



FAPESP
WEEK
GERMANY

March 25-26th, 2025



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Forschungsgemeinschaft



P H E L C O M

Innovating in Eyecare

Developing Cutting-Edge Devices in Brazil

José Augusto Stuchi, PhD
March 2025





Computer Engineer
MSc Electronics Engineering Computer Vision
University of São Paulo (USP)

MBA Business Management
Getulio Vargas Foundation (FGV)

PhD Computer Engineering Machine Learning
University of Campinas (Unicamp)

Biodesign
STANFORD at Einstein

CEO & Co-Founder
PHELCOM TECHNOLOGIES*

* declaration of conflicting interests



Brazil

200 million population

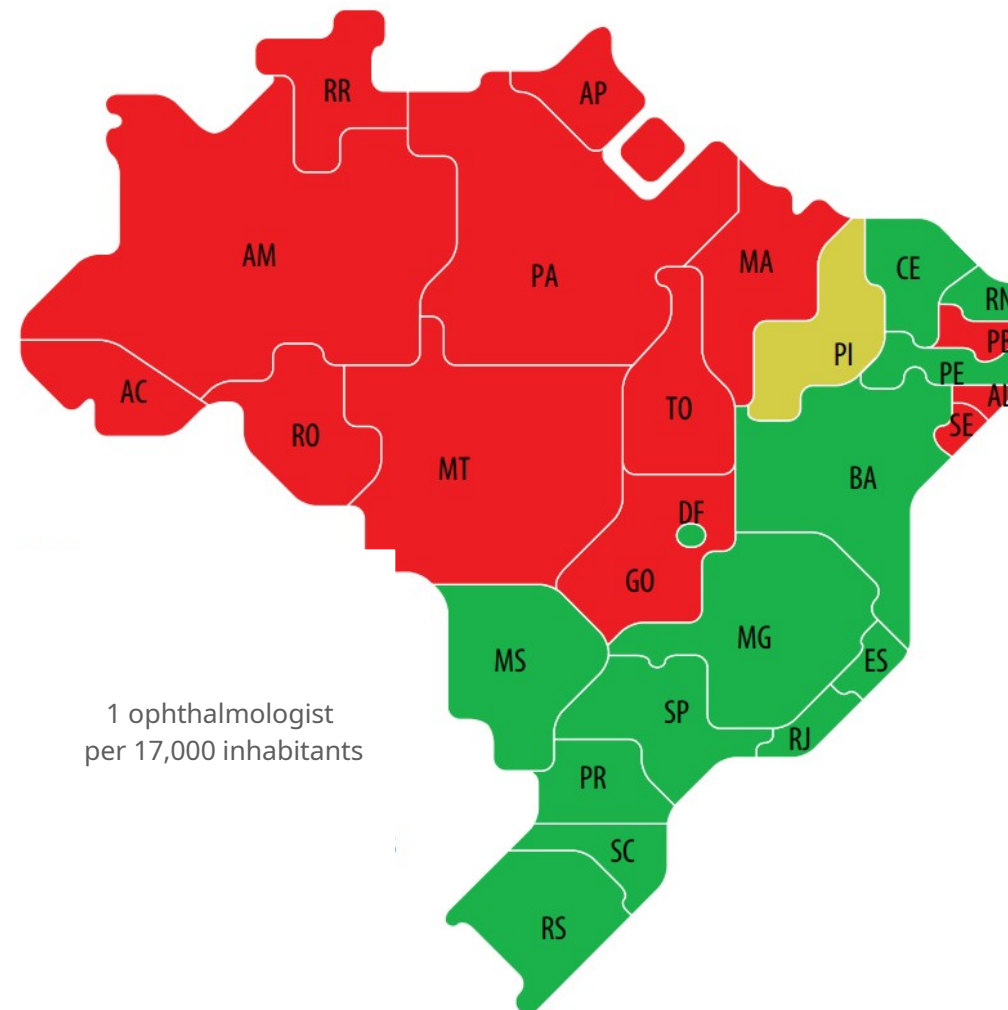
20 thousand eye care doctors

