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(57) Abstract :
The invention discloses a smartphone-based binocular ocular alignment screening apparatus (100) and an associated image-acquisition method. A display (120) presents central and displaced fixation targets while a front-facing camera (110) acquires time-associated images of both eyes. A quality assessment module (170) rejects unsuitable frames. Facial and ocular landmarks (180) support head-motion estimation (190), central-fixation calibration (210) and subject-specific normalization (200). A temporal analysis module (220) derives eye-specific responses, and a differential module (230) calculates interocular residuals while preserving a central-reference offset. A confidence module (240) evaluates frame support and measurement stability. When a target state is inadequate, an adaptive control module (250) repeats or extends the displayed target within an acquisition limit. An output module (260) aggregates accepted residuals and provides a non-diagnostic screening indication or an indeterminate acquisition indication, thereby coupling mobile image-quality feedback to physical stimulus presentation and binocular measurement.

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