

Culinary Art Designer

Fumihiko Kato* Mina Shiina* Takashi Tokizaki* Hironori Mitake† Takafumi Aoki† Shoichi Hasegawa*
University of Electro-Communications* Tokyo Institute of Technology †

Cooking, as an every day task, is one of time consuming and maybe dull task in home. However, looking from a different point of view, it is one of last creative works in everyday home life, where most of them are deprived by automation and capitalism in last century.

Designing of cooking is not very easy. Cooks design their cooking based on their empirical knowledge and such knowledge is difficult to learn without long time experience and/or hard practice under senior cooks. That is why we propose “ Culinary Art Designer ”— a system that supports one to dynamically design their own recipe visually.

Keywords: Edible computing, Real-Time Graphics, Thermal simulation

1 The Art of Cooking

In the cooking world, looks is as important as taste. From the physical appearance of a dish, one judges whether it is delicious or not. Owada [Owada et al. 2004] studied techniques for rendering cross-sections of foods internal when cutted in various places. We propose Culinary Art Designer, a system that simulates the physical and chemical changes that occurs during cooking process visually with high realism because cooking process is essential for making nutritious food, improving taste and to better nutrition absorption towards the body.

2 Innovation

In the past, recipes are based on one static recipe, but with this system, one could dynamically create their own recipe by modeling the relations of the cooking operations and the cooking results. Here are some of the advantages that our system provides.

- By modeling the heat transmission and dynamics, the end result of the cooking process can be simulated in a short time compared to cooking in the real world
- By confirming the end result of a simulation process, the user could get an image of the cooking process and dynamically change it by changing a cooking parameter condition or properties of a food ingredient
- Reproducing high realism of the end results of the appearance for each food ingredient undergoing the simulated cooking process

Culinary Art Designer system consists of 3 elements:

- “Texture and Shape Manipulation”-To raise the realism of the appearance of food ingredients
- “Heat transmission model”-To calculate heat levels inside food ingredients using nodes on meshes to express heat transferring between them
- “Dynamic model”-To simulate the movements of food ingredients in a frying pan or other cooking utensil

In “Texture and Shape Manipulation”, food ingredients shape is reconstructed as a 3D mesh and texture is applied on it to express realness. The heat spread in the food ingredients is simulated as heat transfer between neighboring nodes of the mesh model in “Heat transmission model”. Texture is then changed based on the heating, moisture condition of the food ingredients to simulate chemical reaction caused by heating process. “Dynamic model” is used to simulate movements of the food ingredients when the frying pan is moved as to cause the food ingredients to turn or roll over that literally reflects the food ingredients heating condition in “Heat transmission model”. These series of operation can be altered by the user and physical changes of the food ingredients during cooking is simulated and feedbacked to user on the screen.

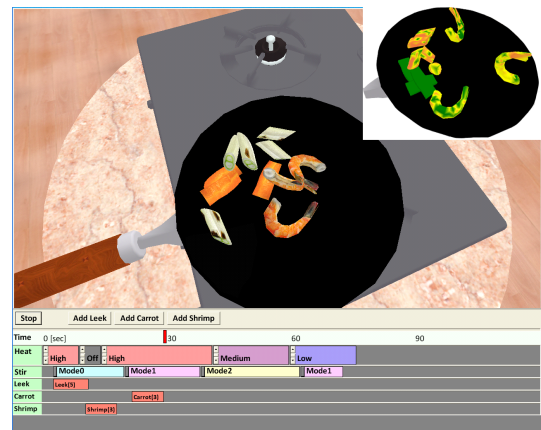


Figure 1: The system image of the “CulinaryArtDesigner”.

3 Vision

With Culinary Art Designer, one can visualize the influence caused by the cooking operation and that enables one to create their own original dish. Because image of a recipe is clear and cooking aid is available, threshold for cooking can be overcome thus anybody can enjoy cooking and moreover, anybody can have a rich and healthy eating diet. Finally, we believe that cooking originality at an individual level increases significantly with this system and cooking can be a good opportunity to open the century of individual creativity.

References

OWADA, S., NIELSEN, F., OKABE, M., AND IGARASHI, T. 2004. Volumetric illustration: Designing 3d models with internal textures. *Proceedings of ACM SIGGRAPH(SIGGRAPH2004)*, 322–328.

*e-mail: { fumihiko.k,shiina,tokizaki,hase } @hi.mce.uec.ac.jp

†e-mail: { mitake,aoki } @hi.pi.titech.ac.jp