4,000 cities without eye care services 70%

30 million elderly

40 million obese

16 million diabetics



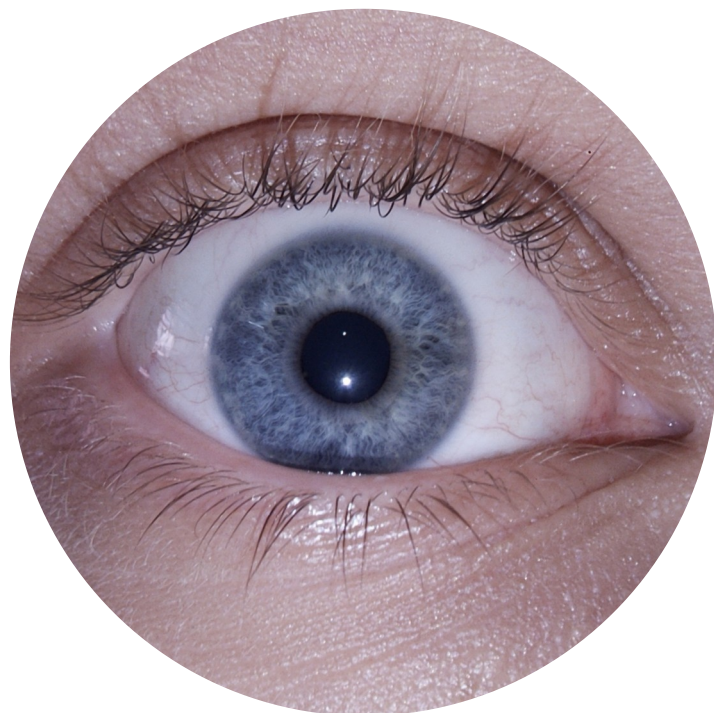


**How can we provide good
care to patients in such a
large country?**

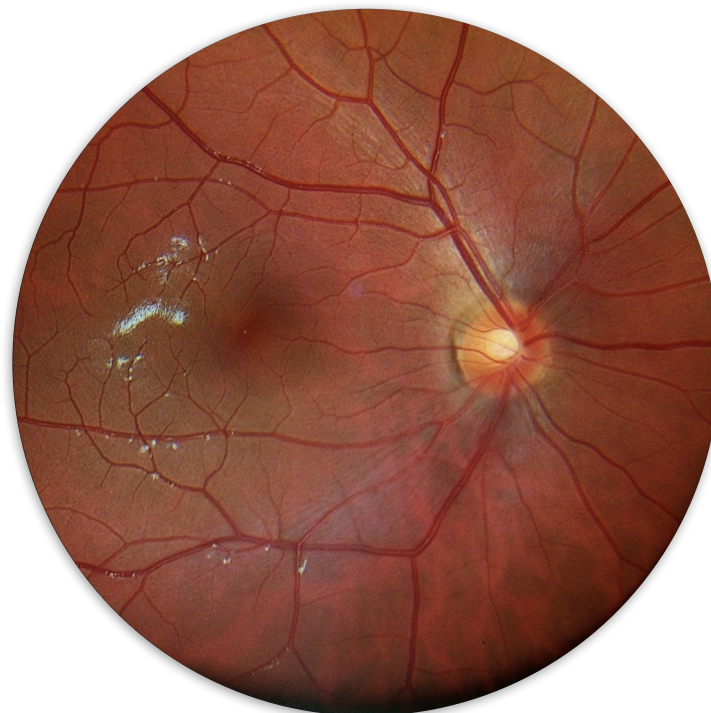




Mobile Health + Cloud Computing + Artificial Intelligence



Easy eye exams
performed anywhere



High-quality exams similar to
traditional clinic-based ones



Automated screening &
Telemedicine



Physics, Electronics and Computing



Diego, CTO
Physicist



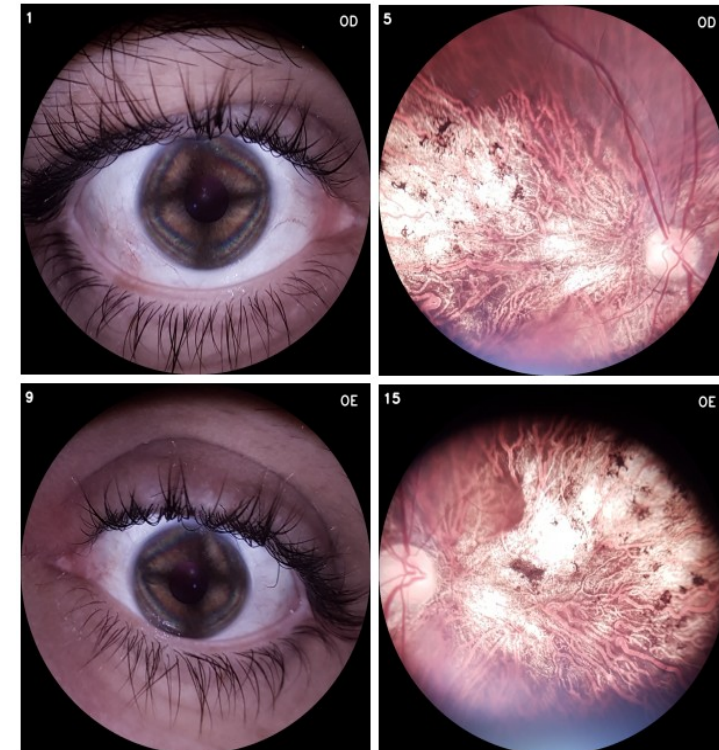
Flávio
Electronic Engineer



Stuchi
Computer Engineer

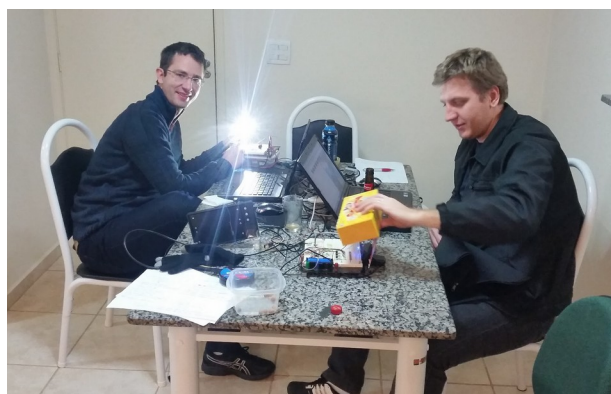
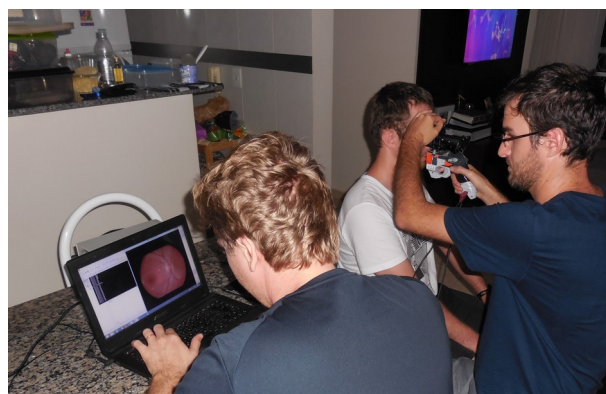
Inspiration

