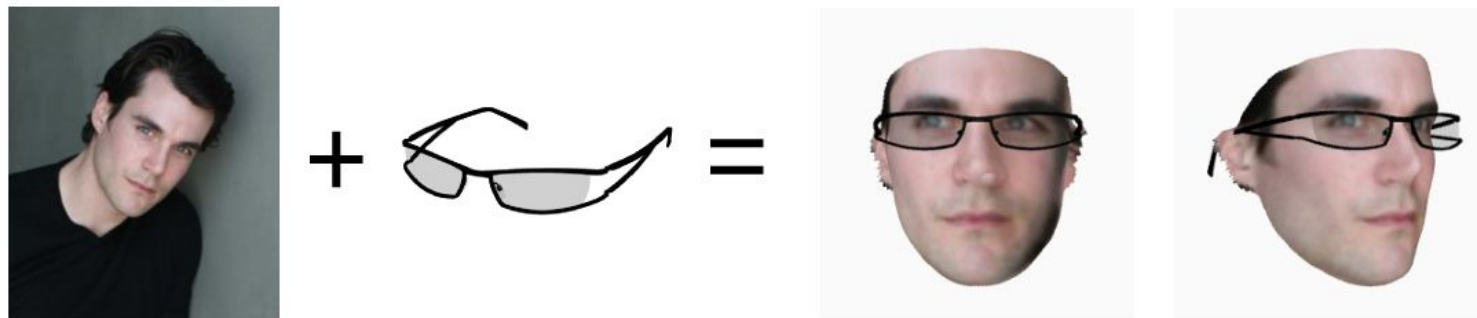


Faithful Fit, Markerless, 3D Eyeglasses Virtual Try-On

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2nd Workshop on Deep Understanding Shopper Behaviours and
Interactions in Intelligent Retail Environments
Milan - Italy - Jan 11th 2021





Virtual try-on allows people to check the appearance of accessories, makeup, hairstyle, hair color, clothes, and more on themselves.

We propose an eyewear virtual try-on experience

- performed on a 3D face reconstructed from a single input image
- takes into account real face and glasses sizes to provide a realistic fit estimation
- fully automated, only requires a face picture and the selection of eyeglasses

Virtual Try-On solutions

<i>Applications</i>	<i>Input</i>	<i>Output</i>	<i>3D Glasses</i>	<i>Size fitting</i>	<i>Markerless</i>
Ditto ^[1]	video	images	✓	✓	—
Glassify ^[2]	image	image	—	—	✓
YouCam ^[3]	image	image	—	—	✓
Jeeliz ^[4]	video / image	video / image	✓	—	✓
Virtual Mirror ^[5]	video	video	✓	—	✓
Ours	image	3D	✓	✓	✓

