

# Digital Ophthalmology

## Highlights

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- Artificial intelligence (AI) algorithms exploit the complex spatial, temporal, and other relationships in digital data derived from the eye.
- In ophthalmology, the ubiquitous use of images and well-established prognostic standards provide many opportunities to employ AI in clinical care and research.
- AI in ophthalmology is more than just machine learning algorithms: its goals, design, development, and implementation need to be carefully considered.

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## Glossary

**Artificial intelligence (AI)** Systems that perform tasks mimicking human cognitive capabilities through the use of machine learning or other optimization techniques.

**Artificial intelligence bias** AI that performs differently for some groups (eg, different races and ethnicities) than others, as a result of concept, design, development, or implementation.

**Coherence** A measure of similarity, such as neighboring pixels in an image of the retina having similar color.

**Machine learning algorithm** An algorithm whose parameters are adjusted in a stepwise fashion during training to increase accuracy or another metric.

**Deep learning algorithm** A specific type of machine learning with a large number of parameters, typically millions.

**Training set** A set of images or other data, in which each image contains its “truth.”

**Truth** The best estimate for what the image or other data represent, such as a disease.

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## The Role of Digital Ophthalmology

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The term *digital ophthalmology* broadly encompasses health information technology, including electronic health records, clinical repositories such as the American Academy of Ophthalmology (AAO) IRIS Registry (Intelligent Research in Sight), teleophthalmology,