



VG.

Xiao Long Bao Shaper

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Problem

Xiao Long Bao is a famous traditional Chinese pastry food. However, it rarely can be found in foreign countries. So, people in foreign countries need to make Xiao Long Bao by themselves when missing its taste. But shaping Xiao Long Bao is very hard for beginners. Xiao Long Bao shapers on market nowadays are designed for business use.

Concept Generation

Our goal is to design and manufacture an available, portable and easily operated machine that can help make Xiao Long Bao at home through simple button operation, thus realizing the automation of making Xiao Long Bao.

Design Description

Our final solution consists of a pressing cylinder placing the dough and a rotation part generating the folds. The pressing cylinder is controlled by a handle. You can pull the handle up and drop the cylinder to press the dough into the turnplate. The rotation part contains a two-level turnplate and ten blades. When we push the side wrench, the turnplate rotates and makes the blades shrink inwards to squeeze the dough forming the folds.

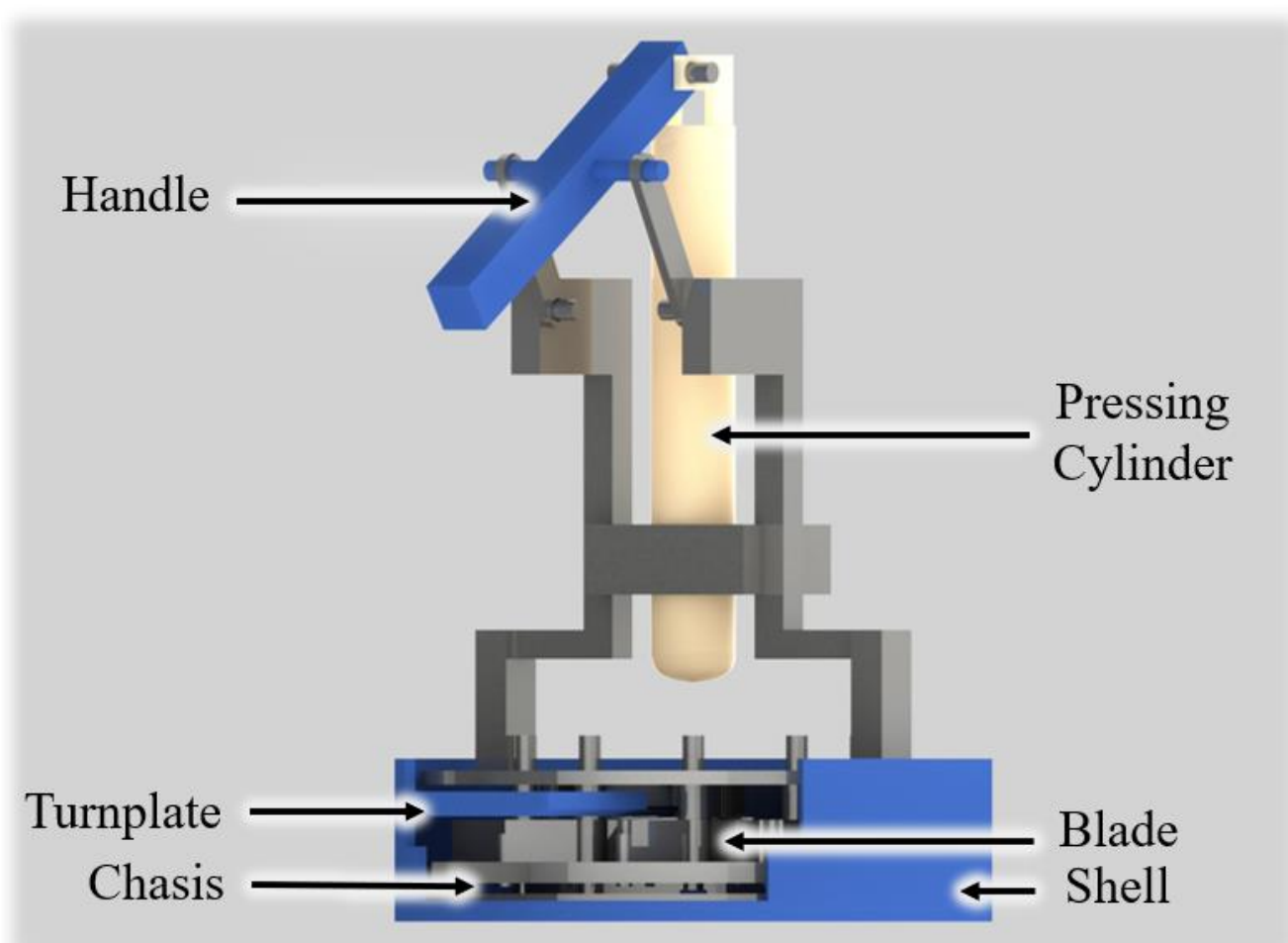


Fig. 1 The structure of the whole Xiao Long Bao shaper

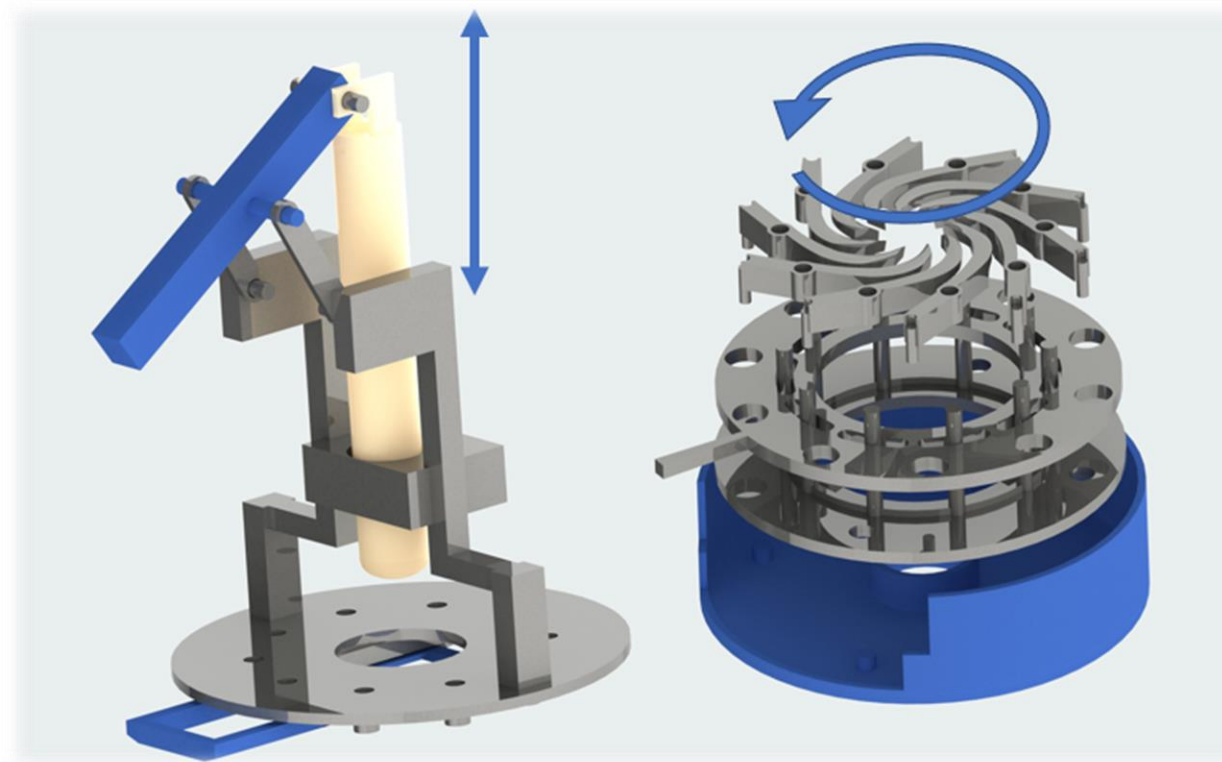


Fig. 2 The pressing cylinder (left) and the rotation part (right)

Modeling and Analysis

There are three parts in the process of making our product. Firstly, we create the 3D-model by Solidworks and we preliminarily ensure that the parts can work together to close the dough successfully with the animation. Next, we produce the components of the Xiao Long Bao shaper, including the chassis, turnplate and blades respectively by 3D-printing and assemble them together to get the complete realistic model with the function of shaping, pleating and sealing. Finally, we improve the model of the blades to make them able to be closed more completely and adjust the shape of the pressing cylinder to decrease the risk of damaging the dough.

