Dataset Selection & Analysis Report for Retinal AI

1. Individual Paper Summaries

Prediction of Cardiovascular Disease from Retinal Images using Deep Learning

• Dataset(s): DRIVE

• Dataset Pattern: 40 color fundus images (20 train / 20 test), 584x565 px, RGB, annotated blood vessels

• Why Selected: Publicly available, expert-labeled, includes pathological cases, widely used for segmentation benchmarking

The State of Retinal Image Analysis: Deep Learning Advances and Applications

• Dataset(s): DRIVE, STARE, CHASE_DB1, MESSIDOR, EyePACS

• Dataset Pattern: Fundus and OCT images with segmentation and disease labels

• Why Selected: Benchmark datasets, broad disease coverage, public access, used in comparative studies

MultiEYE: Dataset & Benchmark for OCT-Enhanced Retinal Disease Recognition

• Dataset(s): MultiEYE (custom)

• Dataset Pattern: Fundus + OCT images labeled with DR, AMD, DME etc.

• Why Selected: Multimodal dataset for cross-domain learning, enhanced diagnosis

Improving Consistency in CVD Risk Assessment — Cross-Camera Adaptation

• Dataset(s): UK Biobank

• Dataset Pattern: 88K+ fundus images from multiple cameras, includes clinical metadata

• Why Selected: Large-scale real-world dataset, camera/device variation, includes patient vitals

DVT-Net: A Multimodal Deep Vascular Topology Network

• Dataset(s): HRF, DRIVE, private hospital data

• Dataset Pattern: Fundus images with detailed vessel annotations and disease metadata

• Why Selected: Needed vascular tree structure for graph-based modeling

Heart Disease Prediction Using Eye Retinal Images

• Dataset(s): STARE

• Dataset Pattern: 20 fundus images, RGB, artery-vein focused, synthetic augmentation

• Why Selected: Vessel visibility and color differences important for heart disease detection

2. Summary Table

Paper	Dataset(s)	Pattern	Reason for Selection
Prediction of Cardiovascular Disease from Retinal Images using Deep Learning	DRIVE	40 color fundus images (20 train / 20 test), 584x565 px, RGB, annotated blood vessels	Publicly available, expert-labeled, includes pathological cases, widely used for segmentation benchmarking
The State of Retinal Image Analysis	DRIVE, STARE, CHASE_DB1, MESSIDOR, EyePACS	Fundus and OCT images with segmentation and disease labels	Benchmark datasets, broad disease coverage, public access, used in comparative studies
MultiEYE	MultiEYE (custom)	Fundus + OCT images labeled with DR, AMD, DME etc.	Multimodal dataset for cross-domain learning, enhanced diagnosis
Improving Consistency in CVD Risk Assessment — Cross-Camera Adaptation	UK Biobank	88K+ fundus images from multiple cameras, includes clinical metadata	Large-scale real-world dataset, camera/device variation, includes patient vitals
DVT-Net	HRF, DRIVE, private hospital data	Fundus images with detailed vessel annotations and disease metadata	Needed vascular tree structure for graph-based modeling
Heart Disease Prediction Using Eye Retinal Images	STARE	20 fundus images, RGB, artery-vein focused, synthetic augmentation	Vessel visibility and color differences important for heart disease detection

3. Common Questions You Might Be Asked (with Sample Answers)

- Q1: Why is dataset selection important in retinal AI studies?

A1: Dataset selection impacts model accuracy, generalizability, and clinical relevance. Well-annotated and diverse datasets enable better training and evaluation.

- Q2: What is the most commonly used dataset for vessel segmentation?

A2: The DRIVE dataset is widely used because it's public, well-annotated by ophthalmologists, and contains pathological and non-pathological images.

- Q3: Why do some papers combine multiple datasets?

A3: Combining datasets improves model robustness, diversity, and prevents overfitting to a single dataset's features.

- Q4: What makes a dataset suitable for cardiovascular disease prediction?

A4: It should contain high-quality vessel details, clinical labels, and ideally be linked with health metadata (like UK Biobank).

- Q5: Why are multimodal datasets like MultiEYE valuable?

A5: They combine fundus and OCT data, giving a more complete view of the eye, which improves diagnostic power.