Welber (Diego's brother) was born with a serious problem in the retina



Smart Retinal Camera - SRC Development

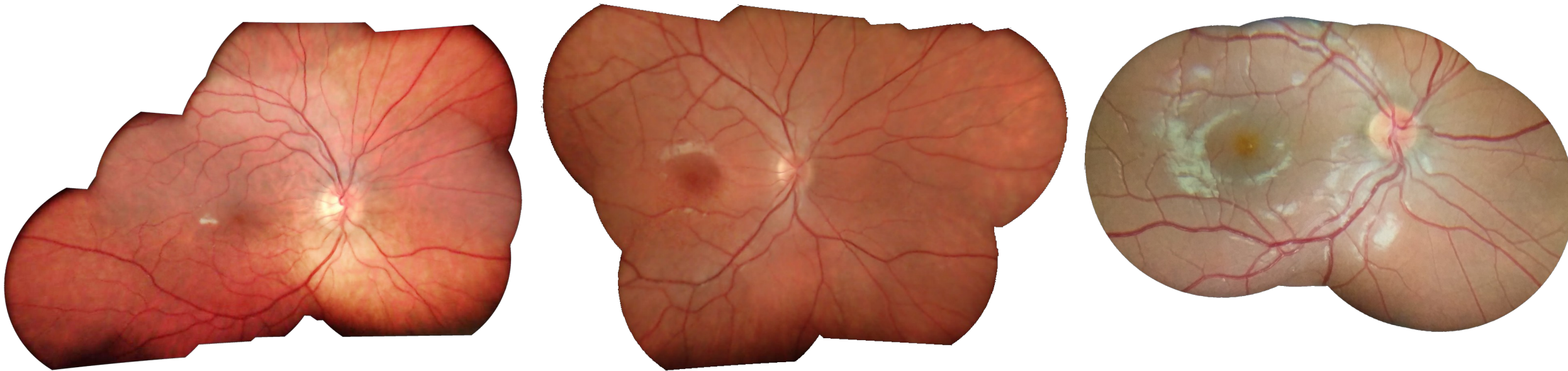
2015





First Pictures of the Retina with SRC

2015





Phelcom Foundation

2016

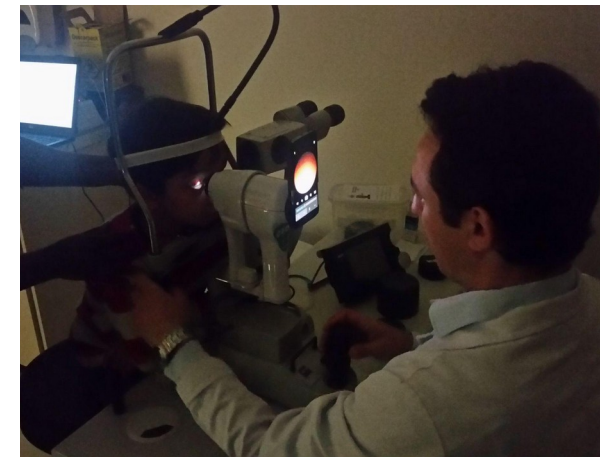