Validation

The shaper performs better in pleating and sealing Xiao Long Bao than beginners. We conducted a comparative visual experiment to observe the distinction in shaping Xiao Long Bao using our specialized shaper versus traditional hand-shaping methods.

Based on our gathered data, the results displayed in Tab. 1 and Tab. 2 clearly indicate that using our shaper to form Xiao Long Bao not only expedites the process (average time by hand 33.92s, average time by shaper 28.69s) but also enhances the aesthetic quality of the dumplings.

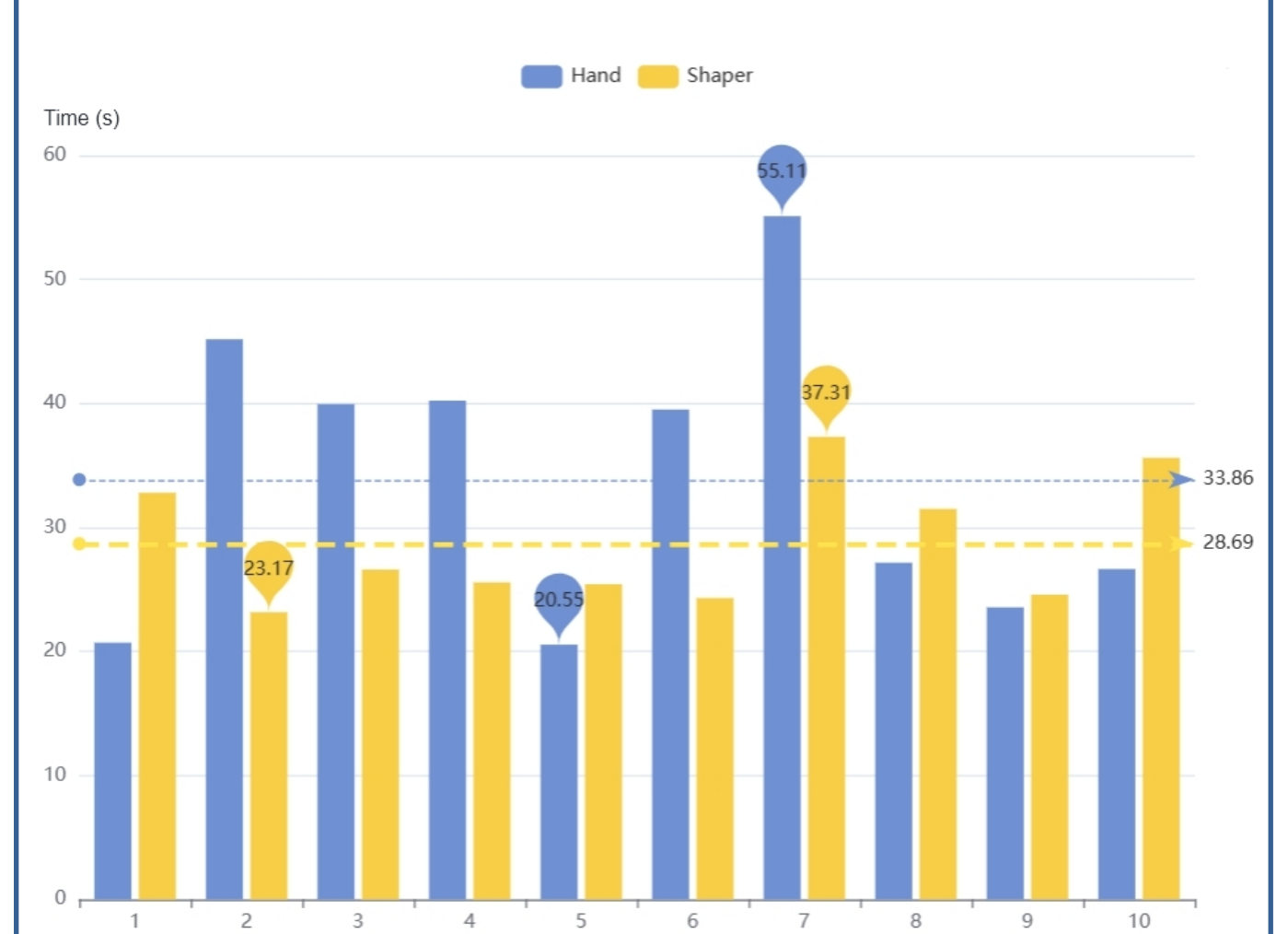


Fig. 3 The time making Xiao Long Bao by hand and by shaper

Furthermore, the shaper has demonstrated a more consistent and reliable sealing technique compared to manual methods.

