retinEdge

AI FOR EYE CARE
INITIATIVE FROM AMBERFLUX

AmberFlux

Sustainable Development Goal – Healthcare for all

UHC Index on essential service coverage is below 50%

3.5 Billion people have no access to basic and essential services

Diabetes expected to affect 1 in 10 people by 2045

India to become the world capital for Diabetes, followed by China

Impacting low income, and rural populations

SDG 2.2 End all forms of Malnutrition

Current Diabetes Status

~540 Million have diabetes

Over 30% to 50% undiagnosed diabetics

Forecasted to reach a Billion in the next 20 years. 3 in 4 adults with diabetes in Low- and Middle-income countries.

Fastest spreading epidemic with ~2 Million deaths attributed to Diabetics.

35% of population do not believe in eye-care even if they have visual impairment

Less than 50% go for regular diabetic checkup

Diabetic retinopathy is the leading cause of new cases of legal blindness among adults

Over 10% of rural population is estimated to have diabetes and DR

India and China to have over 35% of global diabetics

Why Retinopathy?

Non-intrusive detection

Eye is the only place where blood vessels can be photographed

Ongoing research for identification of life-threatening diseases like cardiaovascular, diabetes, anaemia, etc., besides identification of Eye related illnesses

Introducing….

retinEdge is a AI Based application for preliminary diagnostics of diabetes & other ailments using retinal images with a simple, low-cost, non-intrusive, intuitive approach

Use Case: Detection

Susan lives in a remote village and wants her eyes checked without access to a nearby hospital or primary healthcare system. A local pharmacist/ Rural Medical Practitioner can use a fundus camera, take an image, and perform preliminary diagnostics.

Using retinEdge, the pharamacist/ rural medical practitioner can analyze the images for abnormalities and signals characteristics of diabetic retinopathy/ diabetes.

Analysis is done in real-time without human intervention, insights generated and relayed to specialist. Based on retinEdge Analysis, Susan can visit a specialist, if needed.

EdgeAI helps in reducing strain on health care system and network infrastructure as info is processed on device. EdgeAI also reduce the hospital waste for preliminary diagnosis.

retinEdge can also be used for regular, periodic checks for comparison from previous visit.

Use Case : Notifications and Reminders

Best Care Inc is a regional hospital (RH) in the region and is tasked with Universal Healthcare goal for the region. It supports multiple Primary Health Care (PHC)/ Rural Heal Centers (RHC) across the region. Still a large number of people in the region have no access to healthcare. Due to lack of diagnostic facilities, PHC/RHC are overloading the RH for many false positives.

Using retinEdge, PHC/RHC can perform preliminary diagnostics before referring patients to RH. Kiosks with retinEdge can be established at specific locations, and RH Doctors can converse with patients and guide them on usage of retinEdge and based on preliminary diagnostics can schedule appointments.

Using VoiceAI, RH can ensure the patients are provided timely advice, remind of them medicine timings, schedule appointments, and repeated visits. Also alert them of any medical camps. For remote patients, RH Doctors can provide telemedicine.

EdgeAI helps in ease of patient interactions and improves efficiency and increases revenue streams for hospitals and partners.

Simplicity in Usage

Step 1:

retinEdge

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Upload Retinal Image

Drag and drop file here
Limit 200MB per file • PNG, JPG   Browse files

Step 2: Select image file and click 'Analyze'

Upload Retinal Image

Drag and drop file here
Limit 200MB per file • PNG, JPG   Browse files

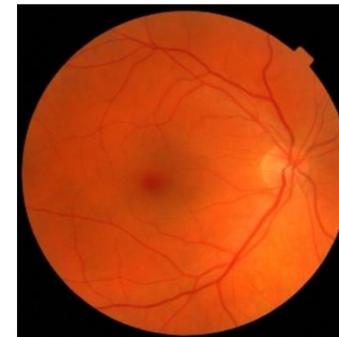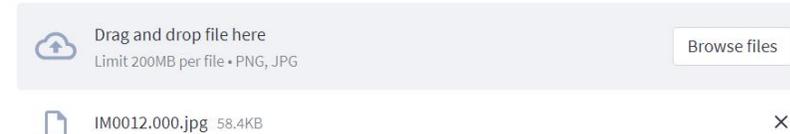IM0012.000.jpg 58.4KB   ×

Analyse

Developed using 35000 Images from Eyepacs and Messidor database. In Discussions for Field Trials.

