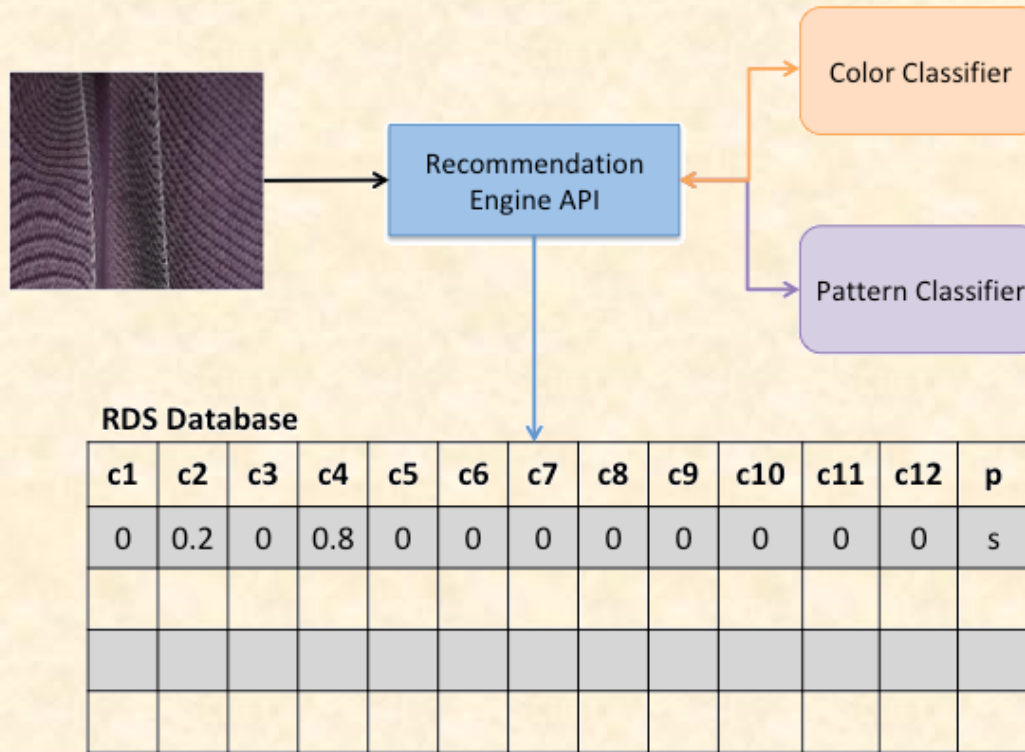
-   
Hand Tinted Rose 
-   
Whirl Breeze 
-   
Kicksilver 
-   
Scape Nighthawk 