[1] DITTO Technologies. <https://ditto.com>

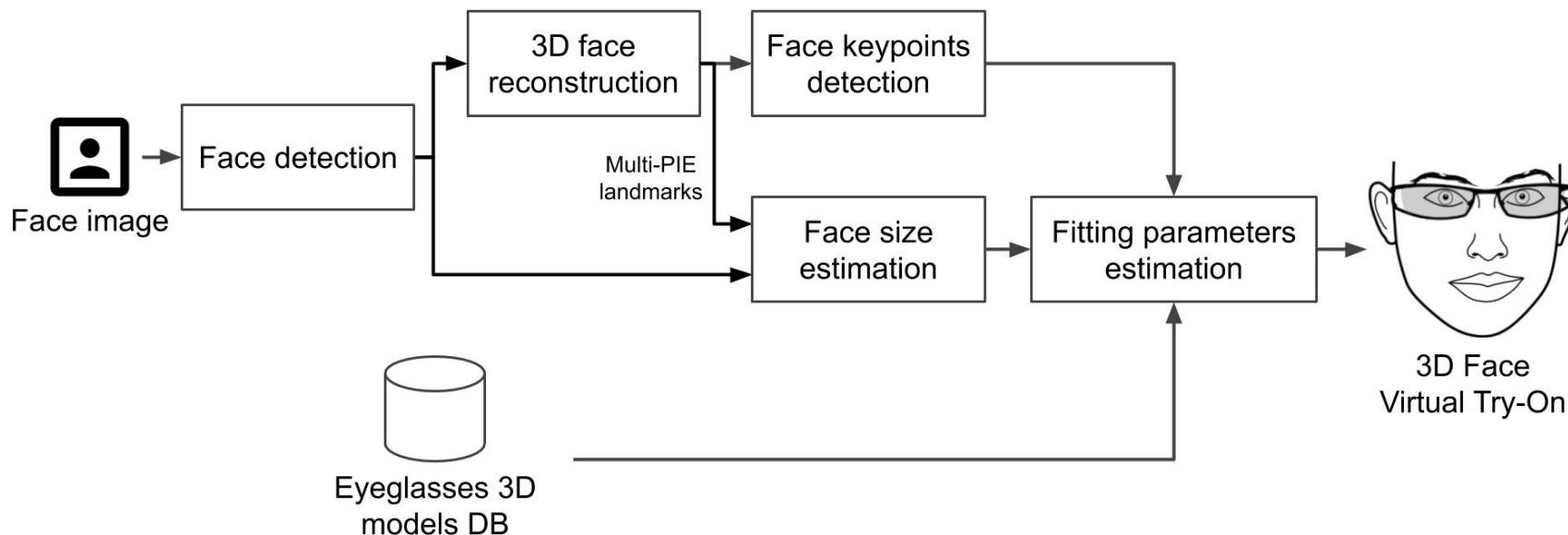
[2] XLabz Technologies: Glassify. <https://apps.apple.com/it/app/glassify-tryon-virtual-glass/id1166851088>

[3] Perfect Corp: Youcam makeup. <https://www.perfectcorp.com/app/ymk>

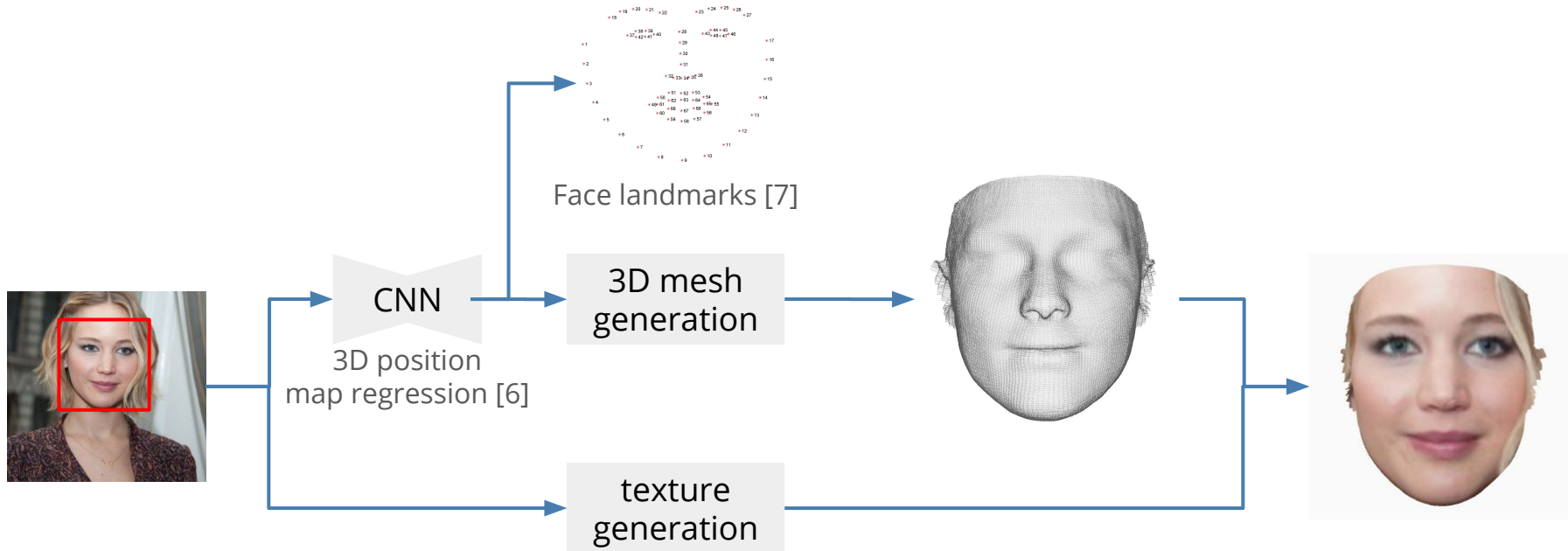
[4] Jeeliz: Jeeliz virtual try-on. <https://github.com/jeeliz/jeelizGlassesVTOWidget>

