



# FLAVOUR ENHANCED FOOD RECOMMENDATION

A Look Into Taste Computing

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# Evolution of Multimedia



# EVOLUTION OF MULTIMEDIA

Audio

Text

Image

Video

Interactive

# Taste

## MULTIMODAL

Food perception is multimodal - visual information, tastes, smells, and tactile sensations.

## FEASIBLE

People share food images, recipes, cooking videos onto the internet. Availability of large scale data and the processing power to handle it.

## UNIVERSAL

Much like text or other visual media, food is universally accessible and available. Any application that utilizes taste will have a similar universal effect.



# Activity

Find a partner.

Describe the attributes that resonate with you.

Share these attributes / features.

2 min.

image





# Activity

Describe a favorite food item and all its features.

taste (the savory and sweet aspect of this curry..)

texture (i enjoy the crispyness of the croissant)

context (when its hot outside, i enjoy..)

etc.







# What we're doing

**Trading Graph**  
Can focus resources on the greatest opportunities to increase sales and achieve the advantage over other competitors. The strategy's goal is to increase sales and achieve the advantage over other competitors.

100%  
90%  
80%  
70%  
60%  
50%  
40%  
30%  
20%  
10%  
0%

Includes short term and long term activities of marketing that take to do with the analysis of a company's situation and contribute to its objectives. The objectives will be based on how you gain sales by analyzing and serving customers. A marketing strategy must convey effective messages with the right kind of marketing approach so that will maximize your marketing and marketing activities.

45,656	12,067	20,776	24,786	45,656
534	534	3,541	354	1,878
764	764	189	189	190
748	748	348	348	134
1,589	1,589	589	589	47,755

**Current financial situation**  
Investment  
5.0%  
3.0%  
1.5%  
5.0%  
5.0%





## THE SYSTEM

Generates healthy food alternatives by constructing a user profile



## DATABASE

User and food data, collected from various sources



## RECOMMENDER

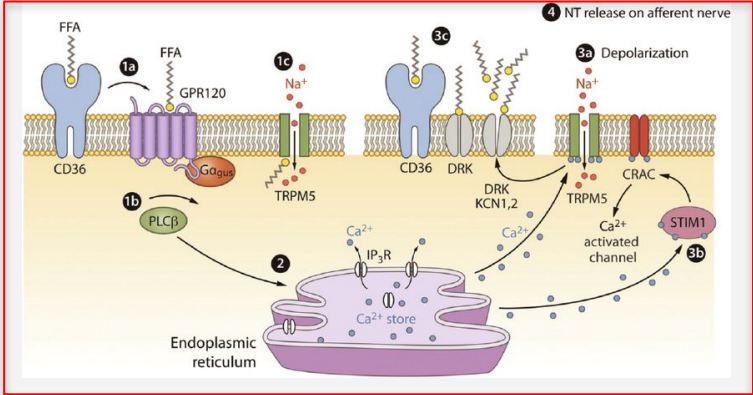
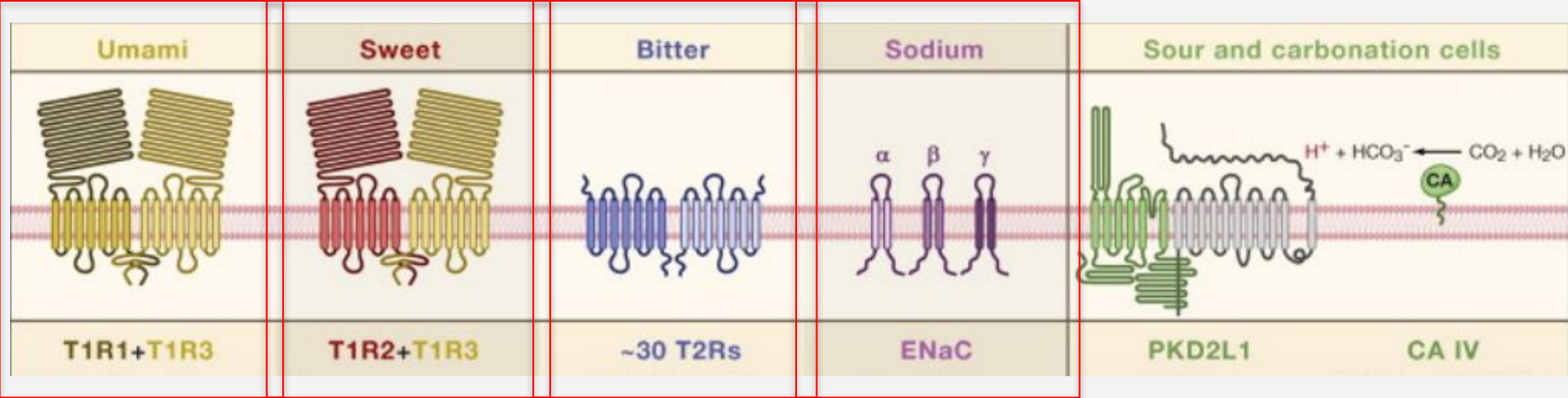
TF-IDF based recommendation system that integrates user and flavour data