# Recommendation Engine

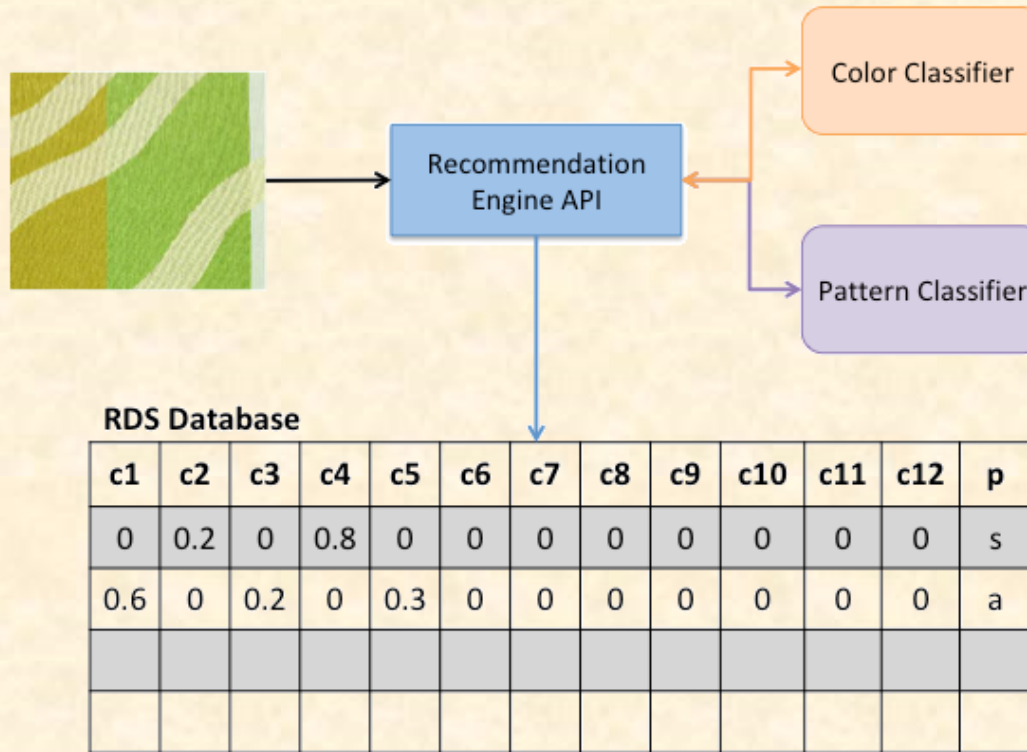




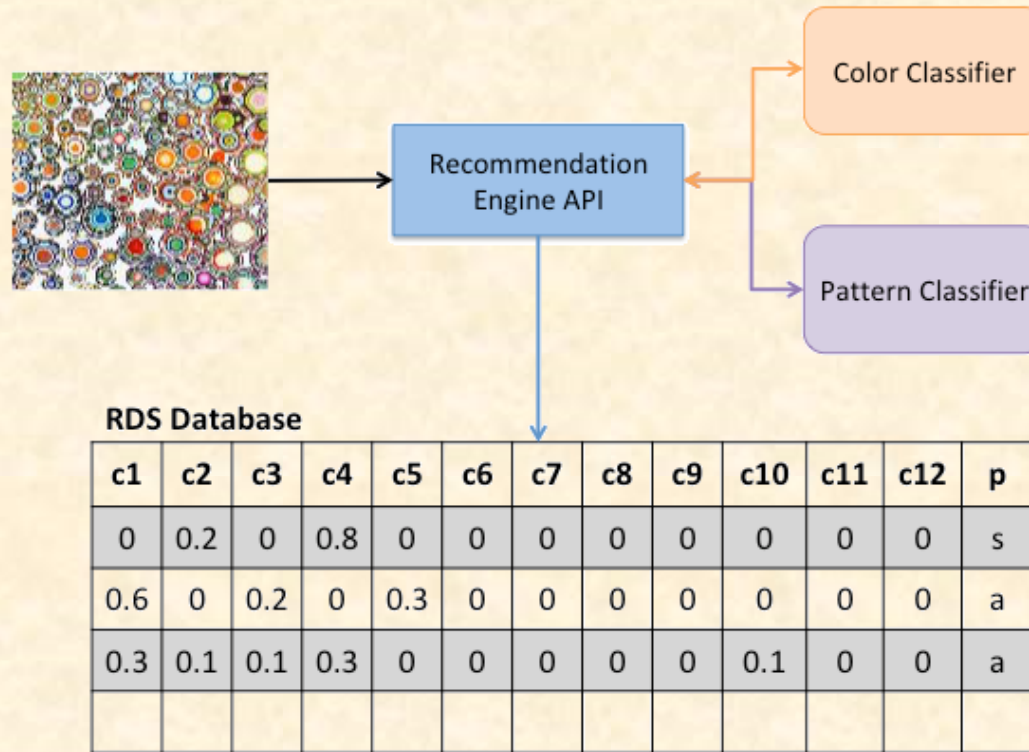
# Recommendation Engine



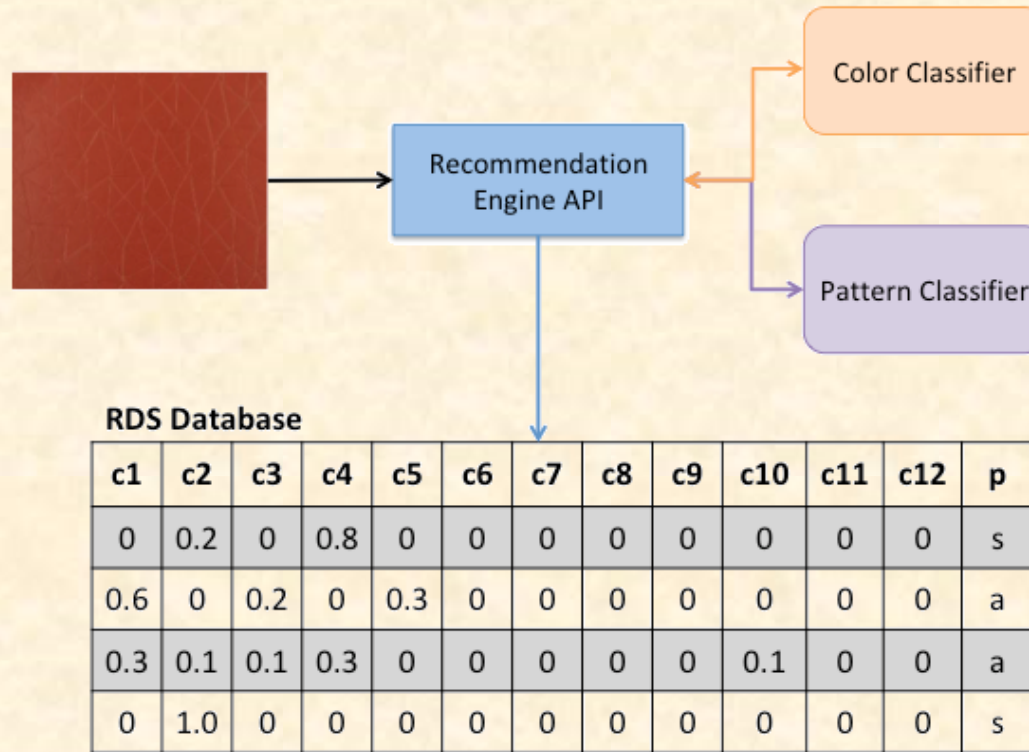
