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An efficient deep sclera recognition framework with novel sclera segmentation, vessel extraction and gaze detection

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Highlights

- DeepR is a deep model for sclera recognition which compares two vessel-structure pairs taking into account their affine-transformation, with no post logic in the matching process.
- An improved version of DeepR (named dual-output), improves results by a large margin achieving AUC score of 0.98 for SBVPI dataset.
- Fast and lightweight model UNet-P, uses a trained knowledge base of selective colour information that simplifies the initial task of sclera segmentation and achieves the best balance between accuracy and efficiency for sclera segmentation.
- Vessel extraction method VESD adapts to multiple datasets easily, and identifies prominent vessels that work best for recognition. Alternatively, DeepV detects vessels directly from color images without prior segmentation.