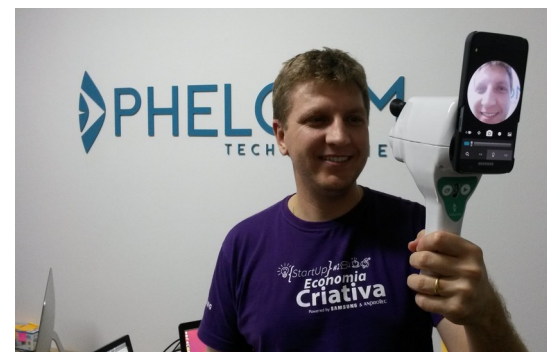


PIPE grant



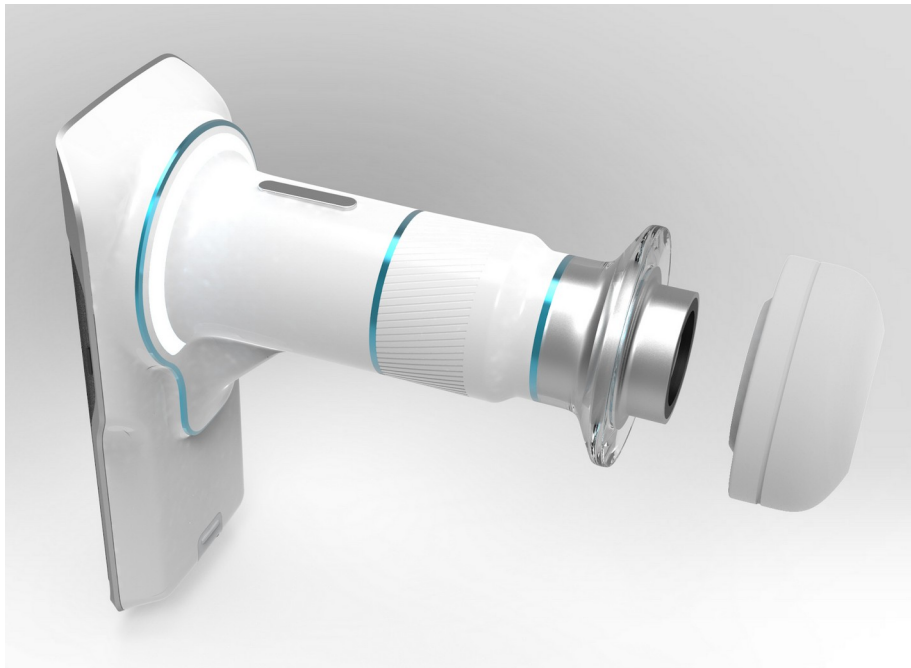
SRC prototype Tests and Validations

2017



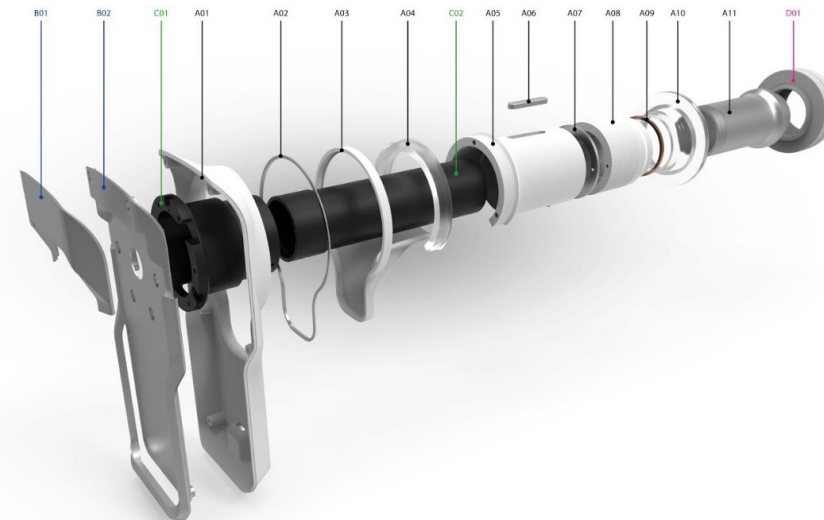


SRC becomes Eyer



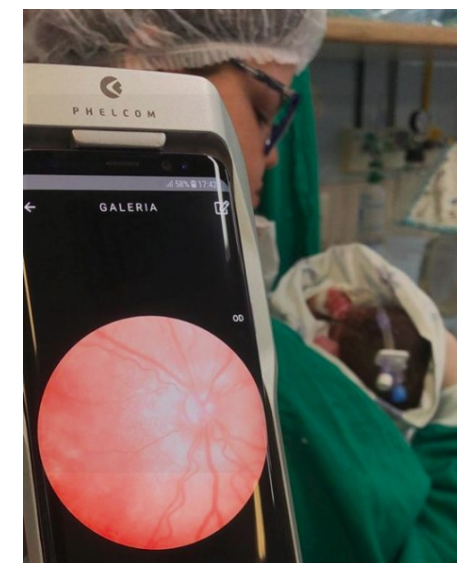
Peter Von Zweigbergk
Sweden Designer
Red Dot Award Winner

