Supplemental Document for
Distortion-Free Wide-Angle Portraits on Camera Phones

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(a) Applying lens correction warp (b) Combing our method and (a)

(c) Rectangular crop of (a) (d) Rectangular crop of (b)

Fig. 1. We correct lens distortion (a) before applying our method to the input. When the mesh optimization finishes, we combine our method and lens correction into a single warp (b) for speed optimization. After rectangular crop, the perspective projection (c) and our result (d) may have slightly different FOVs.

Fig. 2. Our interface for user study on Amazon Mechanical Turk. The left-right orders are randomized. In this case, Option A (left) is the result of our method, and option B (right) is the perspective projection.

Compared to input (perspective projection).

<table>
<thead>
<tr>
<th>Percentage (%)</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>0</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cumulative percentage</td>
<td>25.0</td>
<td>64.2</td>
<td>92.4</td>
<td>99.1</td>
<td>100</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>

Table 1. Distribution of votes favoring our method from user study on 1047 results.

2 ACCOMPANYING WEB PAGES (SECTION 5)

We generate massive results with an accompanying web page under the directory of this document: webpage/index.html for browsing. We show inputs collected by us and downloaded from Flickr, the results of our method, and comparisons with other parametric projections. The data set contains 167 inputs with various facial contents, expressions, and under arbitrary lighting conditions.

3 USER STUDY (SECTION 5.3)

We show the interface for our user study on Amazon Mechanical Turk in Fig. 2. In the title of each assignment, we ask testers to select the image that looks more natural with less distortion between the perspective projection and the result of our method. Testers are given unlimited time to finish the task. For each assignment, we ask the opinions from 5 different testers unaffiliated with us. Our study consists of 1047 testing image pairs and therefore 5235 questions in total. On average, each question takes 9.5 seconds for a tester to finish. Assuming that each worker ID corresponds to a unique person, our study is completed by 117 individual persons. Table 1 shows the distribution of the user study results. By majority voting, 92.4% of our results are classified as more natural. We conduct the
comparisons to other methods using the same approach on the 167 inputs mentioned in Sec. 2, and report the results in Table 2. When compared to the stereographic projection, Mercator projection, and Pannini projection [Sharpless et al. 2010], the percentages favoring our method are 84.4%, 80.8%, and 85.0%.

**REFERENCES**