An Architecture of Digital Gastronomy
Software Design Document

Date: 16/03/2020

Name: Noam Domovich
ID: 204083893.
Coordinator: Shimon Bezalel.
Lab: Hybrid Lab School of Engineering and Computer Science at the Hebrew University, Prof. Amit Zuran .

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1. INTRODUCTION

1.1 Purpose

The project purpose is developing a research tool for Digital Gastronomy (DG), by creating the outlines of a system. The product will cover APIs with other databases and architectures to be used for analyzing the properties of digital gastronomy, and how to improve the quality of this process.

1.2 Scope

Name: An Architecture of Digital Gastronomy
Focus:

- Research about the interactions and protocols for the needs of DG
- Collections and analysis for datasets such as aroma and taste intensities, definition of meta-recipe, etc. in digital context, and create architectures to be used for cooks while they cook.
- Tools for creating a required recipe in real-time environments.

1.3 Motivation

The food industries face global challenges, both through climate change and a growing population. These are accelerating a trend which seeks to further integrate computers into the kitchen. Food-tech startups seeking to bring the digital revolution to growing, manufacturing and processing food ingredients are gaining significant traction. Minimizing food waste is a hot issue as well. One way to reduce food waste is to rely on dry substances in the form of powders, which have a longer shelf life than fresh products and are easier to store and transport. There are more than one path to reach the goal of a sustainable food industry, and not all are equally desirable.

At the Hybrid Lab we believe that the leaders in digitizing the traditional kitchen craft should be the chef's themselves. We worry the natural market pressures alone will lack incentives to create much more than white paste of the aforementioned powders. The opportunities and technologies are ripe to create beautiful, highly variant, customizable and personalized dishes with a computer's aid.

2. SYSTEM OVERVIEW

A recipe's system which outputs a suitable recipe for user requests. At first the user will choose between several diets like: vegan, ketogenic and kosher, and will choose parameters of sustainable cooking as CO2 and water usage. The system will take this requests and wiil offer the suitable recipe.

3. SYSTEM ARCHITECTURE

3.1 Architectural Design

Design Pattern

MVC : modal view Controller

Modal

Will take care about all application data: Aroma and taste intensity , recipes.

View:

Will take care about the communication between the cook and the application

Controller:

Will take care about the cook requests and preferences for the dish cooking process

