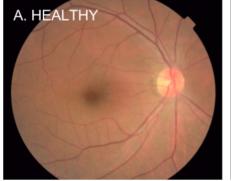
# Diagnostics Helper for Medical Images

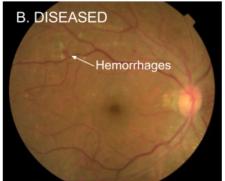
Dr. Franziska Horn

# Motivation

#### **Situation / Problem / Goal:**

We build the machine to take pictures of a patient's retina and want to offer a new feature where we automatically detect retinopathy in these pictures and alert the doctor (e.g., highlight affected areas in the picture).





https://ai.googleblog.com/2016/11/deep-learning-for-detection-of-diabetic.html (29.11.2016)

#### **Value Generation:**

- internal process optimization
- X improves existing product
- new product / Software-as-a-Service
- other:

#### **Business KPI:**

(balanced) accuracy of the model

**Status Quo:** 

human accuracy without model (unknown)

# Solution Outline

**Deliverables:** insights

X software: model that detects retinopathy in the images

X Build

Buy

#### Inputs:

(numeric) values: \_\_\_\_\_

X image

text

other: (e.g., audio, video)

1 Data Point:

an image of a patient's retina

## **Workflow Integration:**

get image from machine and display results on the screen together with the picture that was taken

#### **ML Solution & Output:**

Dimensionality Reduction: **2D coordinates** 

Outlier Detection: anomaly score

Clustering: cluster index

Regression: continuous value: \_\_\_\_\_

X Classification: **discrete value (e.g., yes/no):** retinopathy yes/no

Recommender Systems/Information Retrieval: ranking of items

X Deep Learning: other: mark hemorrhages in image

### **Additional Steps?**

- X Explain predictions (which image sections contributed to prediction)
- Use model in optimization (to find optimal inputs)

Dr. Franziska Horn

# Challenges & Risks (+ Mitigation Strategies)

What might go wrong?	Probability:	Can you do anything about this?
predictions might be wrong	medium	carefully test the model; explainability crucial so doctor can validate the results
data contains noisy labels: doctors sometimes didn't agree on the diagnosis	medium	ask specialists to relabel cases with disagreement
images might change in the future	low	we control the hardware and make sure to track all changes
we don't have the necessary ML expertise in ho to build a good enough model	ouse high	collaborate with external consultants / university