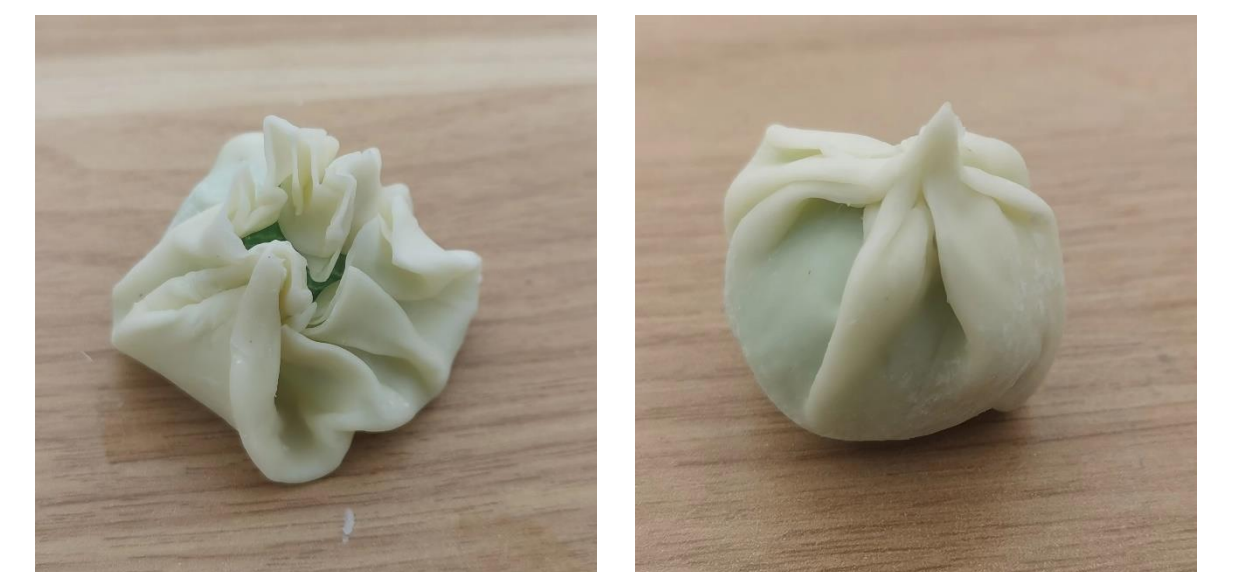


Fig. 4 Xiao Long Bao by hand (left) and by Xiao Long Bao shaper (right)

Conclusion

This project delivers an efficient solution to the challenge of shaping Xiao Long Bao, particularly for dual degree program students. It simplifies the complex process, allowing users to effortlessly shape this beloved dim sum dish. We continuously improve the sealing and pleating functions, ensuring a superior shape without compromising taste. This makes shaping Xiao Long Bao more accessible, and significantly reduces the time and effort required.

Acknowledgement

Dr. Shane Johnson, Dr. Irene Wei, and Teaching Assistants Xi Yufei, Zhu Yihan, Cao Xiwen, Xu Jiaxuan.

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