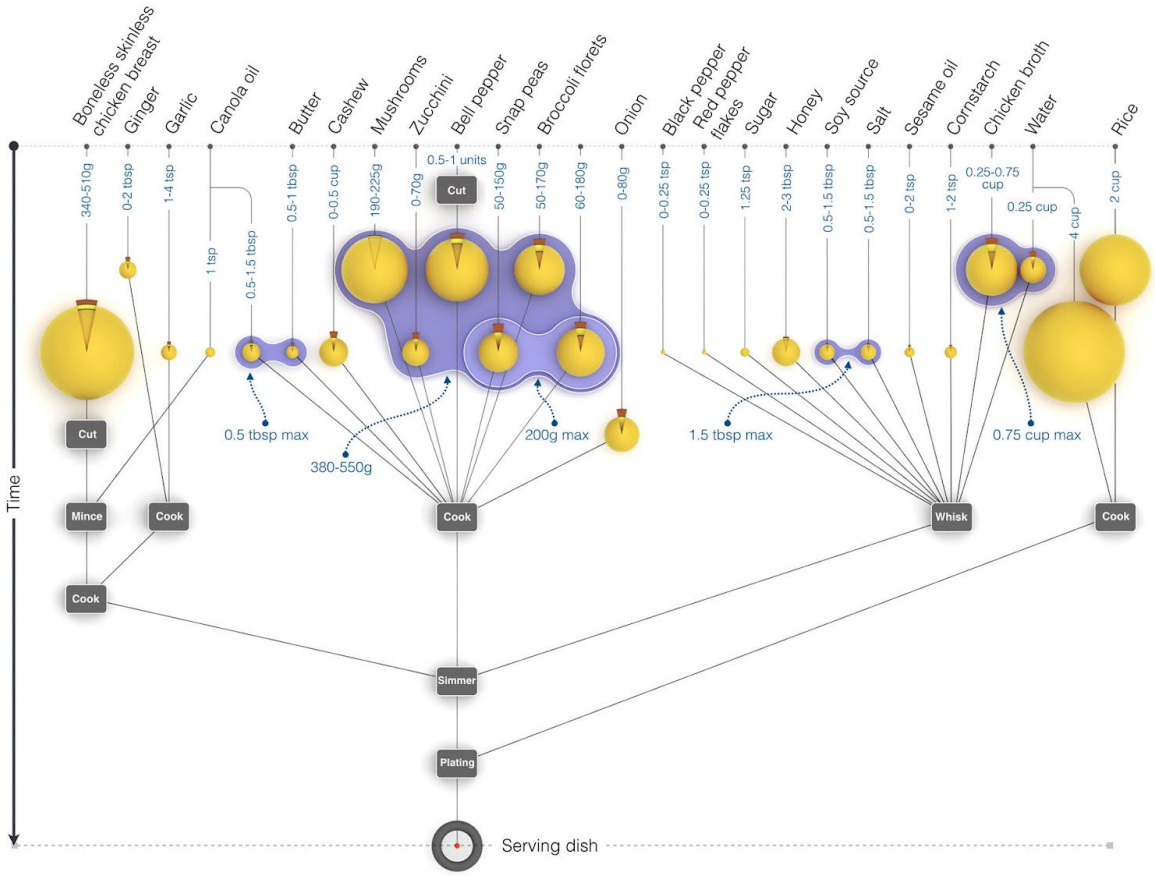
Tech Stack

- Node.js - for back end
- Maybe ionic/react for front end

Meta-Recipe Design

This unit will hold a template for recipe. According to this template the 'Dish control' will send command and requests to the inventory, cookware and will lead the cook during the cooking.

Example of recipe usage:



3rd Party APIs

This unit will demonstrate the aroma and taste intensity for each ingredient. The intensity is based on data which is analyzed and stored in the database.

4. DATA DESIGN

4.1 Data Description

The main DB’s data object:

- Recipes - set of instructions and requirements for the cooking process
- Ingredient aroma and taste - analysis of aroma and taste for each ingredient

4.2 Data Dictionary

Meta-recipe json schema

example:


```
{
  "recipes": [
    {
      "id": 1,
      "name": "omelette",
      "ingredients" : [340, 222, 500] ,
      "tools" : [1,2,3,4,5,6,7,8,9,10],
      "instructions" :
          [
           {
             "step": 1  ,
             "during" : {
               "max_time": "80 min",
               "min_time" : "5 min"
             },
             "range" : {
               "most_before": "500 min",
               "most_recently" : "5 min"
             },
             "action": "Season the beaten eggs well with salt and pepper.",
             "step_tool": [3,2] ,
             "step_ingredient" : [340]
           }
          ]
      }
  ]
}
```


For schema take a look at appendix

Aroma json schema/shcema

example:


```
{
  "ingredients": [
    {
      "category": "animalproduct",
      "entity_id": 0,
      "entity_alias_readable": "Egg",
      "statistical_aroma": {
            "Uncategorised": 0.16,        "Decayed": 0.3,        "Sweet": 0.1,        "Woody": 0.12,
           "Medicinal": 0.31,        "Sulfidic": 0.23,        "Fruity": 0.05,        "Smoky": 0.19,
           "Floral": 0.08,       "Citrus": 0.07,        "Mint": 0.04
      },
      "culinary_1_aroma": {
           "Uncategorised": 0.15,        "Maillard": 0.16,        "Terpene": 0.12,        "Veg": 0.17,
           "Fruity": 0.07,        "Dairy": 0.19,        "Floral": 0.08,        "Sulphur": 0.1,        "Marine":
           0.28,       "Sour": 0.21,        "Phenol": 0.15,        "Pungent": 0.13,        "Savory": 0
                },
      "culinary_2_aroma": {
            "Uncategorised": 0.15,        "Meaty": 0.24,        " Nutty": 0.17,        "Medicinal": 0.14,
           "Chocolate": 0.22,        "Wood": 0.05,        "Spice": 0.02,        "Herbaceous": 0.03,        "
           Berry":0.06,        "Dairy": 0.19,        "Green": 0.12,        "Roasted": 0.1,        "Petrol": 0.6,
           "Floral": 0.08,        "Caramel": 0.07,        "Sulphur": 0.1,        " Tree fruit": 0.01,
           "Tropical":0.04,        "Marine": 0.28,        "Earthy": 0.29,        "Fruit like": 0.42,
           "Melon": 0.0,       "Sour": 0.21,        " Citrus": 0.12,        "Phenol": 0.15,        "Pungent":
           0.13,        "Toasted": 0.0,       "Smoke": 0.0,        "Savory": 0
      }
    }
    ]
}
```