# Recommendation Engine



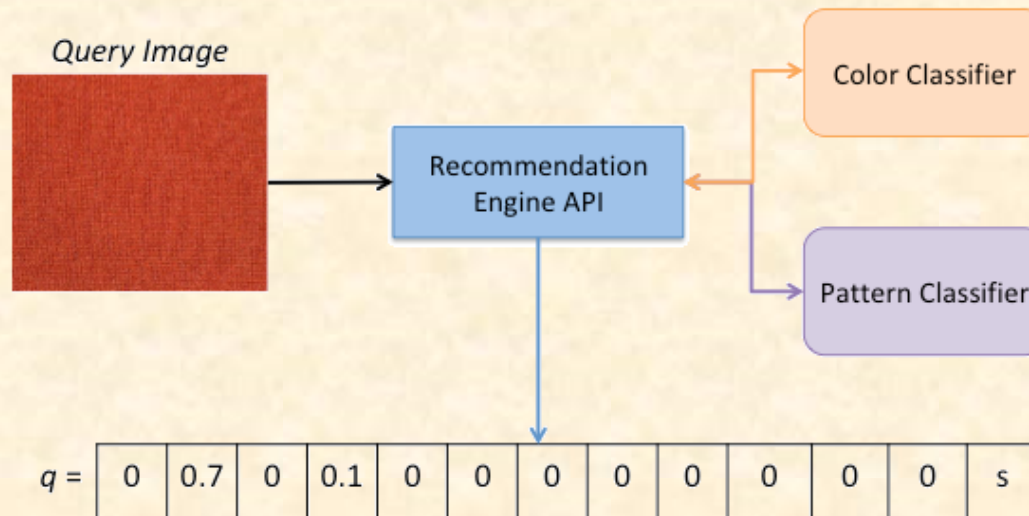
# Recommendation Engine



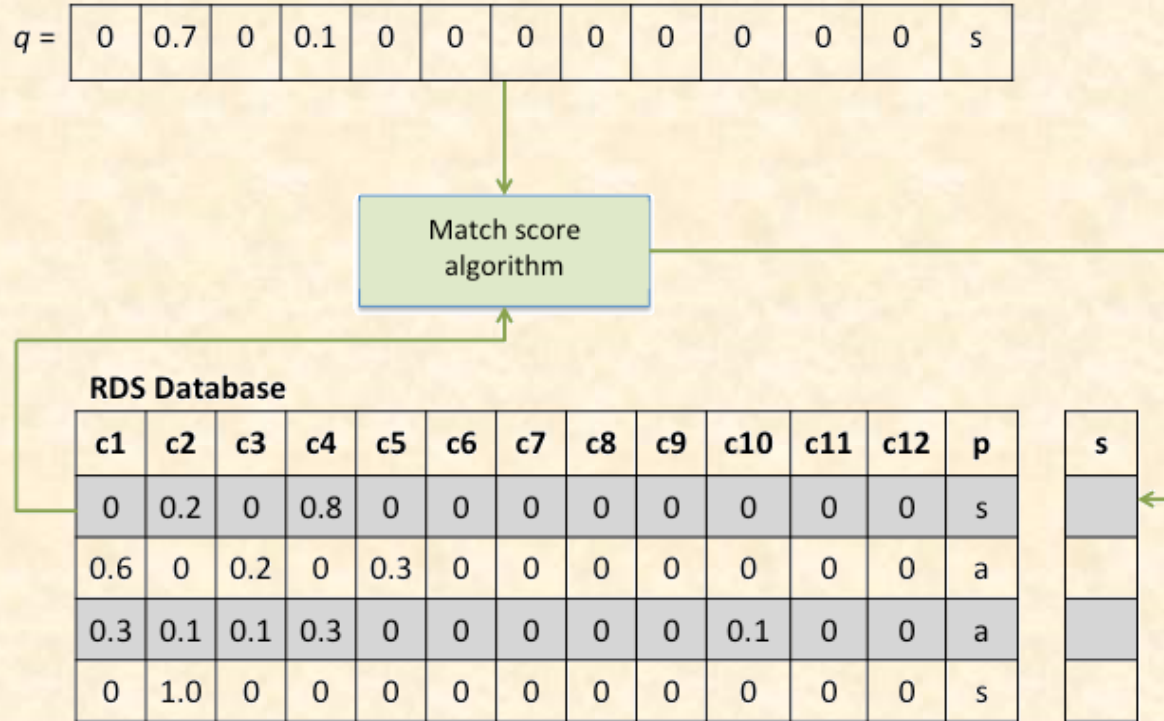
# Recommendation Engine



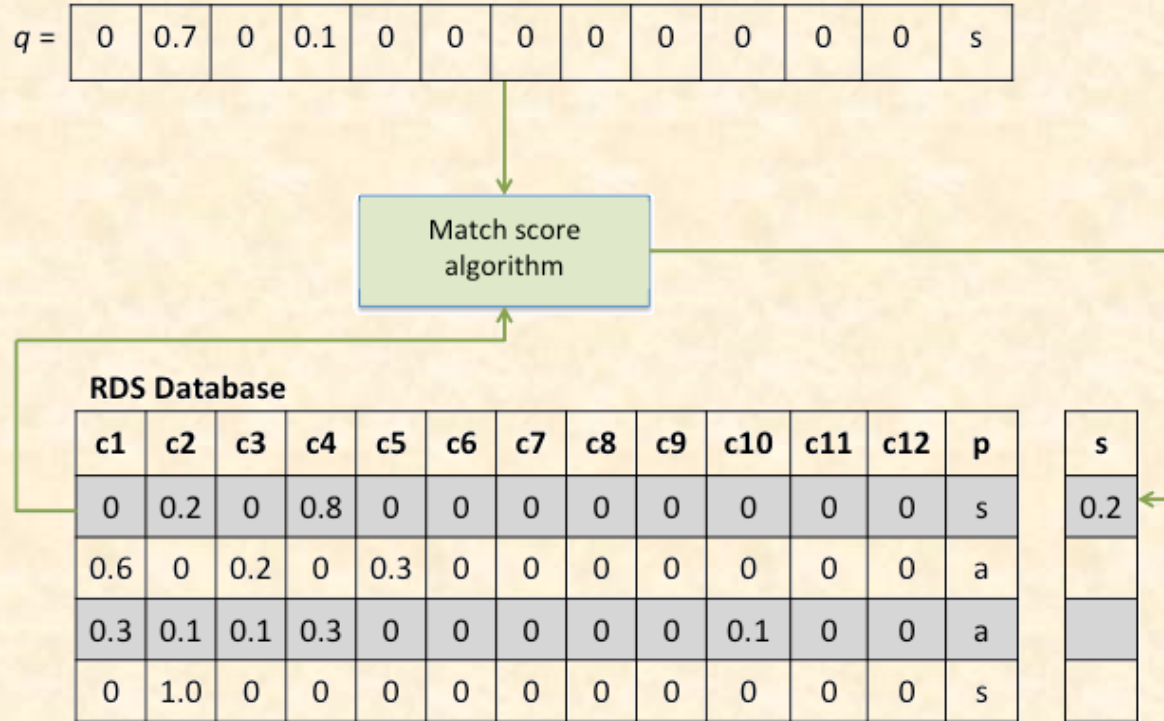