2018



Eyer Launched in Brazilian Market

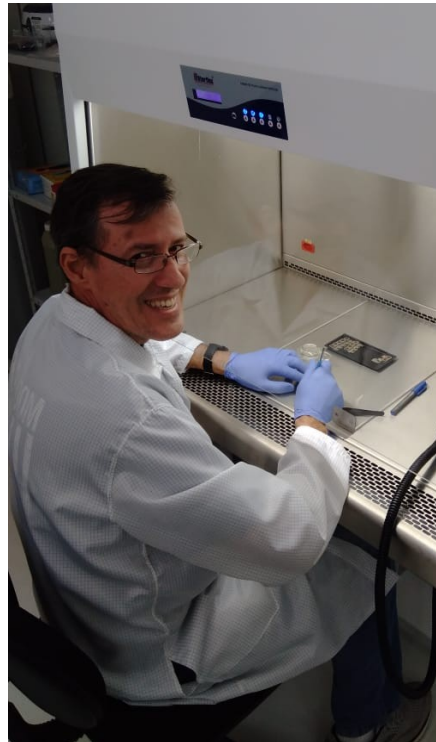
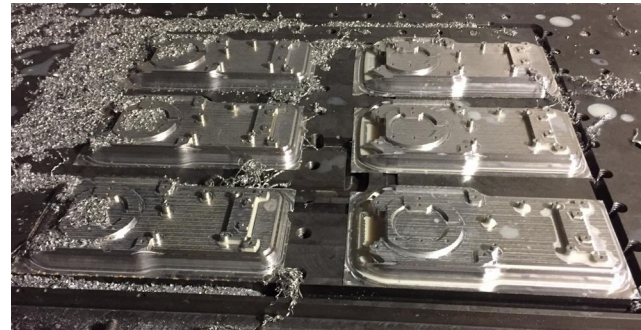
2019





Factory Establishment and Eyer Production

2019



Located in São Carlos, Brazil



Eyer Launched in the US Market

2022





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Eyer2 Launched in Brazilian and USA Market

