

Manual annotations on 100 scans from the FRGC database

Technical Report

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Abstract: Here we provide details about the composition of the dataset, some minor corrections to the previously available ground truth and the new annotations that are made available for the dataset.

1 Composition of the subset

The subset to which this document refers is composed by 100 scans from the Face Recognition Grand Challenge (FRGC) database (Phillips et al., 2005). These scans correspond to the first 100 scans with manual annotations publicly available from (Szeptycki et al., 2009) once a few scans with gross mistakes in the annotations were removed. The resulting scans are listed in Table 1.

2 Previous public annotations

Public annotations for the FRGC database were firstly made available by (Szeptycki et al., 2009) for (almost) all scans in the database. Later on (Creusot et al., 2011) made corrections to these annotations, which resulted in a new set of landmarks¹. We have found that the latter set provides considerably more accurate locations for the nose corners.

By visual inspection of the annotations from Creusot et al. we identified two scans where the outer corner of the left eye was clearly off-target and needed correction. This is illustrated in Fig. 1 and 2. Specifically, the following corrections were made (values in mm):

- Scan 14: 04202d350, outer corner of left eye

Old position : {15.01, 30.25, -1578.99}

New position : {33.28, 25.40, -1594.42}

¹Available at <http://www-users.cs.york.ac.uk/~creusot/>

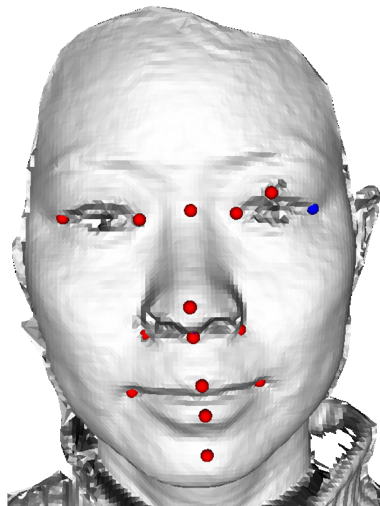


Figure 1: Manual annotations available from Creusot et al. for scan 04202d350 (red dots) and the corrected position for the outer corner of the left eye (blue).

- Scan 37: 04212d352, outer corner of left eye

Old position : {19.87, 23.38, -1547.18}

New position : {42.80, 14.28, -1562.29}

3 New public annotations

We produced new manual annotations for the 100 scans detailed in Table 1 that are made publicly available at <http://fsukno.atSPACE.eu/Data.htm> - If using these annotations please cite (Sukno et al., 2013),

Table 1: Scans composing the 100-element subset

1: 02463d452	2: 02463d454	3: 02463d456	4: 02463d458	5: 02463d460
6: 02463d462	7: 02463d464	8: 04201d302	9: 04201d304	10: 04201d306
11: 04202d344	12: 04202d346	13: 04202d348	14: 04202d350	15: 04202d352
16: 04202d354	17: 04202d356	18: 04202d358	19: 04203d340	20: 04203d342
21: 04203d344	22: 04203d346	23: 04203d348	24: 04203d350	25: 04203d352
26: 04203d354	27: 04211d337	28: 04211d339	29: 04211d341	30: 04211d343
31: 04211d345	32: 04211d347	33: 04211d349	34: 04212d346	35: 04212d348
36: 04212d350	37: 04212d352	38: 04212d354	39: 04212d356	40: 04213d241
41: 04213d243	42: 04217d331	43: 04217d333	44: 04217d335	45: 04217d337
46: 04219d341	47: 04219d343	48: 04219d345	49: 04219d347	50: 04221d343
51: 04221d345	52: 04221d347	53: 04221d349	54: 04222d345	55: 04222d347
56: 04222d349	57: 04222d355	58: 04222d357	59: 04222d359	60: 04225d209
61: 04225d211	62: 04226d329	63: 04226d331	64: 04226d333	65: 04226d335
66: 04226d337	67: 04228d333	68: 04228d335	69: 04228d337	70: 04228d339
71: 04228d341	72: 04229d350	73: 04229d352	74: 04229d354	75: 04229d356
76: 04229d358	77: 04229d360	78: 04233d308	79: 04233d310	80: 04233d312
81: 04233d314	82: 04233d316	83: 04233d318	84: 04233d320	85: 04239d302
86: 04239d304	87: 04239d306	88: 04239d308	89: 04239d310	90: 04243d330
91: 04243d332	92: 04243d334	93: 04243d336	94: 04243d338	95: 04243d340
96: 04243d342	97: 04243d344	98: 04252d169	99: 04252d171	100: 04252d173

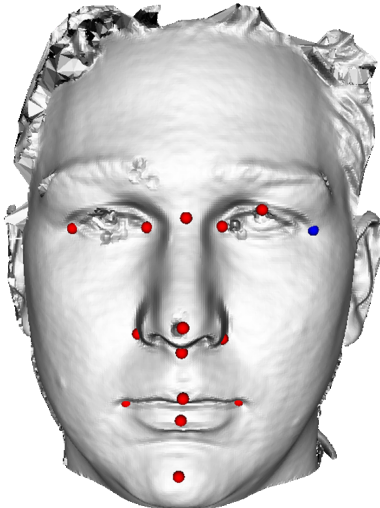


Figure 2: Manual annotations available from Creusot et al. for scan 04212d352 (red dots) and the corrected position for the outer corner of the left eye (blue).

where we also analyze the consistency of the new annotations in relation to previously available ones.

Two aspects to highlight from these annotations are:

- Landmark positions were determined without the aid of previous annotations (i.e. they were not derived as corrections from a previous set) and therefore they are completely independent from annotations made available by Szeptycki et al. and Creusot et al.

- Annotation was performed in 3D² using only geometric features. This contrasts with previously widespread practice of using 2D images to guide the annotation of facial scans without actual 3D information.

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REFERENCES

- Creusot, C., Pears, N., and Austin, J. (2011). Automatic keypoint detection on 3D faces using a dictionary of local shapes. In *Proc. 1st Joint Conf. on 3D Imaging, Modeling, Processing, Visualization, and Transmission, Hangzhou, China*, pages 204–211.
- Phillips, P., Flynn, P., Scruggs, T., Bowyer, K., Chang, J., Hoffman, K., Marques, J., Min, J., and Worek, W. (2005). Overview of the face recognition

²We used Landmark v3.0, a free tool that is available at <http://institute-for-data-analysis-and-visualiz.software.informer.com/>

- grand challenge. In *Proc. IEEE Int. Conf. on Computer Vision and Pattern Recognition, San Diego, CA, USA*, volume 1, pages 947–954.
- Sukno, F., Waddington, J., and Whelan, P. (2013). Compensating inaccurate annotations to train 3D facial landmark localization models. In *Workshop on 3D Face Biometrics*, Shanghai, China.
- Szeptycki, P., Ardabilian, M., and Chen, L. (2009). A coarse-to-fine curvature analysis-based rotation invariant 3D face landmarking. In *Proc. 3rd IEEE Int. Conf. on Biometrics: Theory, Applications and Systems, Washington DC, USA*, pages 1–6.