## FLAVOUR PROFILER

Generates a flavour profile of every dish based on defining chemicals

# Taste receptor based approach



# CHEMICALS INFLUENCING INDIVIDUAL TASTES

<b>Nutrition Facts</b>	
4 servings per container	
<b>Serving size 1 1/2 cup (208g)</b>	
<b>Amount per serving</b>	
<b>Calories</b>	<b>240</b>
<b>% Daily Value*</b>	
<b>Total Fat</b> 4g	<b>5%</b>
Saturated Fat 1.5g	<b>8%</b>
Trans Fat 0g	
<b>Cholesterol</b> 5mg	<b>2%</b>
<b>Sodium</b> 430mg	<b>19%</b>
<b>Total Carbohydrate</b> 46g	<b>17%</b>
Dietary Fiber 7g	<b>25%</b>
Total Sugars 4g	
Includes 2g Added Sugars	<b>4%</b>
<b>Protein</b> 11g	
Vitamin D 2mcg	10%
Calcium 260mg	20%
Iron 6mg	35%
Potassium 240mg	6%

\* The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.



## Salt

Determined by Sodium Content

## Sweet

Monosaccharides and disaccharides have a positive effect  
Polysaccharides have a dampening influence

## Umami

Determined by the glutamate content, often protein rich dishes

## Bitter

Determined by Calcium and Iron content

## Rich

Determined by ratios of saturated fat, cholesterol and total fat content to the total nutritional weight

## Results for Taste Computing

### Flavour Score Samples

Dish	Bitter	Rich	Salt	Sweet	Umami
Curried bean salad	0.961	0.7	2.63	2.47	2.534
Aloo phujia	2.149	2.3	3.116	0.27	9.271
Palak paneer	1.436	2.25	1.184	1.12	8.064
Channa masala	2.012	2.79	3.41	0.88	9.538
Cilantro pesto	0.604	4.45	0.904	0.57	2.198

## Recommender and User Experiments

### Database Statistics

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User Database, Total reviews	30,193
User Database, Unique Users	22,625
User Database, Users with greater than 5 reviews	466
Food Database, Total Dishes	1381
Food Database, Indian Dishes	1051

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### Results of online A/B testing

