

# Face Search at Scale

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Despite significant progress in machine face recognition, accurate search of a large collection of unconstrained face images remains a difficult problem. We present a large scale face search system which combines a fast filtering module with a COTS face matcher, in a cascaded framework. Given a query (probe) face, we filter the large gallery of photos to find the top-k most similar faces using features learned by a convolutional neural network (CNN). The k retrieved candidates are then re-ranked by combining similarities based on deep features and those output by the COTS matcher. Our face search system has been evaluated on a large face database (gallery) of web-downloaded face images and offers an excellent trade-off between accuracy and scalability on galleries with millions of images. Additionally, in a face search involving photos of the Tsarnaev brothers, convicted of the 2013 Boston Marathon bombing, our face search system could find the younger brother's (Dzhokhar Tsarnaev) photo at rank 1 in 1 sec. on a 5M gallery and at rank 8 in 7 sec. on an 80M gallery.