2024





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Eyer

Eye Camera Concept

Galaxy S21, S22 or S23
integrated comes with the
device



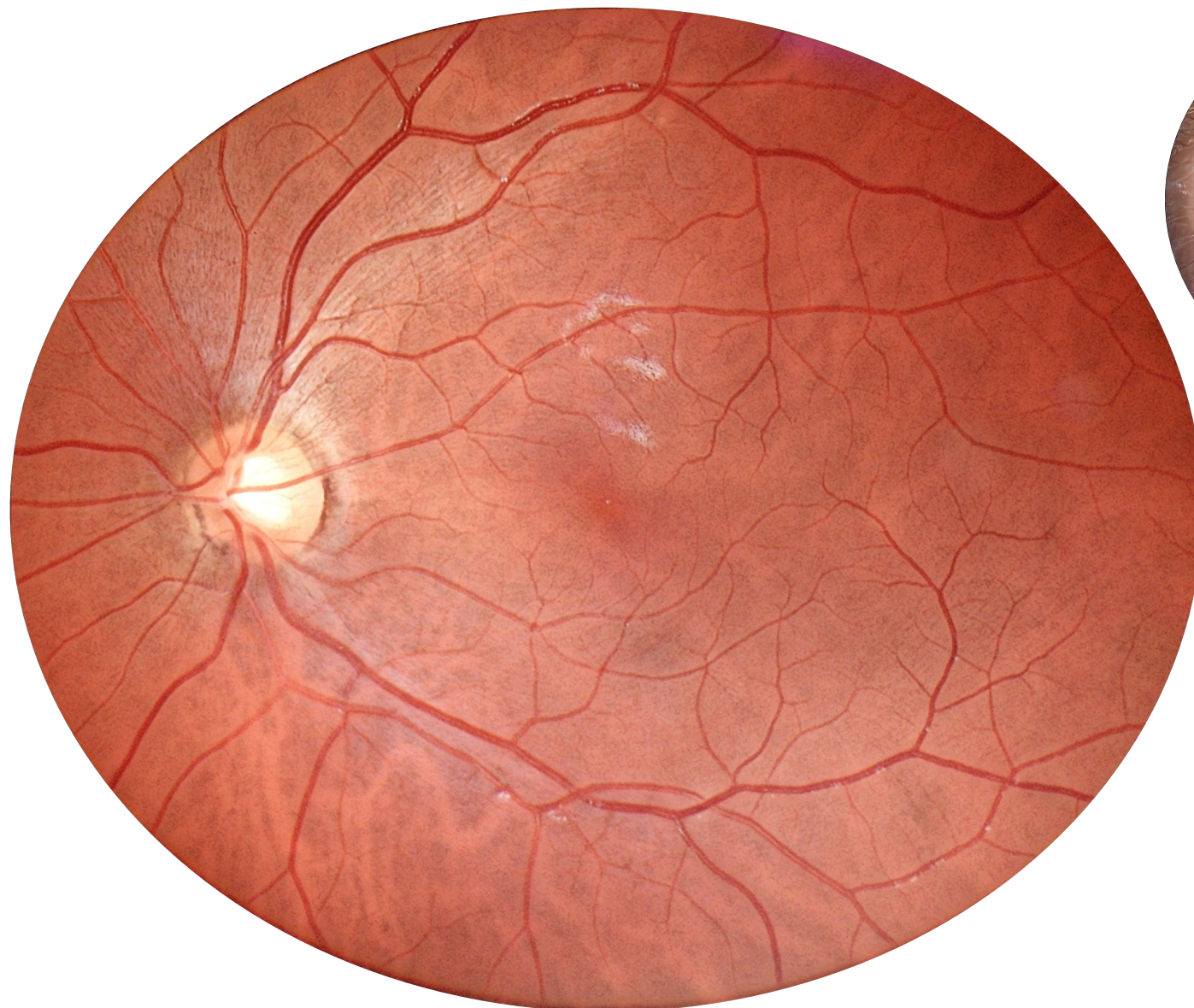
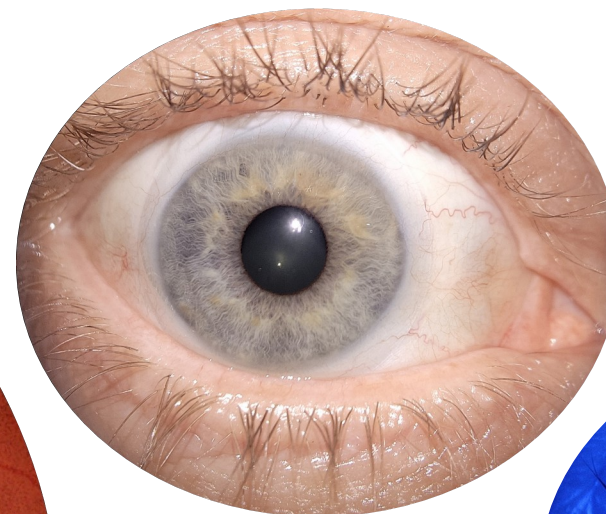


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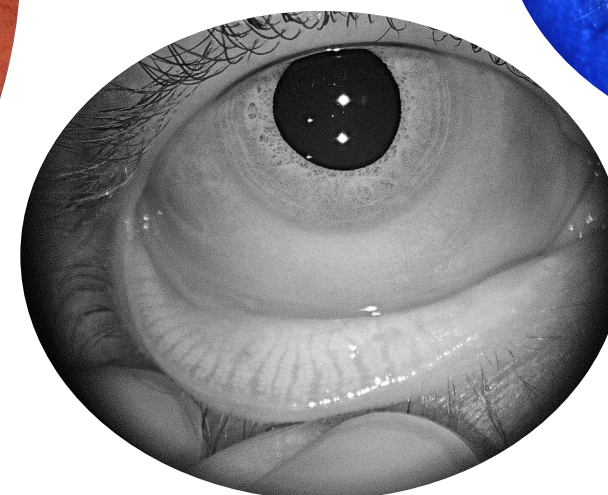
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Eyer2