Currently running on AWS on cloud. Can run independently on a mobile/laptop/desktop without any cloud/internet connectivity, with images being uploaded at a later time to hospital database, enabling usage for medical camps, rural health centers, etc.,

Step 3: Result

Analyse

There is No Diabetic Retinopathy
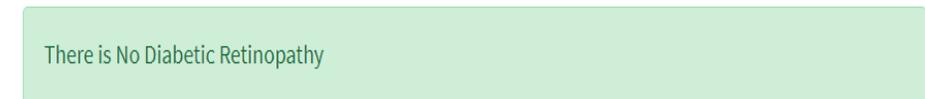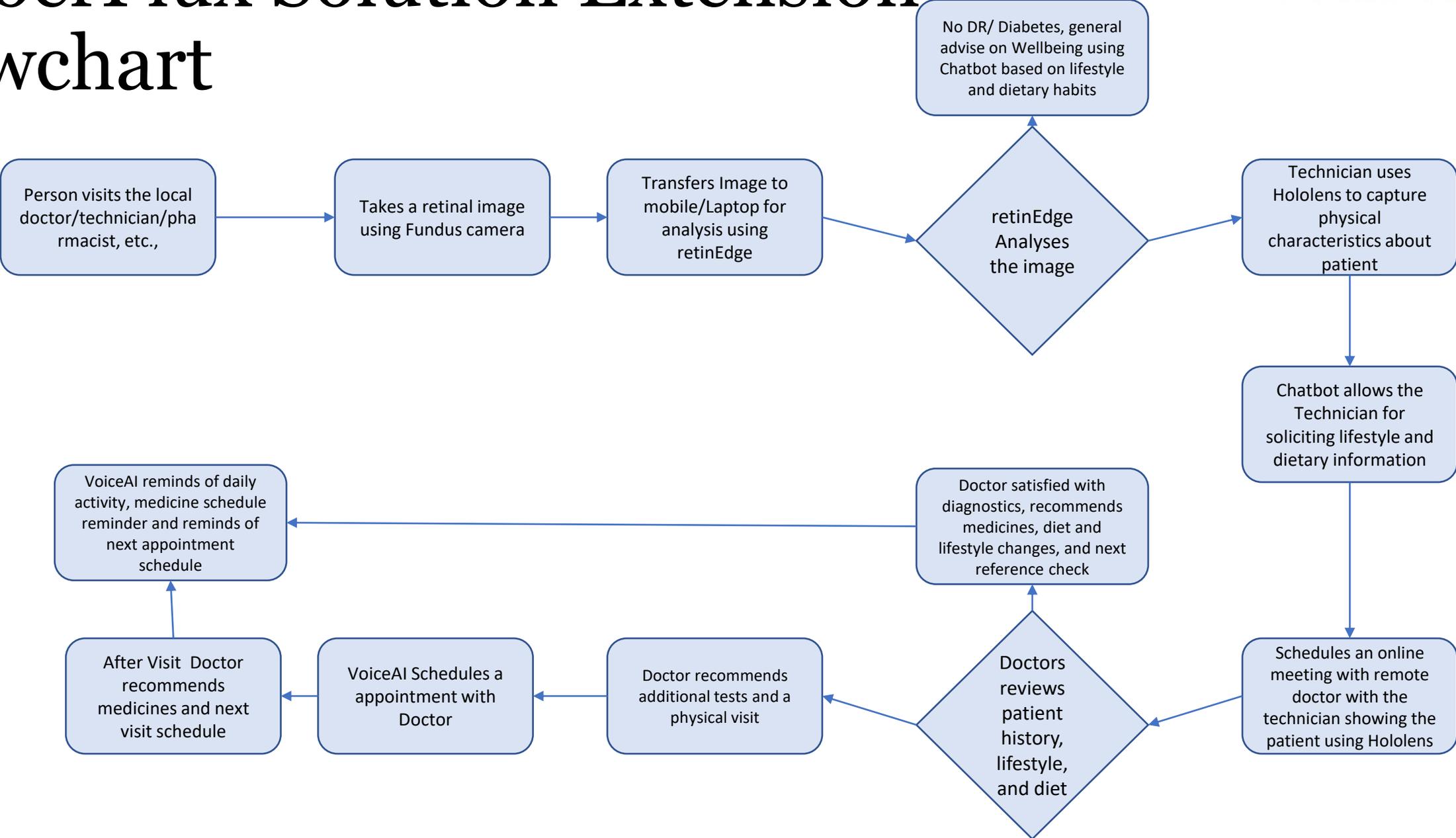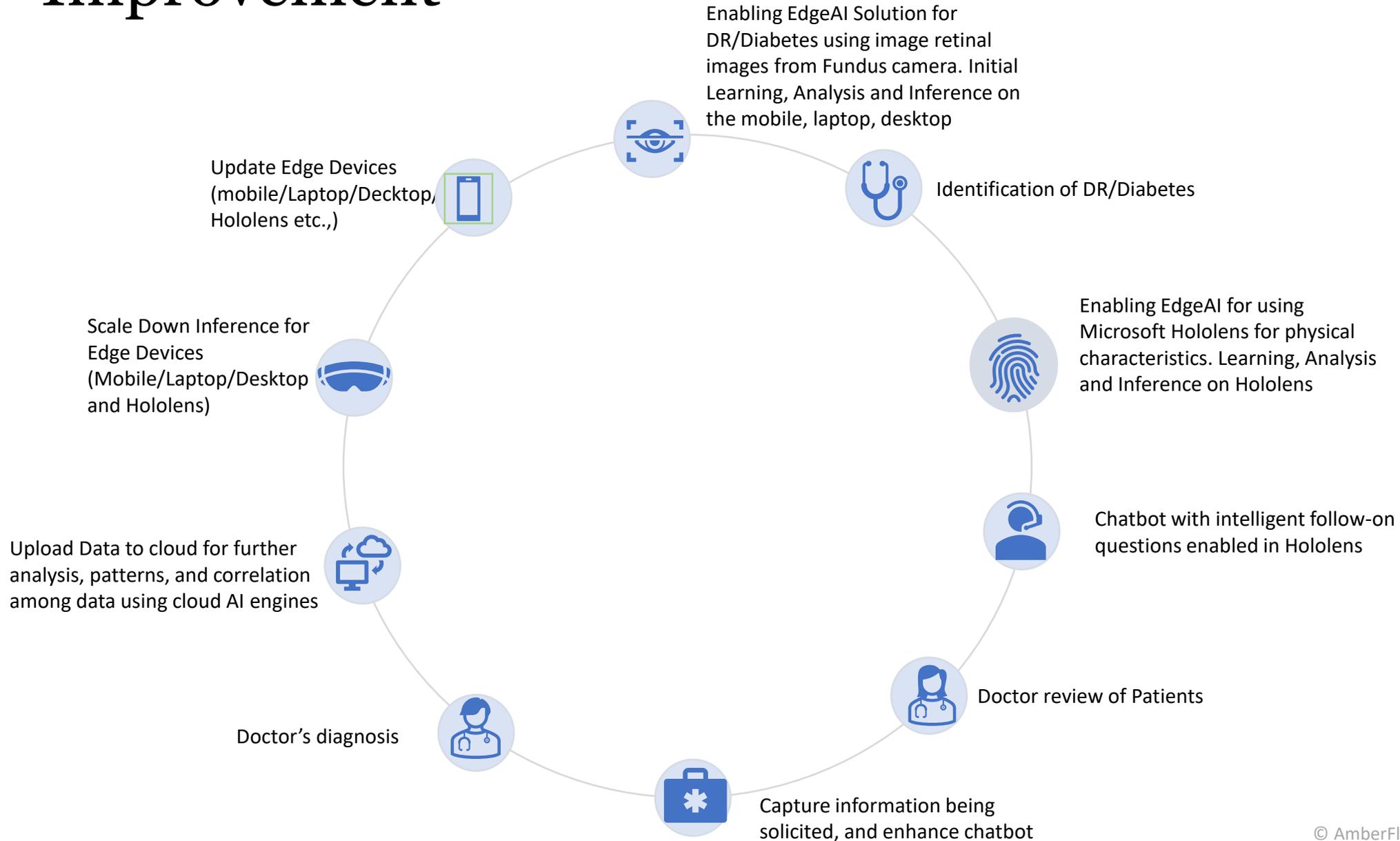
Disclaimer: This is only a preliminary diagnostic, based on the retinal images uploaded. Please consult your doctor for further diagnostics. Your doctor will recommend the right diagnostics and further steps. AmberFlux EdgeAI provides this as preliminary diagnostics and does not guarantee or warranty the accuracy of the diagnostics

