

# Advanced Deep Learning for Graphics

Course Project: Applications of Face Image Parser

# Per frame operations for background

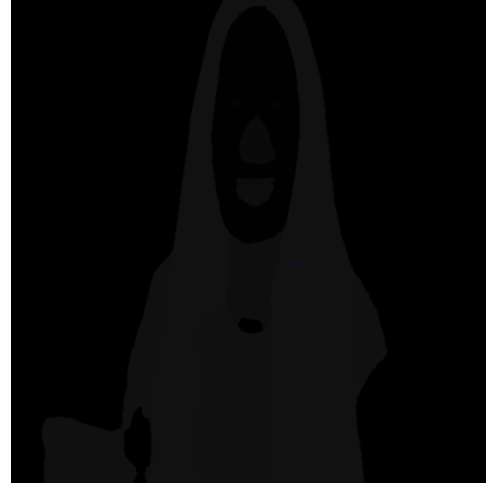
- Read input video
- For each video frame:
  1. Annotation mask = face\_parsing\_model(frame)
  2. Get masked foreground of the frame using annotation mask (bitwise and)
  3. Get masked background of the desired background using inverted annotation mask (bitwise and)
  4. Modified frame = masked foreground + masked background
  5. Write frame to the video writer

# Per Frame Operations



Video Frame

Bitwise and



Annotation Mask

=

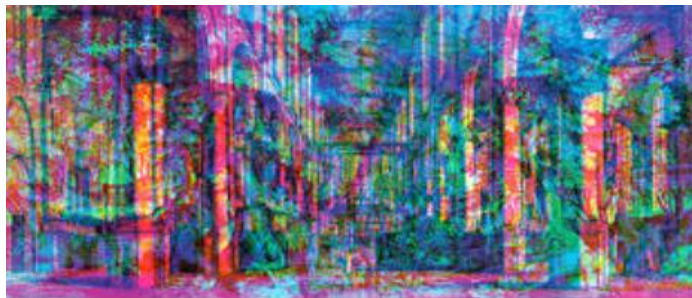


Masked Foreground

+

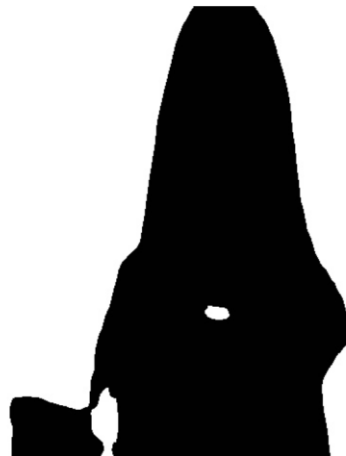


Modified Frame



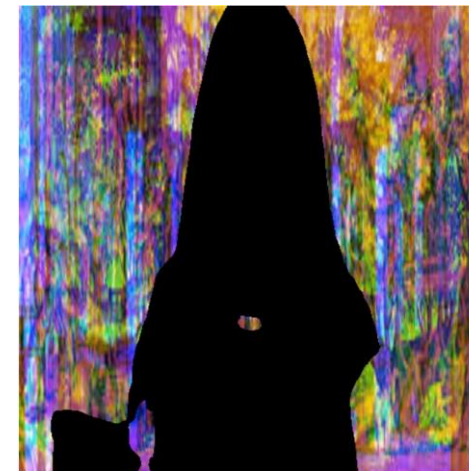
Desired new background

Bitwise and



Inverted Annotation Mask

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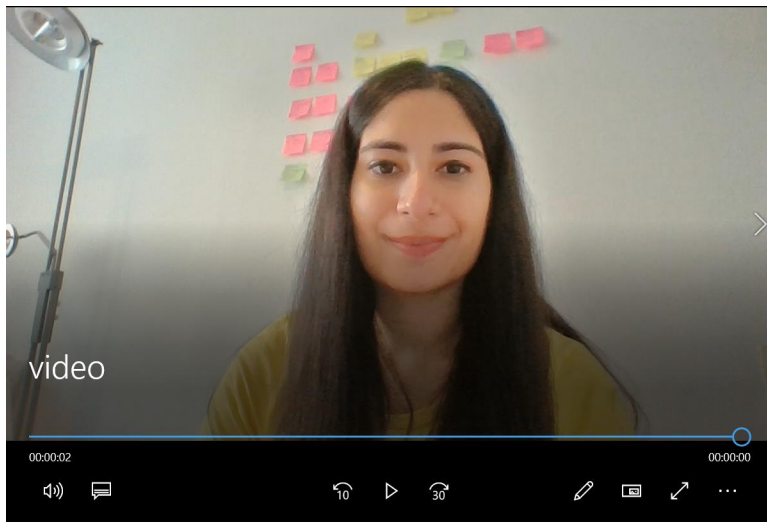
Masked Background