[5] Luxottica Group: Virtual mirror. <http://www.luxottica.com/en/virtual-mirror-technology-arrives-valentinocom>

Virtual Try-On method overview



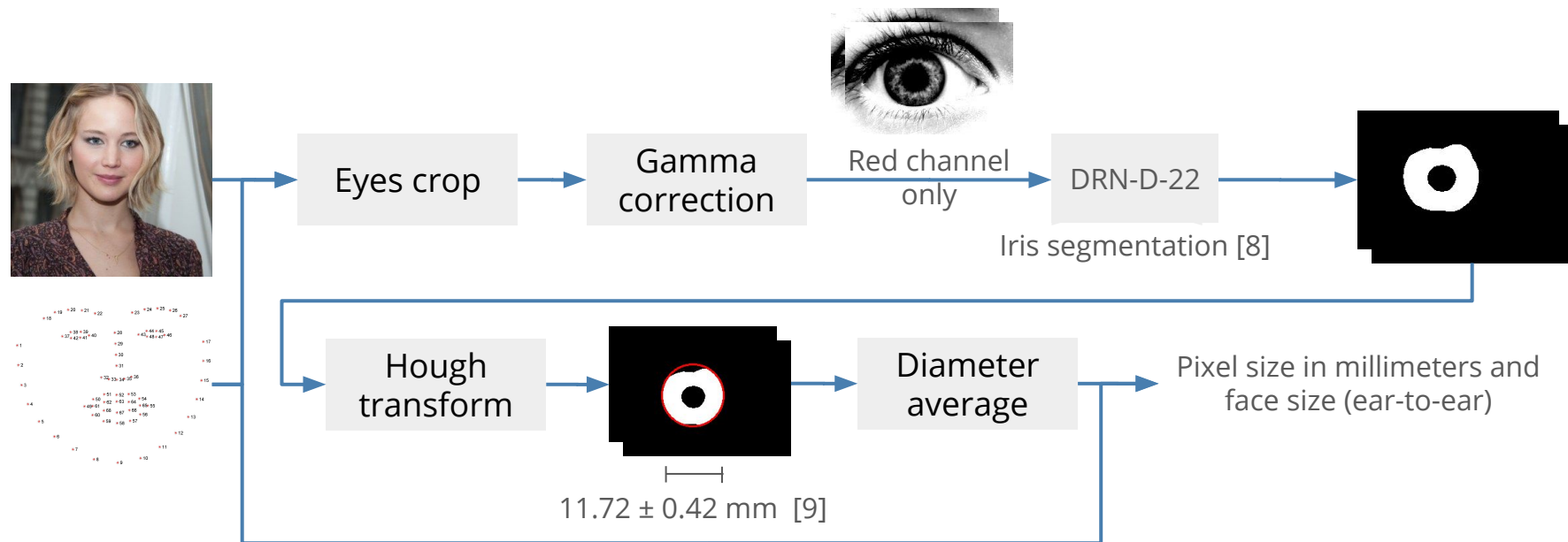
3D Face reconstruction



[6] Feng, Y., Wu, F., Shao, X., Wang, Y., Zhou, X.: Joint 3d face reconstruction and dense alignment with position map regression network. ECCV (2018)

[7] Gross, R., Matthews, I., Cohn, J., Kanade, T., Baker, S.: Multi-pie. Image and Vision Computing 28(5), 807 – 813 (2010)

Face size estimation

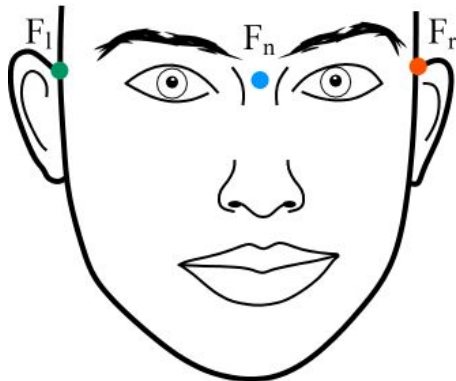


[8] Yu, F., Koltun, V., Funkhouser, T.: Dilated residual networks. In: Proceedings of the IEEE conference on computer vision and pattern recognition. pp. 472–480 (2017)