# Recommendation Engine



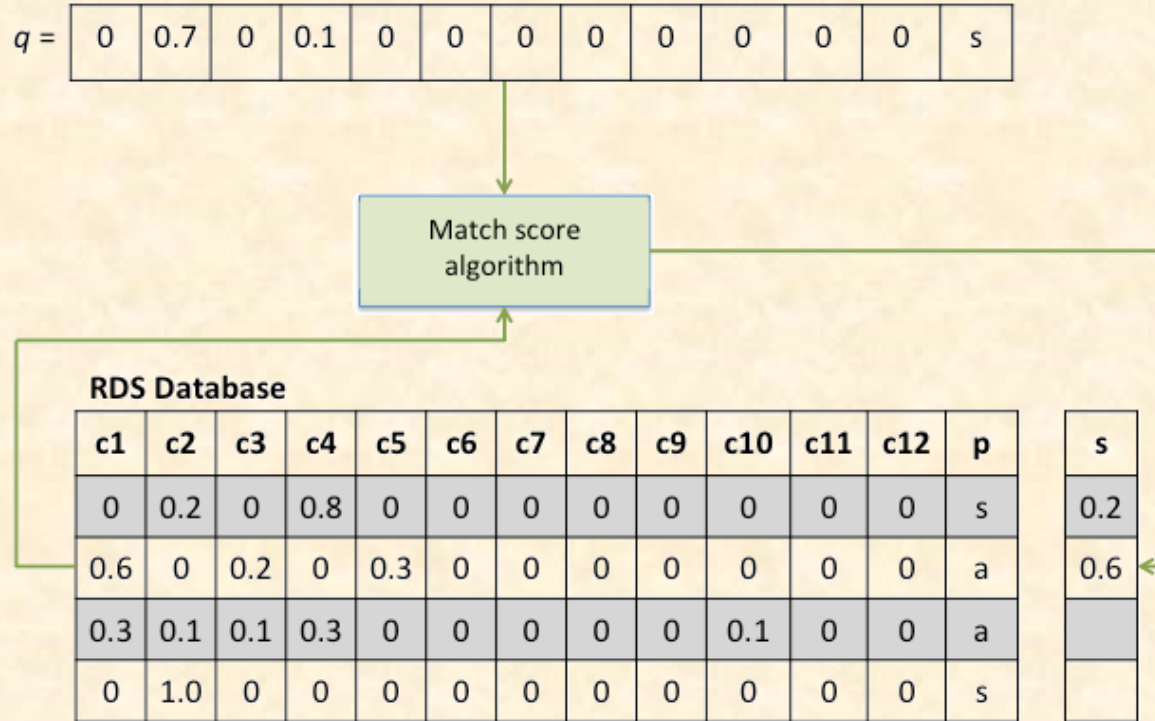
# Recommendation Engine



# Recommendation Engine

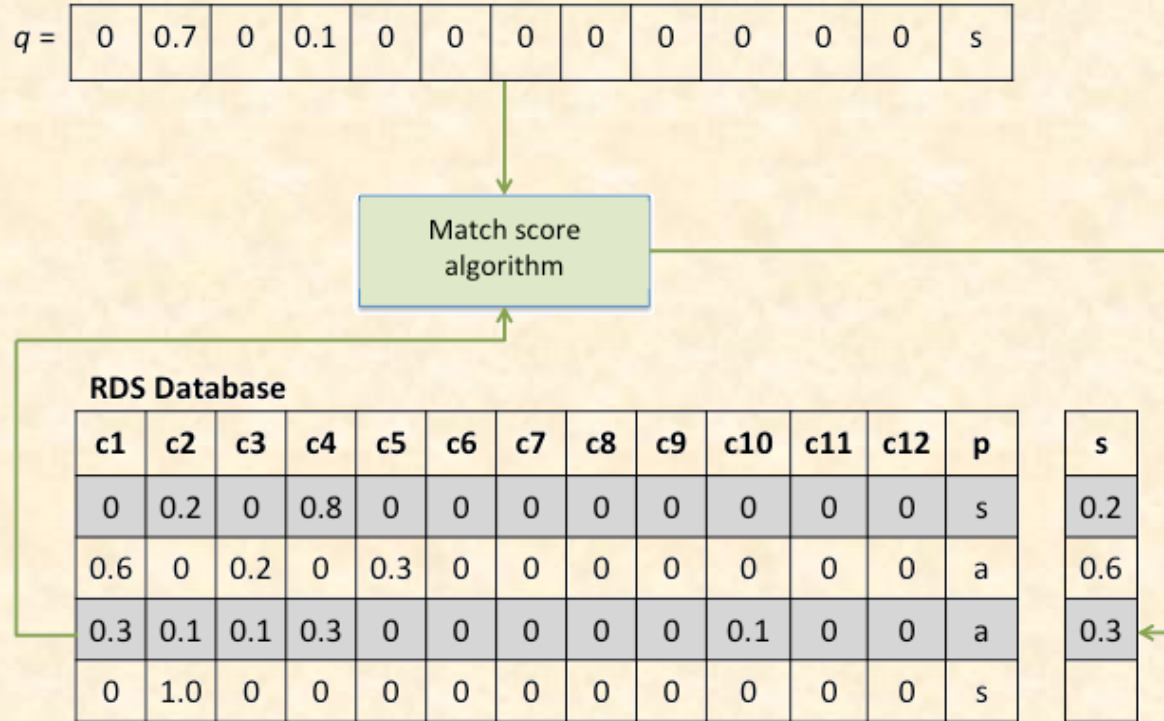