AmberFlux Solution Extension Flowchart

Person visits the local doctor/technician/pharmacist, etc., → Takes a retinal image using Fundus camera → Transfers Image to mobile/Laptop for analysis using retinEdge → retinEdge Analyses the image

No DR/ Diabetes, general advise on Wellbeing using Chatbot based on lifestyle and dietary habits

retinEdge Analyses the image → Technician uses Hololens to capture physical characteristics about patient → Chatbot allows the Technician for soliciting lifestyle and dietary information → Schedules an online meeting with remote doctor with the technician showing the patient using Hololens

Doctors reviews patient history, lifestyle, and diet

Doctor satisfied with diagnostics, recommends medicines, diet and lifestyle changes, and next reference check → VoiceAI reminds of daily activity, medicine schedule reminder and reminds of next appointment schedule

Doctor recommends additional tests and a physical visit → VoiceAI Schedules a appointment with Doctor → After Visit Doctor recommends medicines and next visit schedule

AmberFlux Solution Extension & Continuous Improvement

AmberFlux

Enabling EdgeAI Solution for DR/Diabetes using image retinal images from Fundus camera. Initial Learning, Analysis and Inference on the mobile, laptop, desktop

Identification of DR/Diabetes

Update Edge Devices (mobile/Laptop/Decktop, Hololens etc.,)

Enabling EdgeAI for using Microsoft Hololens for physical characteristics. Learning, Analysis and Inference on Hololens

Scale Down Inference for Edge Devices (Mobile/Laptop/Desktop and Hololens)

Chatbot with intelligent follow-on questions enabled in Hololens

Upload Data to cloud for further analysis, patterns, and correlation among data using cloud AI engines

Doctor review of Patients

Doctor's diagnosis

Capture information being solicited, and enhance chatbot

Status

End-to-End Architecture & design ready

Diabetics Retinopathy product MVP is ready Analyzed 35K Fundus Images for model development (from Messidor and EyePacs)
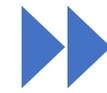
SaaS running on Cloud (AWS)

Can run on mobile or desktop without connectivity
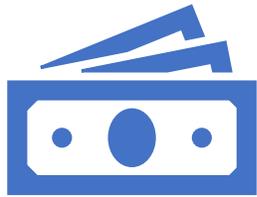
Discussions with Doctors for Field trials

Enhance product based on Doctor's feedback

Enhance the model for better accuracy

Business Model

Pricing per eye analyzed

Pay as you grow, P&L spent instead of expensive CapEx

Rapid sales to deployment cycles

Customer can go live within days, rather than months

TM

Brand building for sales and self service for delivery.

Reduced cost of customer acquisition & improved profitability

retinEdge

Revolutionizing preliminary diagnostics using AI

Contact:

Raghavendra Rao Gudipudi

raghu@amberflux.com

(M) +91 9949039661