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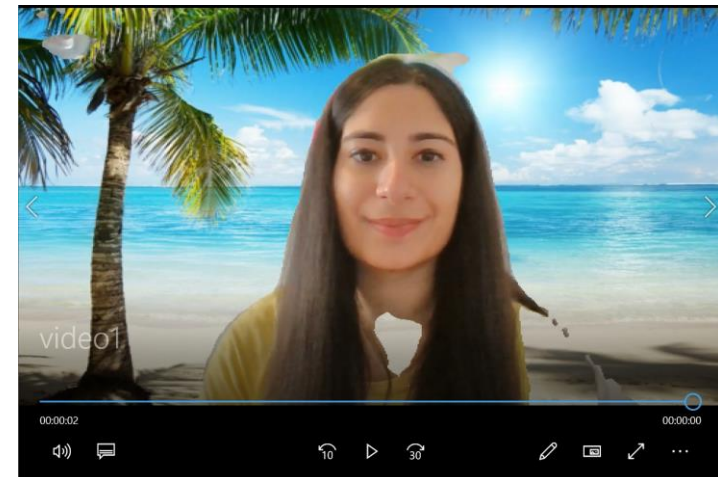
# Change Background



Background Image



Input video

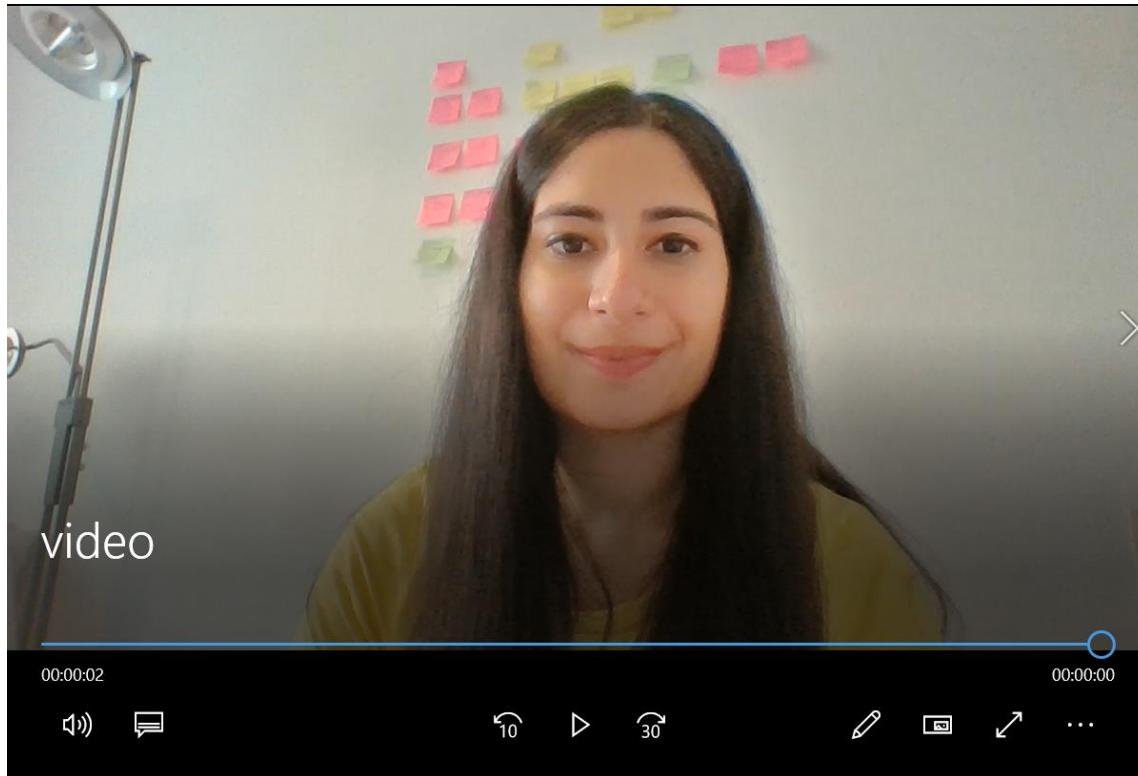


Output video with changed background

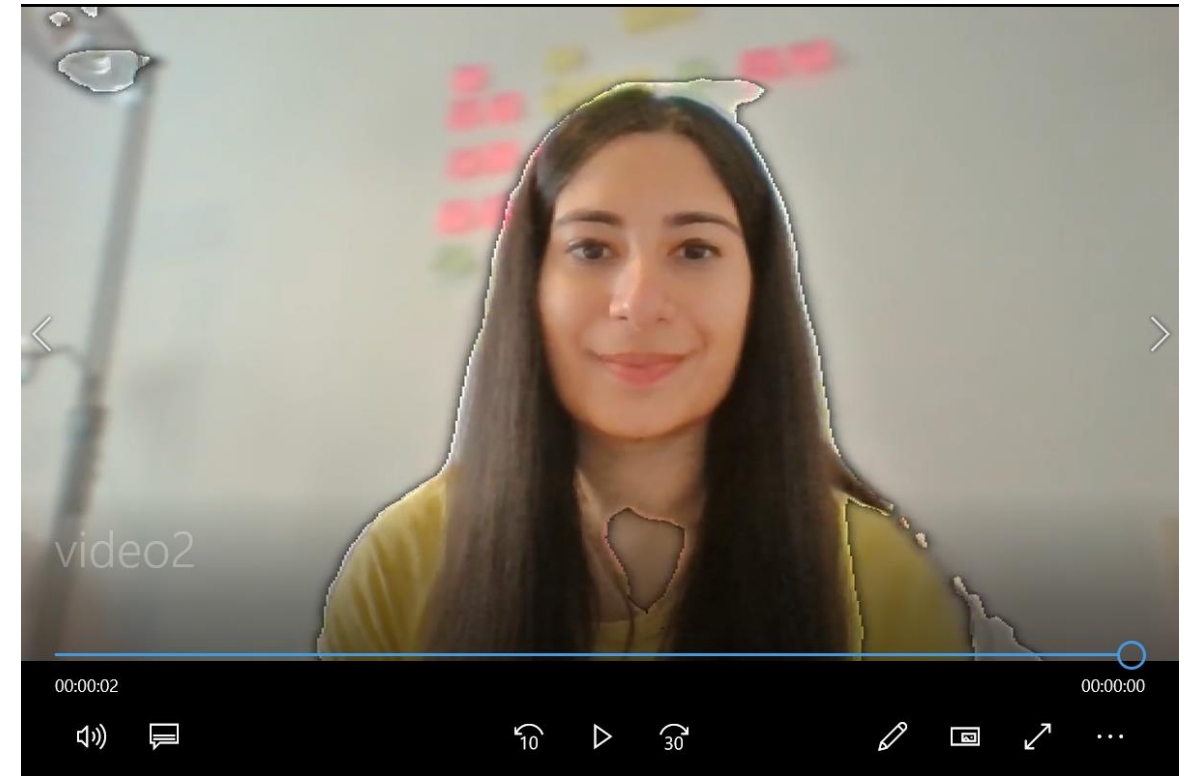
# Per frame operations for background blur

- Read input video
- For each video frame:
  1. Annotation mask = face\_parsing\_model(frame)
  2. Get masked foreground of the frame using annotation mask (bitwise and)
  3. Get (gaussian) blurred background of the modified frame where  
 $\text{modified\_frame} = \text{frame} * \text{inverted\_mask[:, :, np.newaxis]}$
  4. Modified frame = bitwise or of masked foreground , blurred background
  5. Write frame to the video writer