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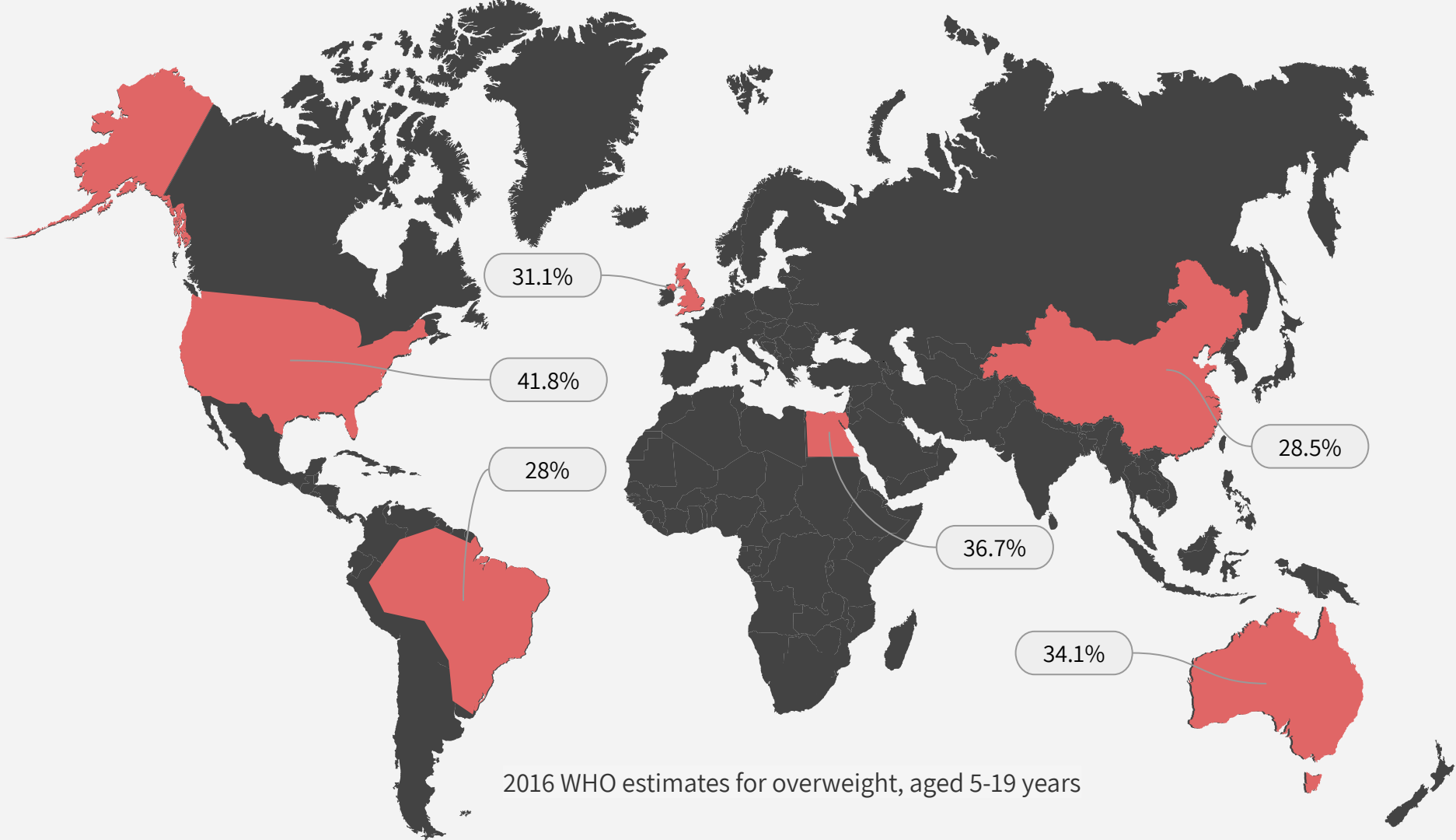
Method	RMSE
Matrix Factorisation	2.93
TF-IDF	2.11
TF-IDF with flavour	1.94

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# **Taste Computing for Health**

Modern Approach to Improve Health



2016 WHO estimates for overweight, aged 5-19 years



## Healthy Diets Are Tough!

### **INCONSISTENT INFO**

Conflicting information induces doubts about choices, heightening stress while shopping.

### **FAMILIARITY**

The impact of familiarity of product even outweighs healthfulness.

### **COST + ACCESSIBILITY**

Due to cost and availability, not everyone can sustain their dietary needs.

### **TASTE**

Although price is a top driver, it is ranked lower than the taste.

The image shows three glasses of beer on a dark bar counter. The glass on the left is filled with a dark, stout-like beer with a thick white head of foam. The middle glass contains a golden beer with a thin head of foam. The glass on the right is partially obscured and contains a similar golden beer. The background is a blurred bar with various bottles and warm lighting. A large white and black geometric shape is overlaid on the right side of the image, containing the title and subtitle text.