[9] Rüfer, F., Schröder, A., Erb, C.: White-to-white corneal diameter: normal values in healthy humans obtained with the orbscan ii topography system. Cornea 24 (3), 259–261 (2005)

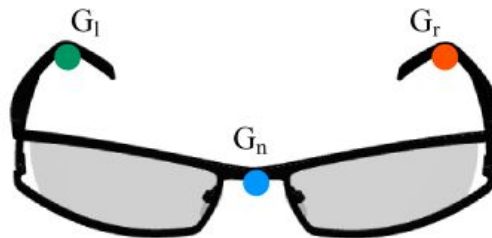
Glasses Virtual Try-On

Parameters



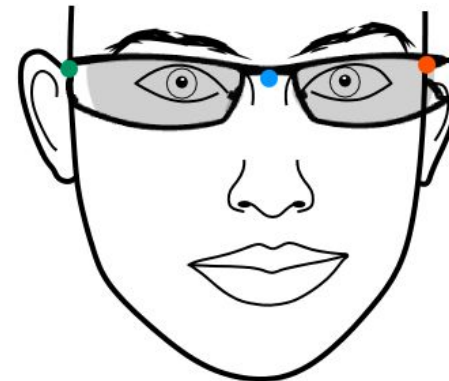
Face keypoints

dynamically detected
on the reconstructed
face mesh



Glasses keypoints

manually defined and
stored in a database
for each glasses frame
model

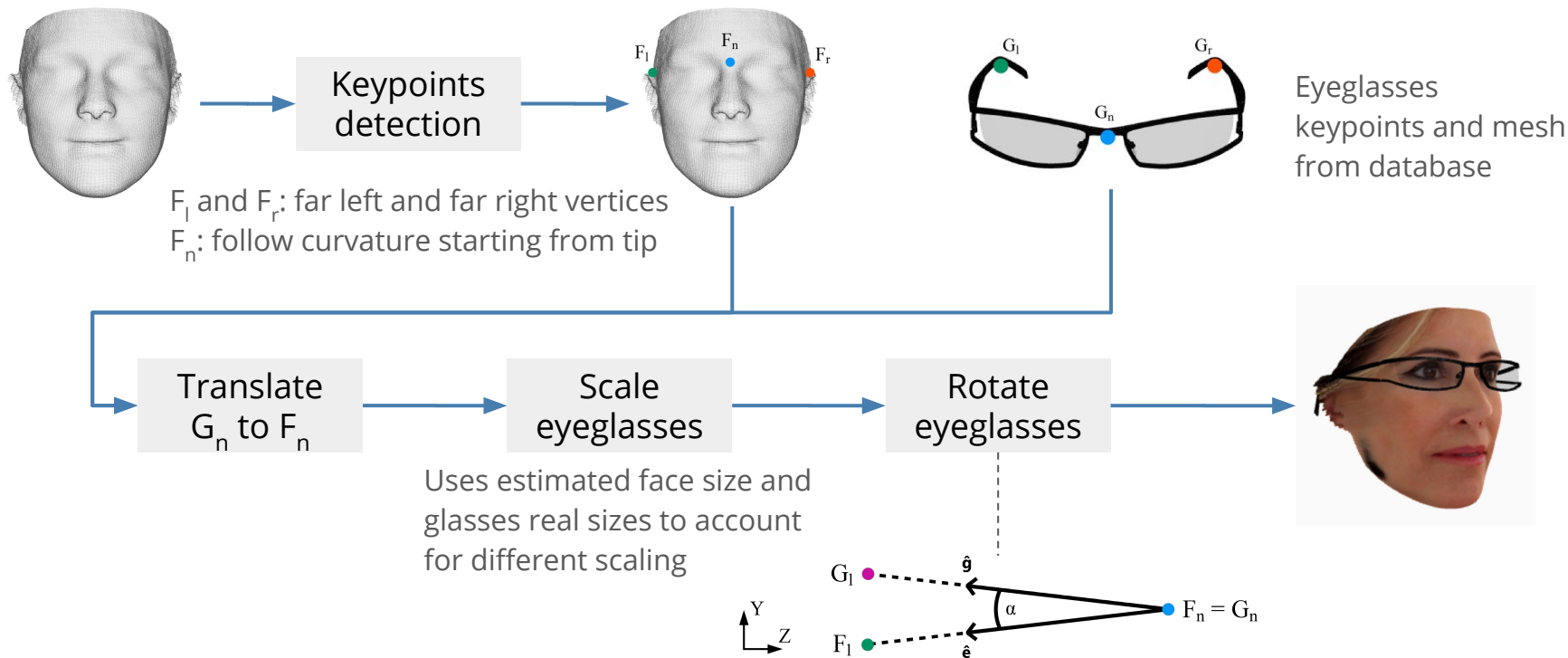