Taste json schema/Eample

exmaple:

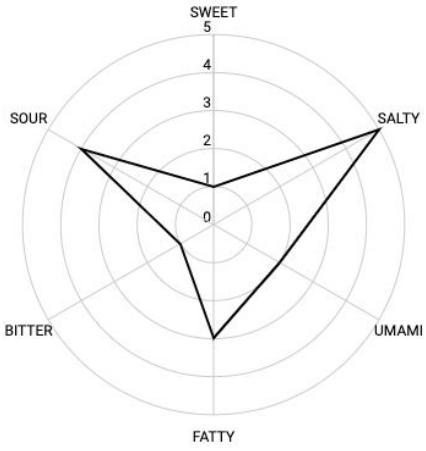

```
{
  "ingredients": [
    {
      "category": "animalproduct",
      "entity_id": 0,
```

"entity_alias_readable": "Egg",
"statistical_taste": {
“Bitter”: ??
“Salty”: ??
“Sour” : ??
“sweet “ : ??
“Umami” : ??
},

5. COMPONENT DESIGN

5.1. Controllable Spider Chart

a. Aroma, Taste



5.2. Recipe Report

a. Environmental Footprint

A component that show for the user the recipe progress and allow him to “edit” parts from the recipe (for example,replace an ingredient for sweeter one)

5.3. Recipe Controllers

a. Button

For update the recipe by:

- Taste
- Aroma
- Water usage
- Sustainable: CO2

Menu

dish selection for cook/costumer , with all the restaurants options

6. APPENDICES

Meta -recipe Schema:

```
{
  "$schema": "http://json-schema.org/draft-04/schema#",
  "type": "object",
  "properties": {
    "recipes": {
      "type": "array",
      "items": [
        {
          "type": "object",
          "properties": {
            "id": {
              "type": "integer"
            },
            "name": {
              "type": "string"
            },
            "ingredients": {
```

```
                "type": "array",
                "items": {}
            },
            "tools": {
                "type": "array",
                "items": {}
            },
            "instructions": {
                "type": "array",
                "items": [
                    {
                        "type": "object",
                        "properties": {
                            "step": {
                                "type": "integer"
                            },
                            "during": {
                                "type": "object",
                                "properties": {
                                    "max_time": {
                                        "type": "string"
                                    },
                                    "min_time": {
                                        "type": "string"
                                    }
                                },
                                "required": [
                                    "max_time",
                                    "min_time"
                                ]
                            },
                            "range": {
                                "type": "object",
                                "properties": {
                                    "most_before": {
                                        "type": "string"
                                    },
                                    "most_recently": {
                                        "type": "string"
                                    }
                                },
                                "required": [
                                    "most_before",
                                    "most_recently"
                                ]
```

```
                    },
                    "action": {
                      "type": "string"
                    },
                    "step_tool": {
                      "type": "array",
                      "items": {}
                    },
                    "step_ingredient": {
                      "type": "array",
                      "items": {}
                    }
                  },
                  "required": [
                    "step",
                    "during",
                    "range",
                    "action",
                    "step_tool",
                    "step_ingredient"
                  ]
                }
              ]
            }
          },
          "required": [
            "id",
            "name",
            "ingredients",
            "tools",
            "instructions"
          ]
        }
      ]
    }
  },
  "required": [
    "recipes"
  ]
}
```