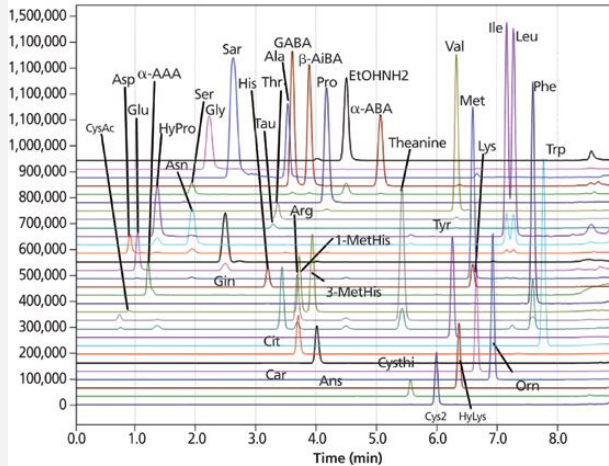
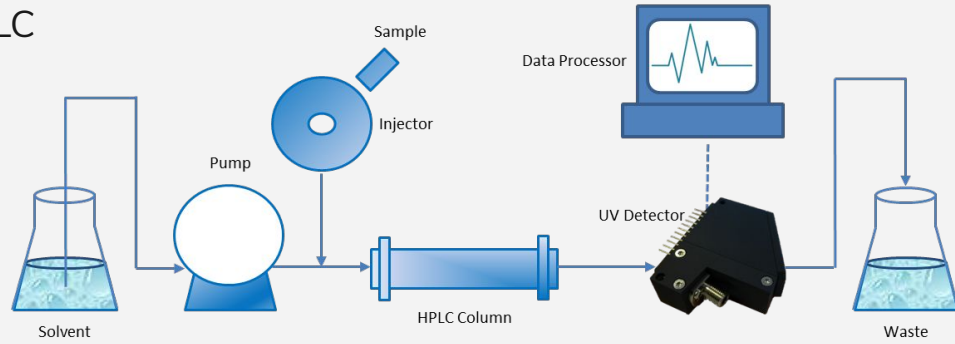
# **Taste Computing for Culinary Arts**

Search, Discovery, Creativity and Joy



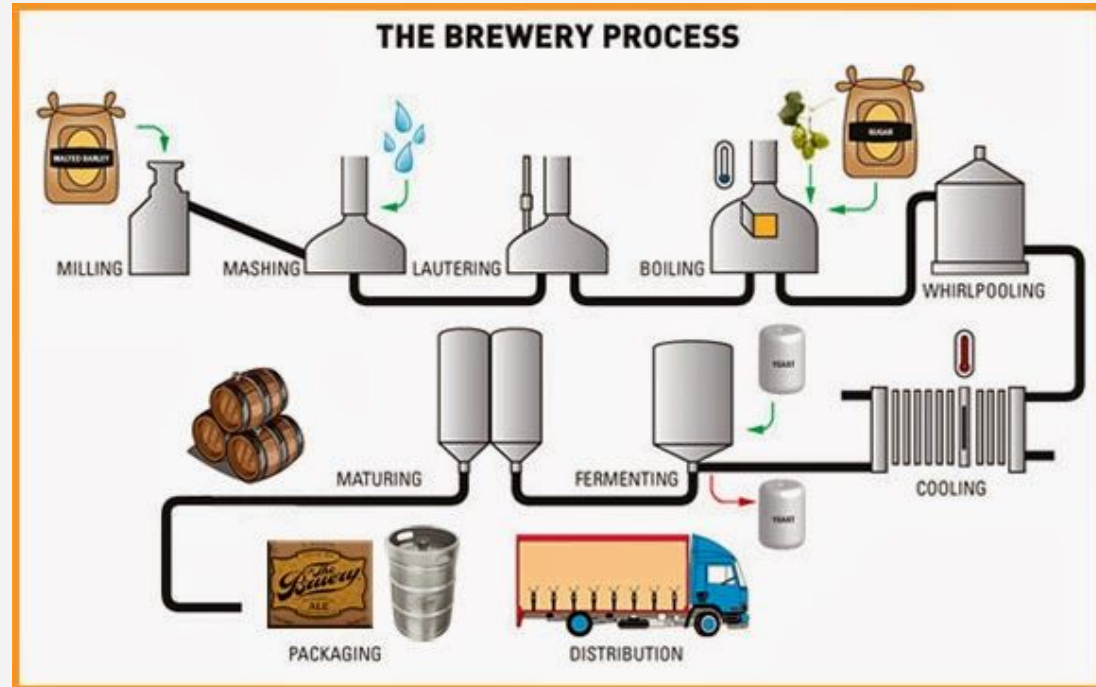
## Extraction of Chemicals in Beer

HPLC



Flavours of food (and their combinations) are the basis of excellent culinary arts.

Using the taste data linked to the process of creating food.



