ChatGPT

Datasets of Fiber Optic Connector End-Face Images

Academic and Research Image Datasets

MDPI "ms-fiber" Dataset (2018): A research team in Wuhan created a collection of microscope images of fiber connector end-faces for defect detection, since **no public dataset previously existed** [1]. Their **"ms-fiber" dataset** contains **116 microscope images** of connector endfaces: **40 clean (defect-free) samples**, **60 with contamination ("region-based" defects like dirt/oil)**, and **16 with scratch defects** [2]. This dataset was used to evaluate automated inspection algorithms. It is openly referenced in their paper (Sensors 2018) and provided via a pan.baidu download link [2]. Researchers can download these images (though the link is on a Chinese server) for training convolutional models. The set focuses on **single-fiber connectors** (standard 2.5mm or 1.25mm ferrules) imaged under an inspection scope, with clear examples of *pristine vs. dirty/scratched end-faces*. This offers a starting point for machine learning, albeit with a modest dataset size.

"New Fiber Model" Defect Image Set (2024): A more recent dataset of **~1,998 fiber end-face images** has emerged from a Chinese deep-learning study. This **open image set** (dubbed *"New Fiber Model"*) was compiled to train YOLOv8 models for fiber connector defect detection [3]. The images cover **many types of defects** – e.g. dust, oil residue, scratches, chips, and even fiber breaks or bubbles – on connector endfaces, with **both clean and contaminated examples**. All images are labeled under one broad "defect" class (for object detection purposes) [3] [4]. The dataset provides a diverse range of contamination scenarios and connector types to improve model robustness. It is described in a 2024 blog/code release and was made available along with the project's training tutorials [5]. While detailed access info is in Chinese, this represents a large, public image repository specifically for fiber connector endfaces. It includes *microscopic inspection photos of various connector styles* (likely SC/LC ferrules, possibly some multi-fiber) in both pristine and defective states. Such a sizable dataset can greatly aid CNN training for defect recognition.

Consortium and Institutional Data (iNEMI): The International Electronics Manufacturing Initiative (iNEMI) conducted an end-face inspection project that gathered hundreds of connector images. In one study, **over 270 end-face microscope images** (various connector types) were collected and analyzed using automated software [6]. These included sequences where connectors were intentionally contaminated (e.g. with Arizona road dust) and then cleaned repeatedly, to study debris transfer and damage. For example, the project's report shows images of a **dirty SC connector transferring dirt** to a clean mating connector, and subsequent cleaning attempts [7]. It also includes wide-field views (whole ferrule) even for **multi-fiber MPO connectors** that were "very dirty" [8]. While the raw iNEMI image set isn't packaged for download, their published documentation (available online) contains numerous microscope photos of **LC/SC ferrules (single-fiber)** as well as **MPO ferrules (multi-fiber)**, in both **clean and contaminated conditions**. These images (and accompanying analysis data) are a valuable public resource [6], illustrating real-world contamination types – e.g. dust particles across the core/cladding, liquid residues, scratches, epoxy bleed, and chipped fiber – under IEC 61300-3-35 criteria. Researchers can extract these images from the iNEMI report or contact the consortium for access to the collection.

Industry Repositories and Training Image Collections

Cisco "Appendix B" Sample Images: Cisco's technical documentation provides a mini-library of fiber scope images showing clean and dirty connectors. In *Appendix B* of their fiber inspection and cleaning guide, they include **"Sample Images of Contamination Conditions."** For example, *Figure 14* shows a **clean single-mode connector end-face at 200×** magnification (a perfectly clean 125 µm ferrule with core) [9]. *Figure 15* shows a **clean multi-fiber (MT/MPO) connector** – multiple fiber cores visible – with only slight acceptable shadowing on the cladding [10]. Subsequent figures illustrate a variety of common contaminants: **dust particles on the ferrule** [11], **liquid blotches**, **dry hazy residue**, **finger oil residue**, and even **scratches across the fiber** [12]. Each image is paired with a description of the contamination or defect and whether it can be cleaned. This Cisco repository is freely accessible and covers **all major connector types** (single-fiber like SC/LC, and multi-fiber MPO) in both **pristine and dirty states**. The images can be downloaded from the Cisco site (as GIFs) for use in training ML models or as reference examples of end-face conditions [9] [11].

Fiber Optic Association (FOA) Reference Images: The FOA's online reference guide includes a rich collection of end-face inspection photos. They demonstrate scenarios such as how **dirt from an uncleaned connector transfers to a clean connector upon mating** (a series of microscope photos shows a dirty ferrule bottom contaminating a clean ferrule top, and the resulting scratches/damage) [7]. The FOA also provides wide-field inspection images – e.g. viewing the entire ferrule and connector body – which reveal hidden dirt in connector sleeves. One example is a **very dirty MPO connector** seen with a wide-field video microscope, showing debris across many fiber positions [8]. Additionally, FOA's site shows what a **"perfectly polished and clean" connector end-face** looks like for comparison. These images are publicly shown in FOA's educational articles and can be saved individually. They span **various connector styles (ST/SC/LC single fibers and MPO arrays)**, with examples of *fingerprint smudges, dust specs, transfer smears, scratches*, etc. This makes the FOA collection a useful open repository of mixed clean/contaminated end-face visuals from an industry training perspective.

Manufacturer Application Notes: Fiber optic test-equipment vendors often publish white papers or application notes with end-face images. For instance, Fluke Networks' guide on fiber inspection includes photos of **dirty vs. clean end-faces** (e.g. a fingerprint on a multimode core vs. a clean core) [13]. VIAVI Solutions' compliance whitepaper similarly shows **mostly clean vs. slightly contaminated connector images** analyzed under different standard criteria [14]. Senko's fiber hygiene presentation depicts a "clean connector + dirty connector = contaminated pair" with microscope snapshots of each [15]. While these are not bulk datasets, they are **open-access PDFs/blogs** that often contain *multiple microscope images* of connector end faces in various conditions. They usually cover **LC, SC, and MPO** connectors (since all require cleaning) and illustrate typical contaminants (dust, oils) and damage. These vendor-provided images (in PDFs from Fluke, VIAVI, Senko, etc.) can be extracted or downloaded, providing additional training material. Although not centrally organized, they complement the above datasets by showing real-world contaminated endfaces from different sources [15] [13].

Summary of Sources and Access

In summary, you can obtain fiber connector end-face images from several public sources: (1) **Academic datasets** like the MDPI "ms-fiber" set [2] and the 2024 Chinese defect image set [3], which offer downloadable image collections specifically for machine learning; (2) **Industry and standards repositories** such as Cisco's Appendix B sample images [9] [11] and FOA's online reference images [7] [8], covering a range of connector types (LC, SC, ST, MPO) with clean/dirty examples; and (3) **White papers or guides** from

fiber optic equipment vendors [15] [13], which include smaller image sets of inspected endfaces. All of these are publicly accessible and allow bulk saving of images. Using these combined resources, you should be able to assemble a comprehensive image dataset of fiber optic connector end faces – from pristine ferrules to heavily contaminated ones – encompassing **single-fiber connectors (like LC/SC/ST)** as well as **multi-fiber MPO connectors**, suitable for training your convolutional neural network on defect detection.

Sources: Public fiber inspection datasets and archives [1] [3] [9] [11] [7] [8] [6] [15] [13] (see linked references for download links and image examples).

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[1] [2] Automated Inspection of Defects in Optical Fiber Connector End Face Using Novel Morphology Approaches
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