# Recommendation Engine

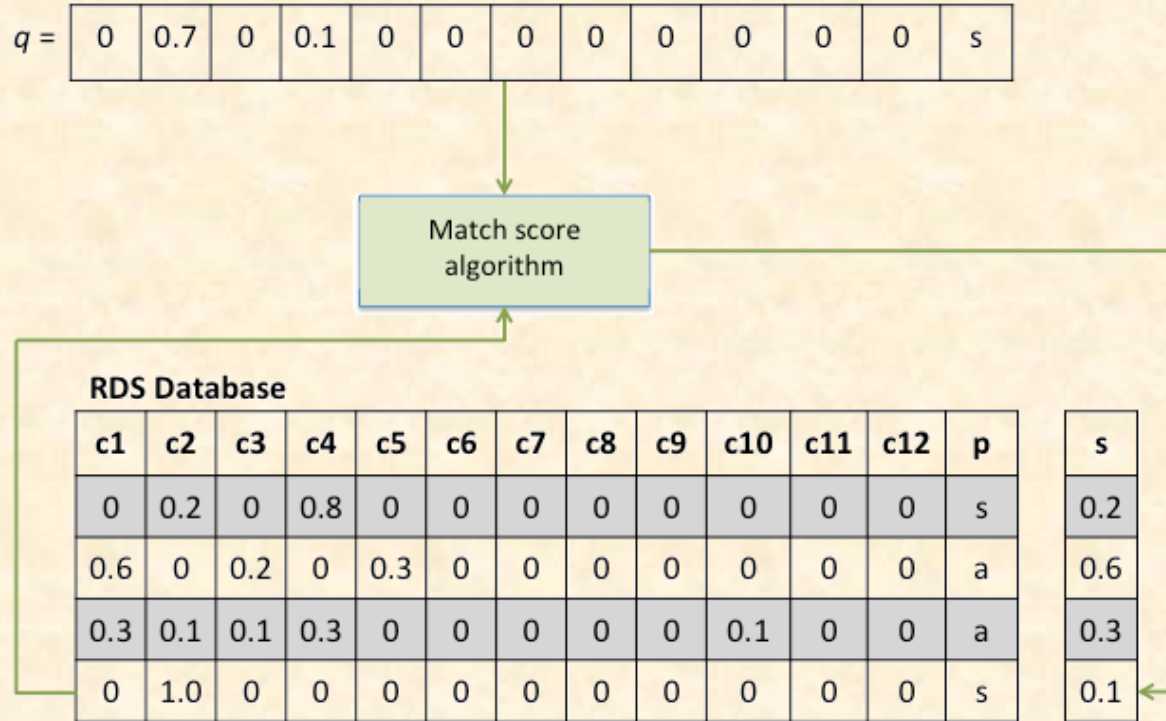




# Recommendation Engine



# Recommendation Engine



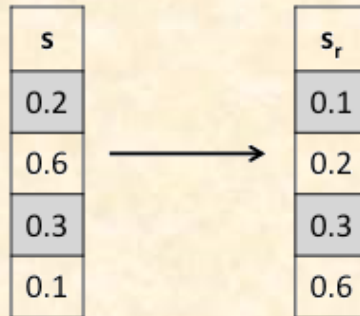
# Recommendation Engine

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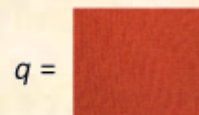
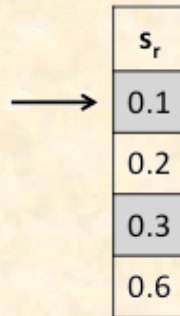
s
0.2
0.6
0.3
0.1



