

# Constructing Recipe Transition Graph with Asymmetric Entropy Difference



**Abstract.** Recipes consists of a lot of features such as ingredients, cooking procedures and cooking time. A unique combination of these features makes a unique recipe. However, some recipes have the similar flavors as well as the similar ingredients. These recipes can be easily transformed into other recipes by adding or removing some ingredients. In this paper, we calculate the asymmetric entropy difference between recipes. Based on this entropy, we construct the recipe transition graphs. The recipe transition graph shows the relations between recipes and the possibility of derivation from a recipe to others.

**Keywords:** Recipe Entropy, Recipe Transition, Recipe Derivation, Complex Network, Recipe Map

## 1 Introduction

### 1.1 Motivation

Recently, the foods and the recipes became new cultural trends by broadcasts and the media in Korea. The foods that satisfy the basic human needs and the recipes of the foods are the common interests as well as the most basic activity of creation. People present their own custom recipes and do the social activities based on these recipes. As result, many various recipes are shared on the internet and also produced at this time.

In this research, we are about to find out the social relation between recipes. Normally, new recipes are the modifications of other original recipes by adding or subtracting some ingredients and cooking processes. Also, by combine two different recipes, new recipes by the name of the fusion cuisine recipes are introduced. However, the recipes are strongly related with the producer of that recipes. As an instance, for the recipes open to the public on the internet, the levels of difficulty are given to them. But these evaluations of difficulty are not objective measures. They are differ for the person. There are not the constant, scientific rules to describe the recipes.

The goal of this research is to make a objective standard to measure the recipes on the basis of the concept of information entropy. Also we presents a social network of the recipes by the similarity of the recipes based on the measure of entropy. As a form of social network of the recipes, we present the recipe transition graph which represents the possible derivation of the recipes from one to another.