Ideal fitting

in the ideal case the
glasses are matching
the keypoint pairs

Glasses Virtual Try-On

Fitting procedure (1/3)



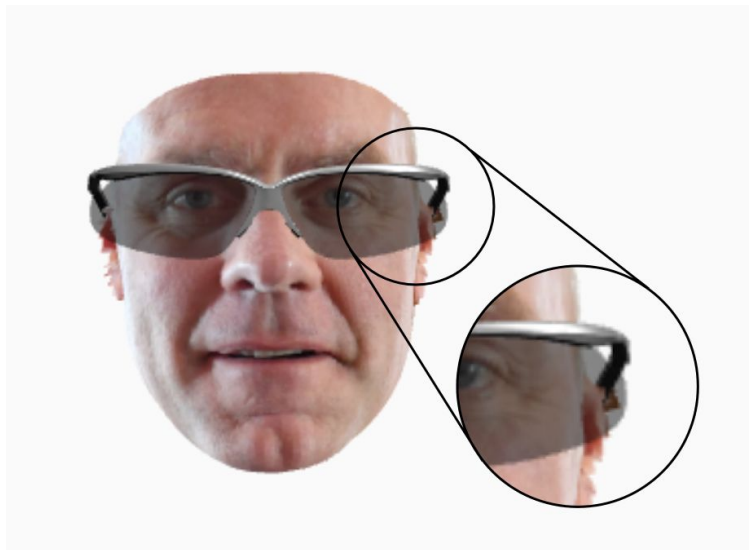
Glasses Virtual Try-On

Fitting procedure (2/3)

Best fit

Keypoints (on face and eyeglasses) are used to align and scale the glasses into position.

No real sizes are taken into account, the result is an ideal best fit of the glasses on the face.



Glasses Virtual Try-On

Fitting procedure (3/3)

