

Project Title: Save more vision

Company: Alcon

Team Name: Panda

Group Members:

Jiayu Chen (Team Lead), jiayuchen@ucsb.edu

Jessica Zhang (Scribe), zhiyun_zhang@ucsb.edu

Z Huang, zilie_huang@ucsb.edu

Zora Jiang, qianqian@ucsb.edu

Yinglong Wang, yinglong@ucsb.edu

Grace Zhang, gracezhang@ucsb.edu

Project Summary:

Overview (What problem the project is solving?)

- Doctors are not able to discover all the suspicious symptoms in patients on their own in a short time.
- Without the help of diagnostic assistance, sometimes surgeons can not correctly and completely identify the eye diseases of patients.
- Surgeons do not remind the patients of the potential complications after eye surgery.
- Patients can self-check eye diseases by taking photos of their eyes.

Why is this problem important?

- In eye surgery, it is important for the surgeon to get enough symptom information of the patient's eyes. However, these symptoms may not always be noticed by the doctors. And sometimes one small change can save a patient's eyesight.
- If surgeons do not remind the patients of the potential complications after eye surgery, patients' eyesight and eye problems might get worse.

How is this problem solved today? (if it is)

- Digital fundus photography and optical coherence tomography (OCT) are currently implemented at primary care level, aiming to provide timely referral for vision-threatening DR and DME to ophthalmologists for timely treatment and vision loss prevention.
- Deep Learning is currently widely used in various tasks including image recognition, virtual assistant, and diagnostic assistant systems. The architecture of deep learning uses more hidden layers to decode raw data without the need to handcraft specific features and or use feature selection algorithms.

Project Goals/Outcomes

- Help eye surgeons to identify telltale visual signs
- Assist surgeons to discover as many symptoms as possible

Possible Tools/Technologies

- machine learning: C++, Python, OpenCV, TensorFlow
- Alcon's API
- Database: MongoDB/DynamoDB

Solution Implementation/Design

- Use python machine learning algorithms
- Tensorflow to analyse data
- Set up a database to store analytical data from eye surgeries

Milestones

- Train model utilizing database
- Display visual signs
- Display potential complications of the eye