Eye Tracking Technology for Nystagmus Detection and Analysis

Prepared for

DR: aliaa

2025

Readings(Velocity, Amplitude and Frequency) :

Neuro-ophthalmology Illustrated Chapter 16 – Nystagmus and Other Ocular Oscillations 2 — Neuro-Ophthalmology

Neuro-ophthalmology Illustrated Chapter 16 – Nystagmus and Other Ocular Oscillations 1 — Neuro-Ophthalmology

Frontiers | Eye Movement and Pupil Measures: A Review

Clinical Guidelines: Childhood Nystagmus Workup - American Academy of Ophthalmology

Nystagmus - EyeWiki

Portable eye-tracking as a reliable assessment of oculomotor, cognitive and reaction time function: Normative data for 18–45 year old | PLOS ONE

Eye Tracking with Phone & Gaze Fixation Accuracy:

https://ieeexplore.ieee.org/document/8978502.

Hybrid Eye-Tracking on a Smartphone with CNN Feature Extraction and an Infrared 3D Model - PMC (nih.gov)

https://ieeexplore.ieee.org/document/8669057

Sci-Hub | | 10.1109/embc.2019.8856537

Sci-Hub | Eye-tracking technology for the analysis of dynamic data. 2018 IEEE 9th International Conference on Dependable Systems, Services and Technologies (DESSERT) | 10.1109/DESSERT.2018.8409181

Sci-Hub | Effect of eye and body movement on augmented reality in the manufacturing domain. 2012 IEEE International Symposium on Mixed and Augmented Reality (ISMAR) | 10.1109/ISMAR.2012.6402591

Sci-Hub | Eye Tracking and Head Movement Detection: A State-of-Art Survey. IEEE Journal of Translational Engineering in Health and Medicine, 1, 2100212–2100212 | 10.1109/JTEHM.2013.2289879

Gaze fixation Accuracy:

[PDF] Gaze Tracking Using an Unmodified Web Camera and Convolutional Neural Network | Semantic Scholar

Gaze fixation and the neural circuitry of face processing in autism | Nature Neuroscience

Social content and emotional valence modulate gaze fixations in dynamic scenes | Scientific Reports (nature.com)

Control and Functions of Fixational Eye Movements - PMC (nih.gov)

[PDF] Towards Designing Diegetic Gaze in Games: The Use of Gaze Roles and Metaphors | Semantic Scholar

Eye Gaze Accuracy in the Projection-based Stereoscopic Display as a Function of Number of Fixation, Eye Movement Time, and Parallax | IEEE Conference Publication | IEEE Xplore

Free-Head Appearance-Based Eye Gaze Estimation on Mobile Devices | IEEE Conference Publication | IEEE Xplore

Oculomotor Rehabilitation:

e072786.full.pdf (bmj.com)

Review of Vestibular and Oculomotor Screening and Concussion Rehabilitation - PMC (nih.gov)

Nystagmus:

https://pubmed.ncbi.nlm.nih.gov/29120919/

https://pubmed.ncbi.nlm.nih.gov/22459007/

Problem Definition

https://my.clevelandclinic.org/health/diseases/22064-nystagmus

What Is Nystagmus? - American Academy of Ophthalmology

Nystagmus | AOA

Measurements of Eye parameters:

Best low-cost methods for real-time detection of the eye and gaze tracking

Self-reported visual dysfunction in Parkinson disease: the Survey of Health, Ageing and Retirement in Europe - Hamedani - 2020 - European Journal of Neurology - Wiley Online Library

deep learning system for video nystagmus detection:

aEYE: A deep learning system for video nystagmus detection - PMC

The use of smartphone in nystagmus:

Smartphone-based nystagmus diagnostics: development of an innovative app for the targeted detection of vertigo - PMC

Look me in the eye: evaluating the accuracy of smartphone-based eye tracking for potential application in autism spectrum disorder research - PubMed

Infantile and acquired nystagmus in childhood - PubMed

Integrating Gaze Tracking and Head-Motion Prediction for Mobile Device Authentication: A Proof of Concept - PubMed

1D Convolutional Neural Networks for Detecting Nystagmus:

1D Convolutional Neural Networks for Detecting Nystagmus | IEEE Journals & Magazine | IEEE Xplore

Frontiers | A Cross-sectional Survey and Cross-sectional Clinical Trial to Determine the Prevalence and Management of Eye Movement Disorders and Vestibular Dysfunction in Post-Stroke Patients in the Sub-Acute Phase: Protocol

Automatic Classification of the Vestibulo-Ocular Reflex Nystagmus: Integration of Data Clustering and System Identification:

Automatic Classification of the Vestibulo-Ocular Reflex Nystagmus: Integration of Data Clustering and System Identification | IEEE Journals & Magazine | IEEE Xplore

An Optokinetic Nystagmus Detection Method for Use With Young Children:

An Optokinetic Nystagmus Detection Method for Use With Young Children | IEEE Journals & Magazine | IEEE Xplore

Distribution of Visual and Oculomotor Alterations in a Clinical Population of Children with and without Neurodevelopmental Disorders

Frequency of oculomotor disorders in adolescents 11 to 17 years of age with concussion, 4 to 12 weeks post injury - ScienceDirect

A new method of saccadic eye movement detection for optokinetic nystagmus analysis:

A new method of saccadic eye movement detection for optokinetic nystagmus analysis | IEEE Conference Publication | IEEE Xplore

AN ELECTROOCULOGRAM BASED REAL TIME SYSTEM FOR MEASUREMENT AND ANALYSIS OF VISUAL STIMULI FOR DETECTING STRABISMUS AND NYSTAGMUS:

An electrooculogram based real time system for measurement and analysis of visual stimuli for detecting strabismus and nystagmus | IEEE Conference Publication | IEEE Xplore

Nystagmus Signal Feature Extraction and Tracking for Diagnosis of the Vestibular System:

Nystagmus Signal Feature Extraction and Tracking for Diagnosis of the Vestibular System | IEEE Conference Publication | IEEE Xplore

The Prevalence of Nystagmus: The Leicestershire Nystagmus Survey | IOVS | ARVO Journals

Capturing nystagmus during vertigo attacks using a smartphone: adherence, characteristics, pearls and pitfalls:

Capturing nystagmus during vertigo attacks using a smartphone: adherence, characteristics, pearls and pitfalls - PMC (nih.gov)

Eye Tracking Techniques including Computer Vision:

https://arxiv.org/pdf/2312.00425

https://ar5iv.labs.arxiv.org/html/2404.11770

Nystagmus - EyeWiki

Model architecture (Role of AI in nystagmus):

Frontiers | Feasibility of video-based real-time nystagmus tracking: a lightweight deep learning model approach using ocular object segmentation

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