Learning to see through multimode fibers: supplementary material

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This document provides supplementary information to "Learning to see through multimode fibers," https://doi.org/10.1364/OPTICA.5.000960. Included are supplementary figures with measurements for each fiber length (2cm, 10cm, 10m and 1km) used in the work presented in the main article.

1. SLM INPUT RECONSTRUCTION USING THE U-NET CNN

Figure S1. Examples and accuracies of the reconstructed SLM input images from the recorded distal speckle intensity patterns.

Fig. S1 is the full version of Fig. 4 presented in the main manuscript. In this figure, we present examples of the reconstructed SLM input obtained by the U-net CNN trained on the recorded distal speckle intensities patterns. In addition, results for the 2cm fiber and the case of phase modulated inputs are also shown. It is clear that the classification accuracy does not experience any deterioration for fibers up to 10m in length, thus proving that the use of DNNs can lead to new methods for image transmission through MMFs.

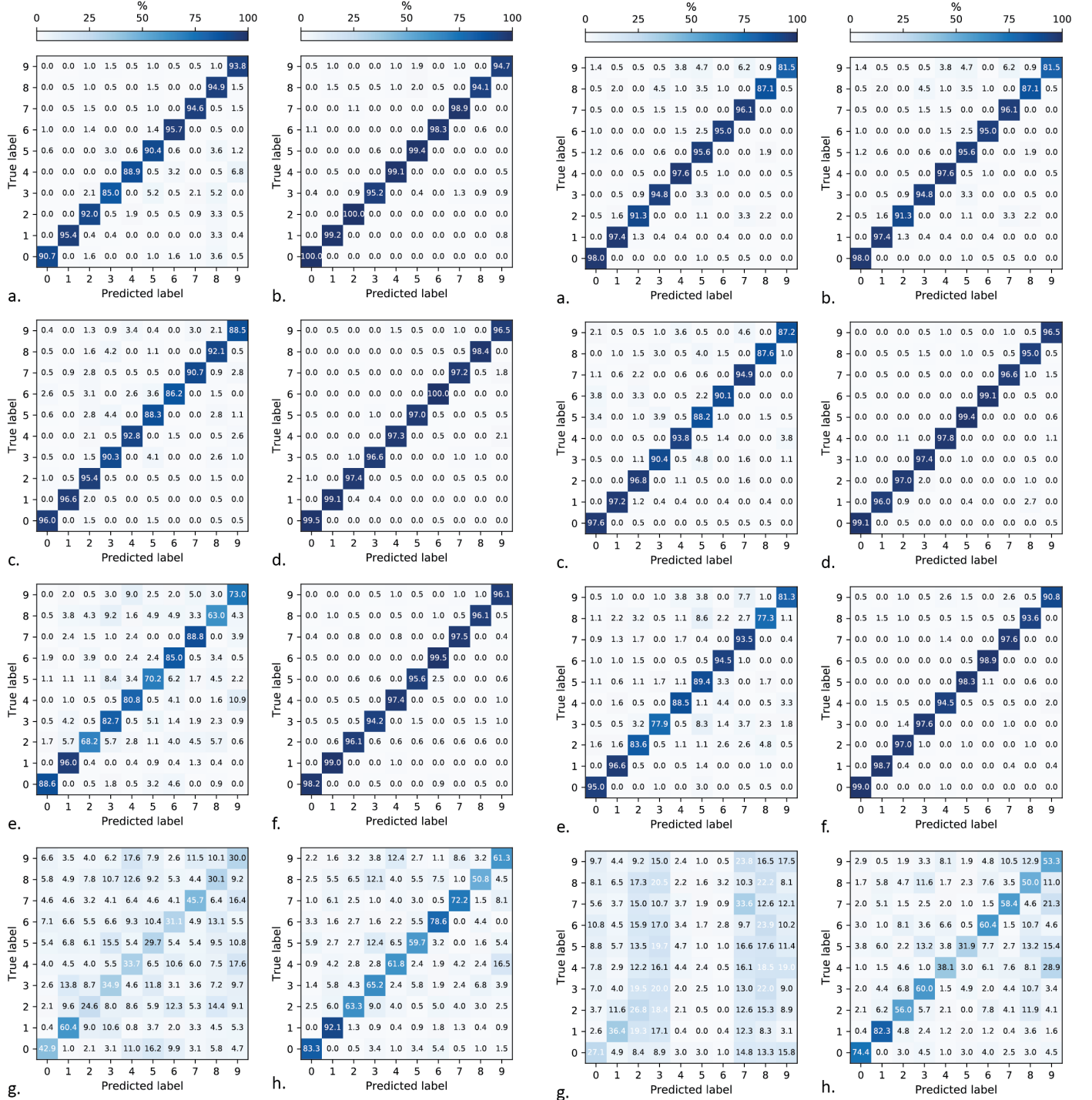## 2. DATA CLASSIFICATION USING THE VGG CNN

Figure S2. Normalized confusion matrices for classification with amplitude modulated proximal inputs for a) 2cm fiber speckle patterns, b) 2cm reconstructed SLM inputs, c) 10cm fiber speckle patterns, d) 10cm reconstructed SLM inputs, e) 10m fiber speckle patterns, f) 10m reconstructed SLM inputs, g) 1km fiber speckle patterns, and h) 1km reconstructed SLM inputs.

Figure S3. Normalized confusion matrices for classification with phase modulated proximal inputs for a) 2cm fiber speckle patterns, b) 2cm reconstructed SLM inputs, c) 10cm fiber speckle patterns, d) 10cm reconstructed SLM inputs, e) 10m fiber speckle patterns, f) 10m reconstructed SLM inputs, g) 1km fiber speckle patterns, and h) 1km reconstructed SLM inputs.