Digital Fabricated and Machine-Generated Masks in Covid-19: Design Methodology, Functions, and Datasets of Masks

Kengo Tanaka

With the worldwide spread of COVID-19, wearing a mask becomes sometimes mandatory and prevalent. In certain situations or due to cultural background, people may like to wear non-typical masks for functional or aesthetic reasons. Computer assisted techniques provide us with flexibility to learn such information from the media so that mask customization can be tailored in order to fulfill the needs of individual users. I aim to design masks by considering not only their functionality of protecting pandemic risks but also human-centered factors, such as regional culture and fashion. In this work, I first establish a taxonomy upon online mask images from multicultural and diversity perspectives. Second, I develop an experimental framework for producing modern masks using computational methodology and digital fabrication. To demonstrate the applicability of our fabricated masks, I measured and evaluated the diffusivity of droplets on masks with various shapes in an in-lab setting, and conducted a discussion of cross-domain perspectives for inspiring future applications and research directions.

(Advisor: Yoichi Ochiai)