Blind Removal of Facial Foreign Shadows
Yaojie Liu*1, Andrew Hou*1, Xinyu Huang2, Liu Ren2, Xiaoming Liu1
Michigan State University1, Bosch Research North America2
* denotes equal contributions

Motivation
● Self-shadow removal is a well studied problem, but foreign shadow removal is understudied.
● Outside of images, shadow removal in videos lacks temporal consistency.
● There are very limited options for evaluating foreign shadow removal and segmentation on in-the-wild images.

Proposed Solution
● We propose a foreign shadow removal method that decomposes the problem into grayscale shadow removal and colorization.
● We propose a temporal sharing module (TSM) that improves video shadow removal consistency and face symmetry.
● We collect a new in-the-wild database of subjects with diverse foreign shadows called Shadow Faces in the Wild (SFW), which can be used to evaluate shadow segmentation and removal.

Input Image                       Deshadowed Image            Predicted Shadow Mask

Examples of images with foreign shadows cast by external objects such as hands, paper, and pens.

Model Architecture

Temporal Sharing Module (TSM)

Our temporal sharing module (TSM) uses temporal max pooling to share illumination information across video frames.

Temporal GS+C improves over naive RGB shadow modeling and the baselines.

Video Shadow Removal on SFW

TSM improves temporal consistency of video shadow removal.

TSM leaves less shadow traces and estimates better shadow masks.

Video Shadow Removal (no TSM)  Video Shadow Removal (w/ TSM)

Takeaways
● Decomposing shadow removal into grayscale shadow removal and colorization improves over naive RGB shadow modeling.
● Temporal max pooling can share illumination information across frames and improve temporal consistency of shadow removal.

Examples of images with foreign shadows cast by external objects such as hands, paper, and pens.