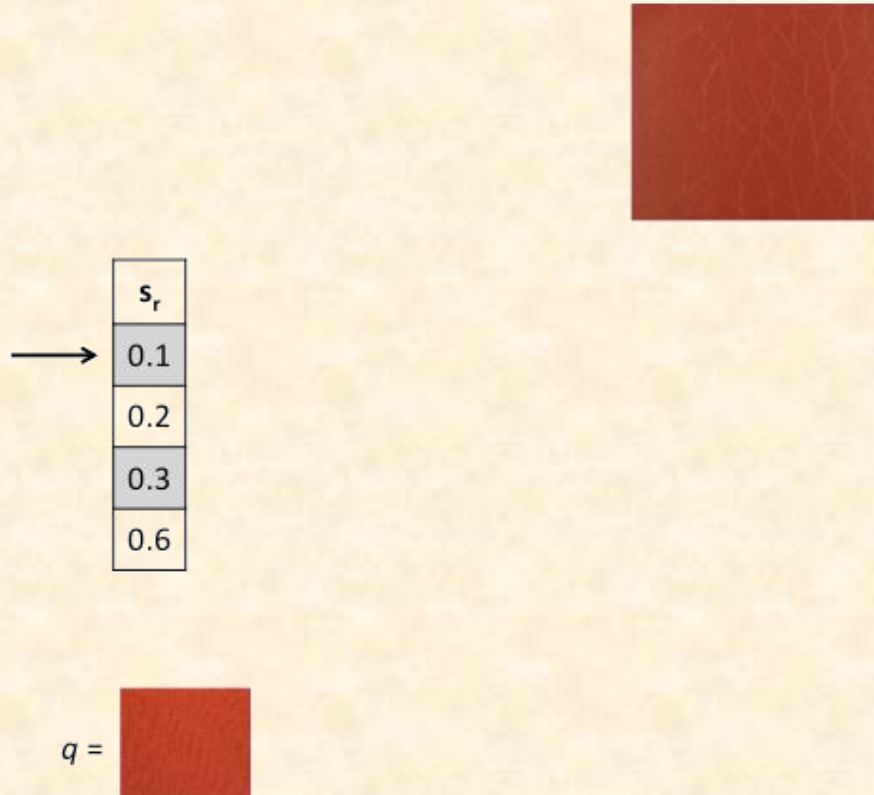
# Recommendation Engine



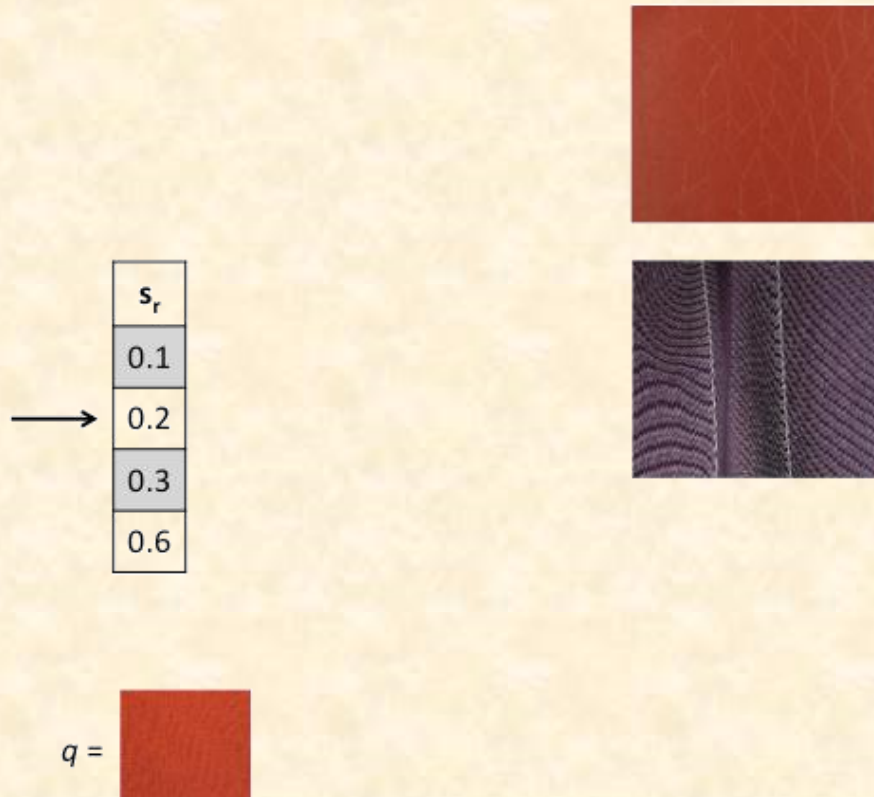
# Recommendation Engine



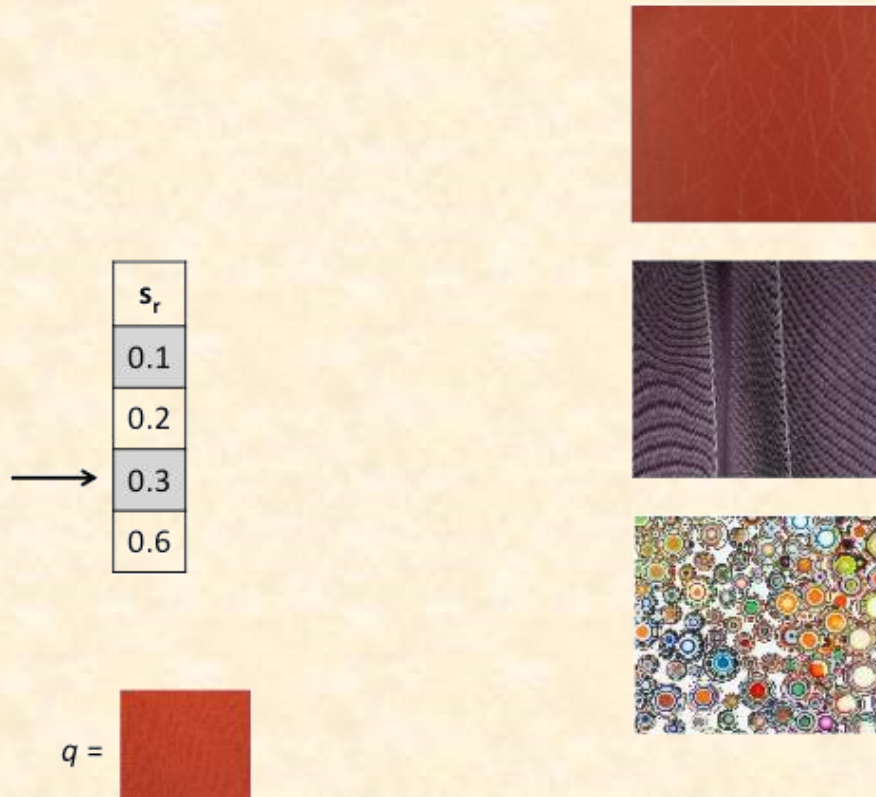
# Recommendation Engine



# Recommendation Engine

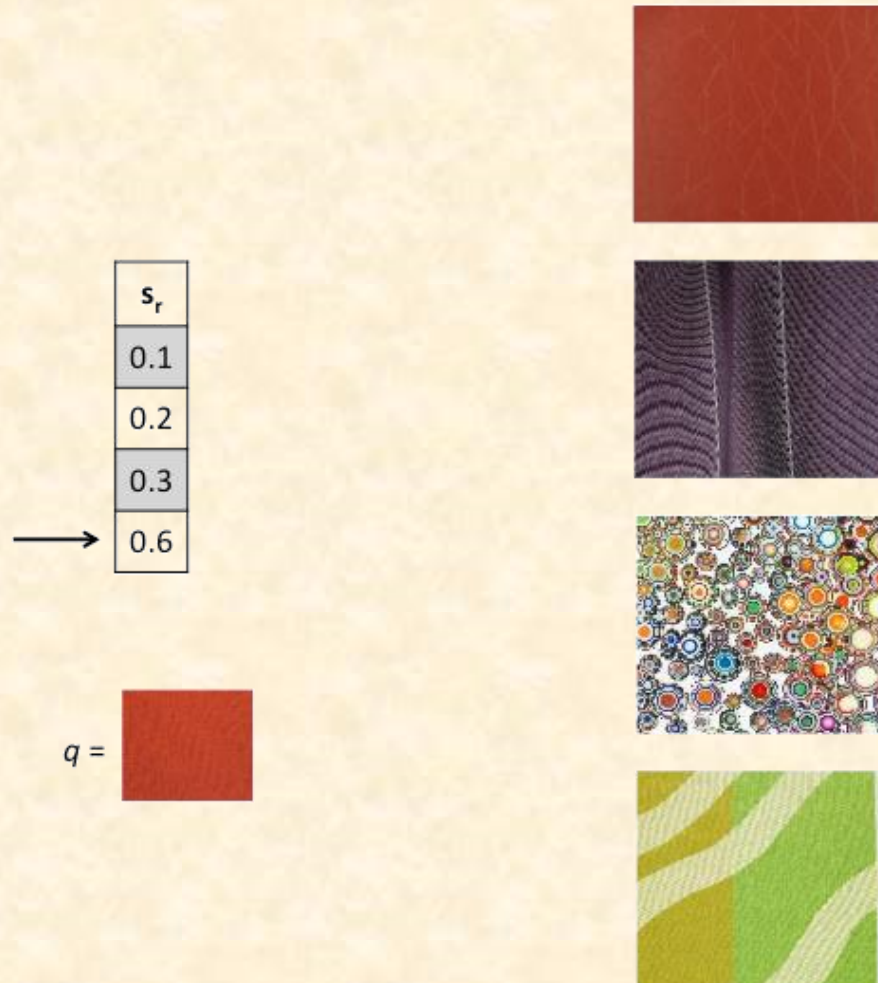


# Recommendation Engine





# Recommendation Engine



# 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?

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- 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?

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