

Nain Tara Raja, Sara Raja, Dr Arslan Raja, Dr Rehab Ismail

Background

Artificial intelligence (AI) and machine learning (ML) are evolving the way doctors classify, diagnose, and manage various eye diseases. This has been especially beneficial for conditions such as uveitis and medical retinal diseases including age-related macular degeneration (AMD), diabetic macular oedema (DMO), and diabetic retinopathy (DR). Due to their variable clinical presentations and overlapping features, these conditions present with significant diagnostic challenges. Even with advanced imaging techniques such as optical coherence tomography (OCT) and fundus autofluorescence (FAF), early disease detection can remain difficult.

Aim

To evaluate the role of artificial intelligence and machine learning in the diagnosis, prognosis, and management of uveitis and selected medical retinal diseases, with a focus on imaging-based applications.

Method

This literature review combines results from several research databases, yielding a total of 17 studies published between June 2010 and August 2025. The aim was to evaluate the role of AI in diagnosing, predicting outcomes, and managing uveitis and selected medical retinal conditio

Results

Uveitis

AI distinguishes uveitis subtypes using clinical and imaging data.
Bayesian, neural, and rule-based models support diagnosis and track disease progression.

Diabetic Retinopathy (DR)

Deep learning detects and grades DR with expert-level accuracy.
Works with low-cost fundus cameras and across diverse populations.
Supports early detection and timely referral.

AMD & Diabetic Macular Oedema (DMO)

CNN-based models analyse OCT and fundus images.
Accurately identify drusen, subretinal, and intraretinal fluid.
Enable monitoring of disease progression and treatment response for personalised care.

Condition	AI Technique	Key Findings
Uveitis	Bayesian & neural networks	Accurate subtype classification
Diabetic Retinopathy	Deep learning	Specialist-level screening accuracy
AMD	CNN + OCT	Reliable disease staging
DMO	Multimodal AI	Improved detection and monitoring

Conclusion

Artificial intelligence has significant potential to enhance the diagnosis and management of uveitis and medical retinal diseases. AI-based systems can achieve high diagnostic accuracy, support earlier disease detection, and enable personalised treatment plan for each patient.
Explainable AI plays important role in allowing transparency and clinician confidence.
Addressing current limitations will be essential for AI advances into routine ophthalmic practice.