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Data Article

MCIndoor20000: A fully-labeled image dataset to advance indoor objects detection

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ABSTRACT

A fully-labeled image dataset provides a unique resource for reproducible research inquiries and data analyses in several computational fields, such as computer vision, machine learning and deep learning machine intelligence. With the present contribution, a large-scale fully-labeled image dataset is provided, and made publicly and freely available to the research community. The current dataset entitled *MCIndoor20000* includes more than 20,000 digital images from three different indoor object categories, including doors, stairs, and hospital signs. To make a comprehensive dataset addressing current challenges that exist in indoor objects modeling, we cover a multiple set of variations in images, such as rotation, intra-class variation plus various noise models. The current dataset is freely and publicly available at https://github.com/bircatmcri/MCIndoor20000.

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Specifications table

Subject area	Machine learning, computer vision, deep learning, machine intelligence.
More specific subject area	Object classification, object detection, object recognition.
Type of data	2D-RGB digital images (.JPEG, .PNG).
How data was acquired	Original images were collected in Marshfield Clinic by capturing photos from remarkable landmark objects, including clinic signs, doors and stairs. Images are manually cropped to eliminate the effect of surrounding objects in the learning process. To cover multiple variations in the objects model, we systematically rotated and augmented diverse noises to the original images.
Data format	Digital images, in raw and processed formats.
Data source location	Marshfield Clinic, Marshfield, Wisconsin, USA.
Data accessibility	The dataset is accessible at [1], and it is freely and publicly available for any academic, educational, and research purposes.

Value of the data

- Machine intelligence and particularly computational vision have become ubiquitous in our daily life, with a variety of applications ranging from face recognition and fingerspelling to surveillance systems and healthcare informatics. Core to many of these applications is image classification and recognition which is defined as an automatic task that assigns a label from a fixed set of categories to an input image. The MCIndoor20000 dataset is a resource for use by the computer vision and deep learning community, and it advances image classification research.
- The MCIndoor20000 dataset, collected in Marshfield Clinic, Marshfield, presents various digital images of three guideline indoor objects, including clinic signs, doors and stairs.
- To provide a comprehensive image classification repository, the current dataset covers several object model variations involved from the perspectives of computer vision and deep learning strategies. The variations include viewpoint variation, intra-class variation, rotation, noisy conditions (e.g., Gaussian, Poisson), and occlusion.
- The present dataset assists reproducible research and allows rapid application development (RAD) and fast prototyping by the research community.

1. Data

The MCIndoor20000 is a fully-labeled image dataset that was launched in Marshfield Clinic to facilitate broad use of image classification and recognition. Examples of such valuable annotated image datasets include OpenImages [2], CIFAR-10 and CIFAR-100 [3,4], ImageNet [5] as well as environmental scene database [6]. The uniqueness of the MCIndoor20000 is that the dataset consists of three different image categories, including: (1) Door, (2) Sign, and (3) Stair, all of which are remarkable landmarks for indoor navigation. The number of original images is 754, 702 and 599 across these categories, respectively. Fig. 1 presents different examples from each category. One potential application of the present dataset lies in the development of combined machine learning and computer vision algorithms to help people with visual impairment during mobility, especially in unfamiliar environments, such as hospitals and urgent cares [7].

The dataset's original images were captured in Marshfield Clinic in summer 2017, with a variety of viewpoint and intra-class variations along with occlusion across each class. We then systematically added Gaussian, Poisson, and Salt-Pepper noises to the original images, rotating all images to make a comprehensive dataset. Fig. 2 shows an example of all the variations that exist in the dataset. With