# Background Blur



Input video



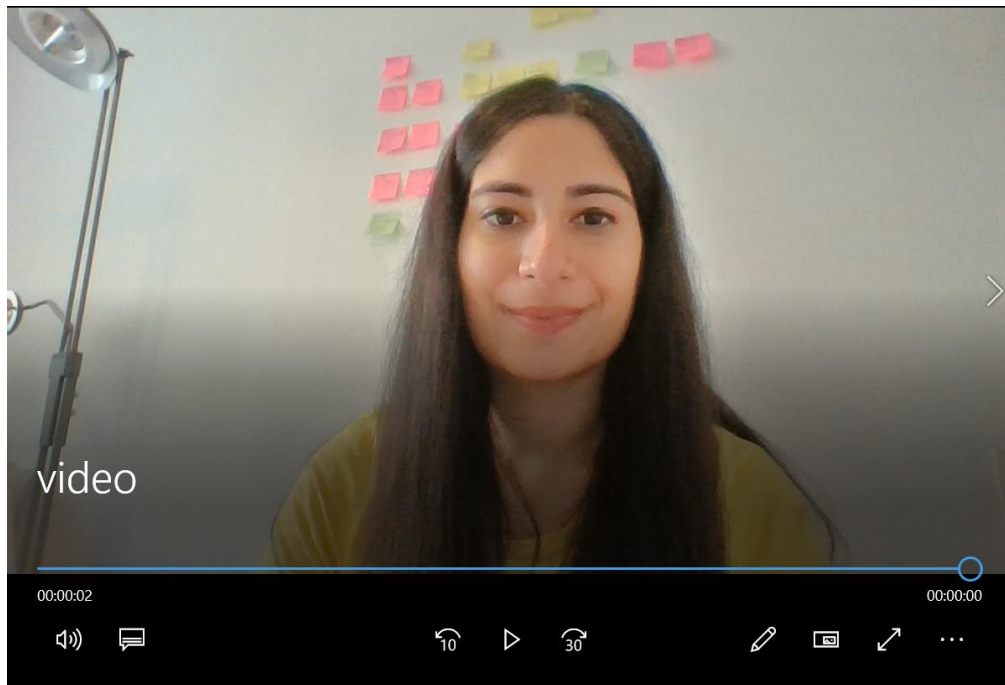
Output video with blurred background

# Per frame operations for makeup

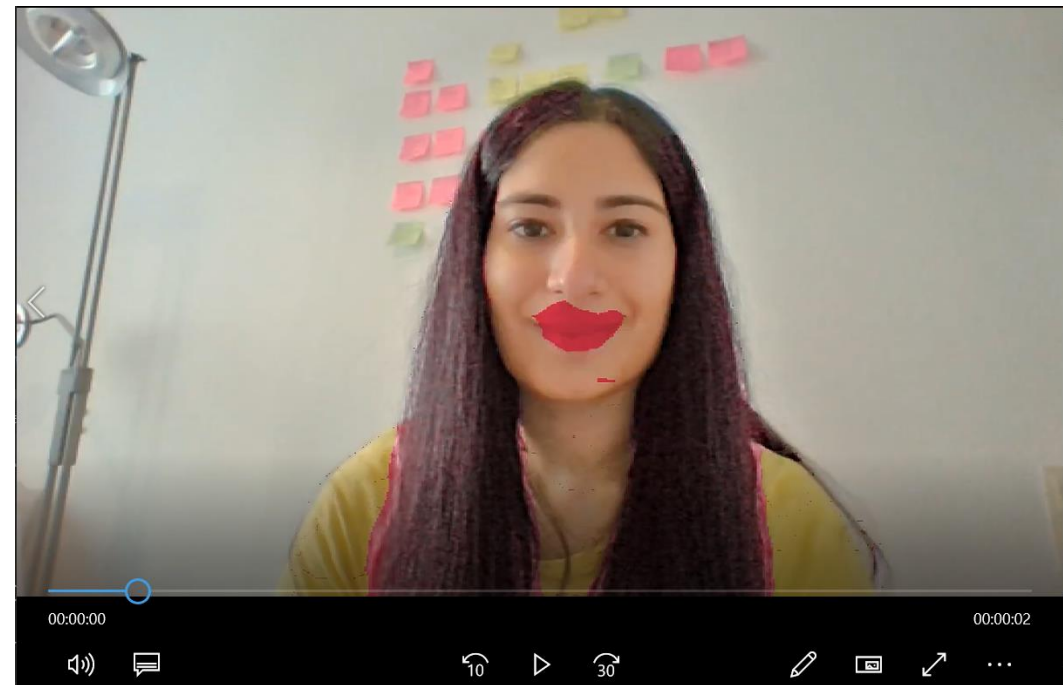
- Read input video
- For each video frame:
  1. Annotation mask = face\_parsing\_model(frame)
  2. Use makeup.py (to update the frame) for the part you want to apply makeup to
  3. Write the modified frame to the video writer



# Makeup



Input video



Output video with different hair, lower and upper lip color