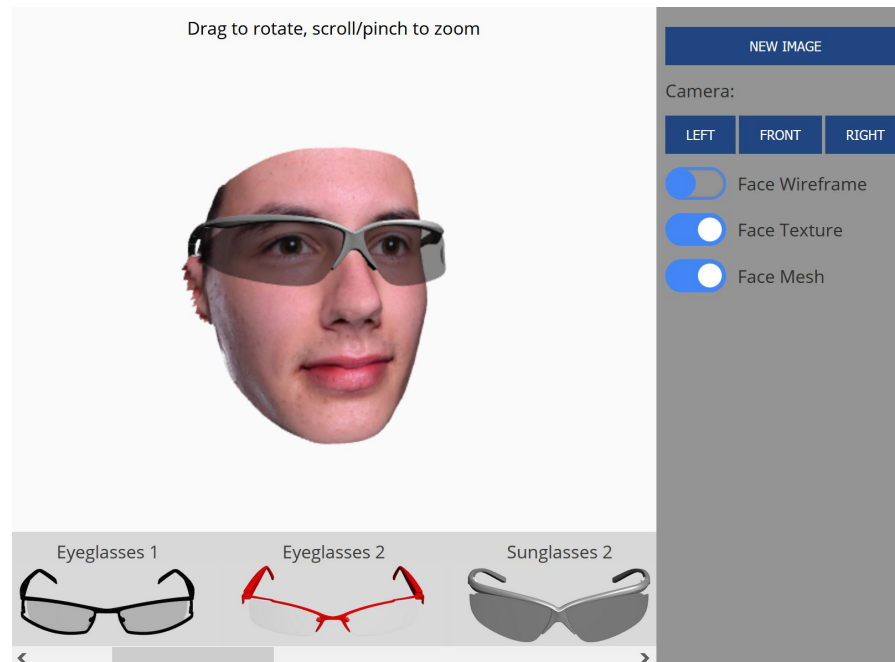
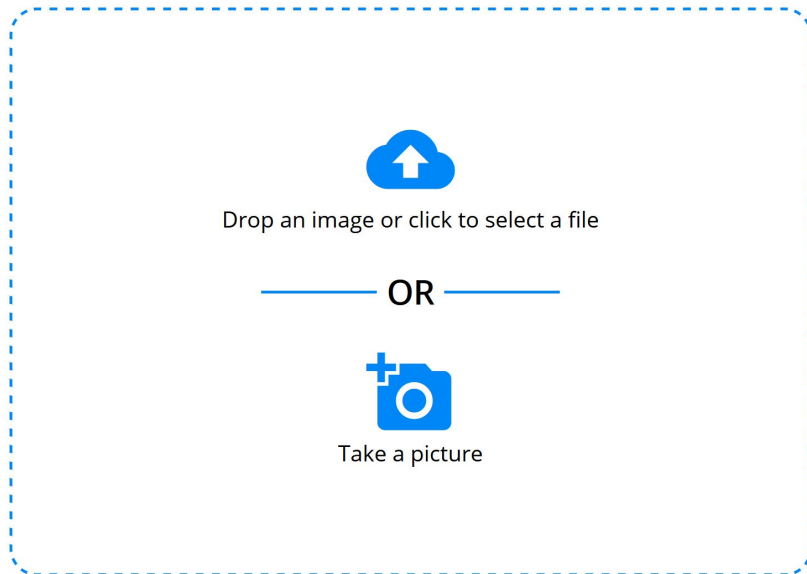
Faithful fit

Keypoints (on face and eyeglasses) are used to properly align the glasses. Scale factor is computed using face size estimation.

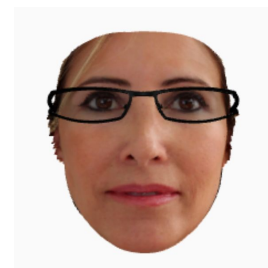
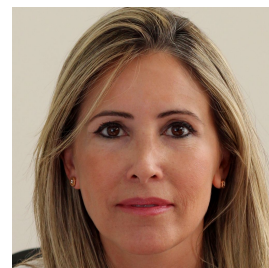
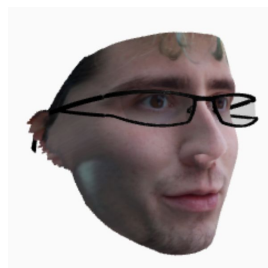
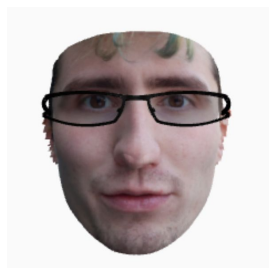
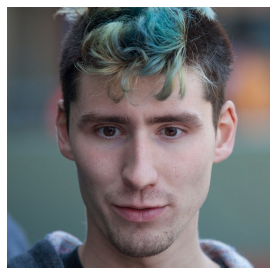
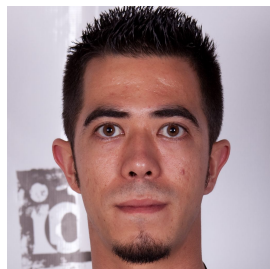
Real glasses sizes and estimated face size are taken into account, the result is a faithful estimated fit of the glasses on the face.



User interface



Examples



We presented a web application for 3D eyeglasses virtual try-on that considers real measures to provide a realistic try-on experience. The try-on process only requires a single picture portraying the user's face to perform size estimation using the iris diameter.

Future work:

- Provide better 3D face reconstructions
- Enhance iris detection
- Detect occlusions and ask for new face image
- Virtual try-on evaluation and usability study
- Provide the try-on experience through a mobile application

Thank you!



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