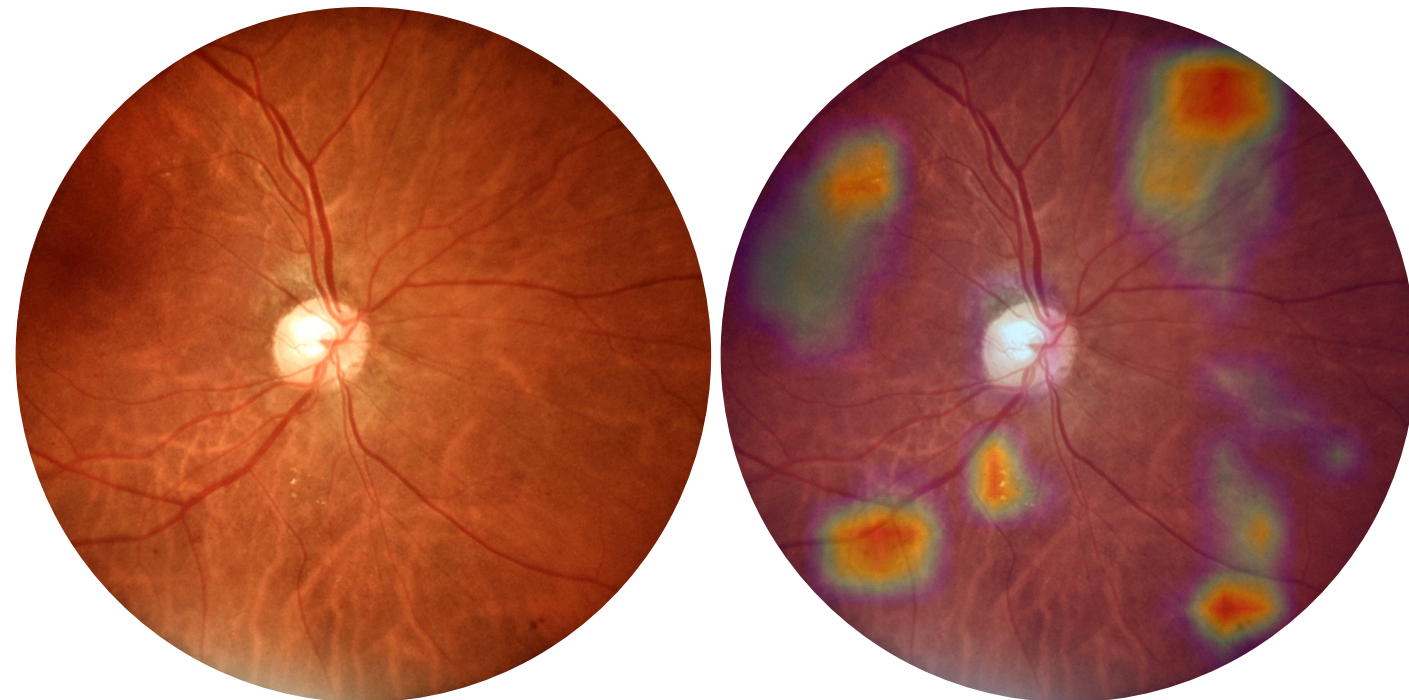


Multifunctional
Eye Camera



Eyer Maps

Embedded AI for real time screening



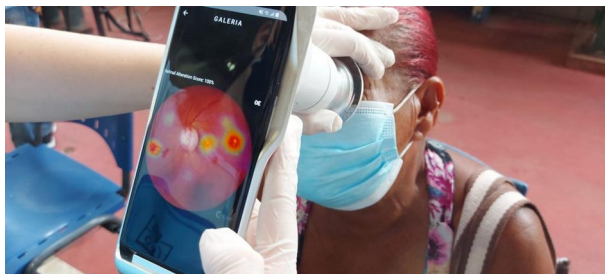


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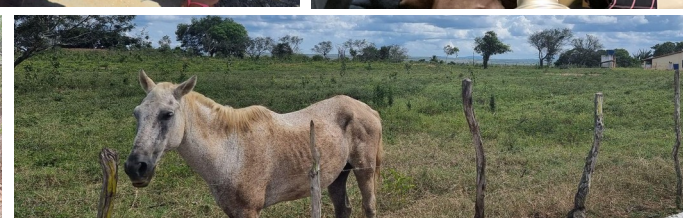


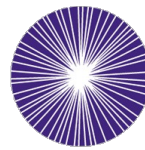
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David Geffen
School of Medicine



Research



Automated Identification of Different Severity Levels of Diabetic Retinopathy Using a Handheld Fundus Camera and Single-Image Protocol

Fernando K. Malerbi, MD, PhD,¹ Luis Filipe Nakayama, MD,¹ Gustavo Barreto Melo, MD, PhD,¹ José A. Stuchi, MSC, PhD,² Diego Lencione, MSC,² Paulo V. Prado, MSC,² Lucas Z. Ribeiro, MD,¹ Sergio A. Dib, MD, PhD,¹ Caio V. Regatieri, MD, PhD¹

Purpose: To evaluate the performance of artificial intelligence (AI) systems embedded in a mobile, handheld retinal camera, with a single retinal image protocol, in detecting both diabetic retinopathy (DR) and more-than-mild diabetic retinopathy (mtmDR).