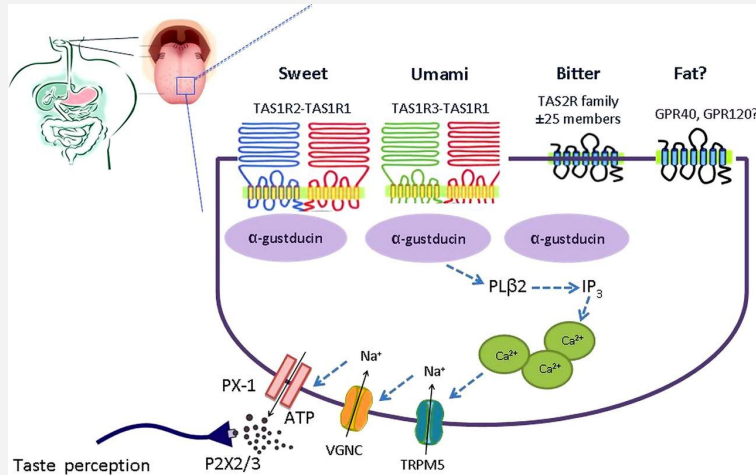
A black and white microscopic image of a neural network, showing a dense web of interconnected neurons with their cell bodies and branching processes. The image is positioned on the left side of the slide, partially overlapping a white geometric shape.

# **Taste Computing for Science**

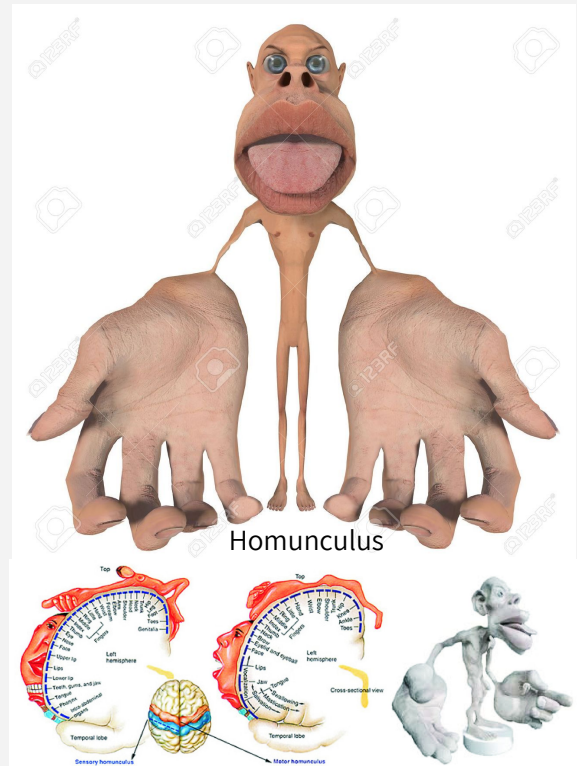
Understanding Neuroscience

## Understanding biologically how we sense our environments through chemical interactions

### Taste receptors



### Texture receptors



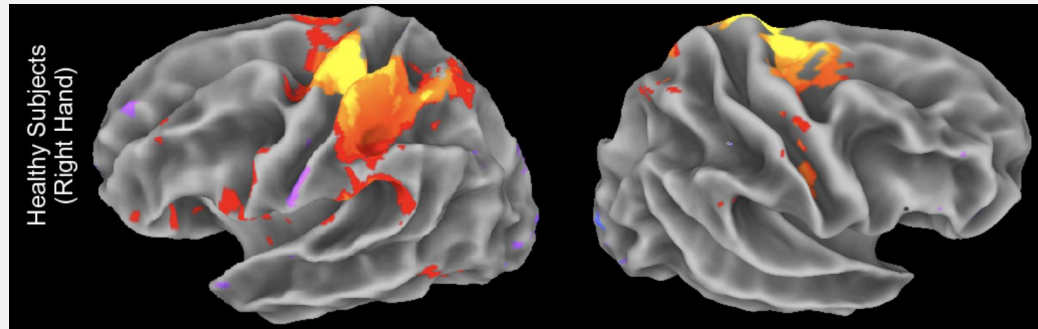
## Understanding biologically how we sense our environments through chemical interactions

Task (Eat)


-Features include taste / texture etc.



Brain Imaging







# Thank you.

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