Acta Diabetologica
<https://doi.org/10.1007/s00592-020-01585-7>

ORIGINAL ARTICLE



Original Article

Diabetic Retinopathy Screening Using Artificial Intelligence and Handheld Smartphone-Based Retinal Camera

Fernando Korn Malerbi, MD, PhD^{1,2}, Rafael Ernane Andrade, MD, PhD^{1,3}, Paulo Henrique Morales, MD, PhD^{1,2}, José Augusto Stuchi, MSC⁴, Diego Lencione, MSC⁴, Jean Vitor de Paulo, MSC, PhD⁴, Mayana Pereira Carvalho, MD⁵, Fabricia Silva Nunes, MD⁵, Roseanne Montargil Rocha, RN, PhD⁵, Daniel A. Ferraz, MD, PhD^{2,6}, and Rubens Belfort Jr, MD, PhD^{1,2}

Penha et al. *International Journal of Retina and Vitreous* (2023) 9:41
<https://doi.org/10.1186/s40942-023-00477-6>

International Journal of Retina
and Vitreous

ORIGINAL ARTICLE

Open Access

Single retinal image for diabetic retinopathy screening: performance of a handheld device with embedded artificial intelligence

Fernando Marcondes Penha^{1,2*}, Bruna Milene Priotto¹, Francini Hennig¹, Bernardo Przysieszny¹, Bruno Antunes Wiethorn¹, Julia Orsi¹, Isabelle Beatriz Freccia Nagel¹, Brenda Wiggers¹, Jose Augusto Stuchi³, Diego Lencione³, Paulo Victor de Souza Prado³, Fernando Yamanaka³, Fernando Lojudice^{4,5} and Fernando Korn Malerbi⁶

Journal of Diabetes Science and Technology
1–8
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Journal of Medical Systems (2022) 46:8
<https://doi.org/10.1007/s10916-021-01795-8>

MOBILE & WIRELESS HEALTH



Diabetic Macular Edema Screened by Handheld Smartphone-based Retinal Camera and Artificial Intelligence

Fernando Korn Malerbi¹, Giovana Mendes², Nathan Barboza³, Paulo Henrique Morales^{1,4}, Roseanne Montargil⁵, Rafael Ernane Andrade²

DIABETES RESEARCH AND CLINICAL PRACTICE 168 (2020) 108380



Contents available at ScienceDirect

Diabetes Research
and Clinical Practice

Journal homepage: www.elsevier.com/locate/diabres



The feasibility of smartphone based retinal photography for diabetic retinopathy screening among Brazilian Xavante Indians

Fernando Korn Malerbi^{a,b,*}, Amaury Leles Dal Fabbro^c, João Paulo Botelho Vieira Filho^b, Laercio Joel Franco^{b,c}



Ophthalmology Retina

Available online 14 May 2024

In Press, Journal Pre-proof What's this?



Manuscript

Synchronous Diagnosis of Diabetic Retinopathy by a Handheld Retinal Camera, Artificial Intelligence, and Simultaneous Specialist Confirmation

Received: 5 June 2020 / Accepted: 21 July 2020
© Springer-Verlag Italia S.r.l., part of Springer Nature 2020



OPEN
DATA DESCRIPTOR

A portable retina fundus photos dataset for clinical, demographic, and diabetic retinopathy prediction

Chenwei Wu^{1,6}, David Restrepo^{2,6}, Luis Filipe Nakayama^{2,3}, Lucas Zago Ribeiro², Zitao Shuai³, Nathan Santos Barboza⁴, Maria Luiza Vieira Sousa⁴, Raul Dias Fitterman⁴, Alexandre Duraõ Alves Pereira⁴, Caio Vinicius Saito Regatieri³, Jose Augusto Stuchi⁵, Fernando Korn Malerbi³ & Rafael E. Andrade⁴



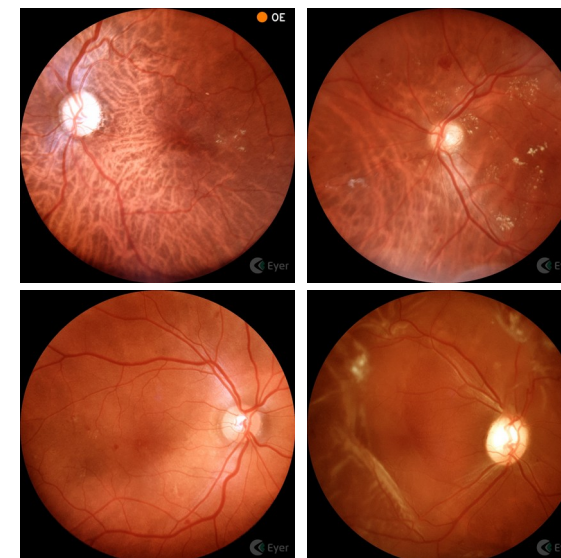
5164 images
from 1291 patients

Download:

<https://physionet.org/content/mbrset/1.0/>



nature
SCIENTIFIC DATA





60+ employees



factory



headquarters



Boston office



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5 million
patients examined
with the Eyer

Thank you!

José Augusto Stuchi
Phelcom CEO
stuchi@phelcom.com