

# WIDVISION

Non-Profit Organization

## PROFILE

WidVision is a non-profit organization that is dedicated to improving the quality of life for individuals with visual impairments. The organization operates through three distinct branches, including the Central Executive Office, the IT Office, and the PR Office. Each branch operates under the shared motto of "Together with Blind Community" and works towards a common goal.

### STUDENT ENGAGEMENT

The WidVision Program offers students in Seoul Scholars Internationals a unique opportunity to contribute to the visually impaired community by engaging in volunteer work, research, and writing.

### COMMUNITY SERVICE

This initiative not only allows students to expand their knowledge and understanding of the challenges faced by visually impaired individuals, but it also provides them with an opportunity to make a positive impact.



# General Introduction

TOGETHER WITH BLIND COMMUNITY

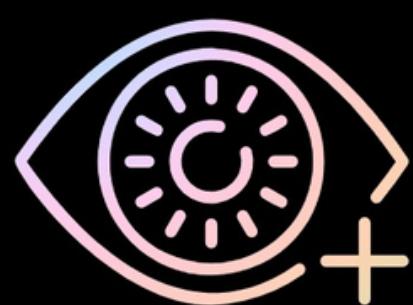
## CEO's Greetings



Sungju Park,  
Founder & CEO of  
WidVision

Hello, My name is Sungju Park, and I am currently a junior at Seoul Scholars International, set to graduate in 2024. As a passionate and dedicated individual, I have been leading three different clubs in my school, including the computer science club, the newspaper club, and the together with blind community club.

With the aim of bringing about greater impact and positive change, I have decided to combine all these clubs into a grand non-profit organization called WidVision. Our primary objective is to increase eye health awareness and provide support for the blind community. I strongly believe that the eye is a crucial part of our body, and it is essential that we take active steps towards promoting eye health and supporting those with visual impairment.



**WIDVISION**



Seoul Scholars International

## Related Links

[Homepage Website](#)

[Business Proposal](#)

[Vision AI research paper](#)

[Pitch Deck](#)

[Survey Result](#)

# Central Executive Office

TOGETHER WITH BLIND COMMUNITY

Through the past events, the department aimed to educate communities and schools on the reality of avoidable blindness and organized used book fundraising activities to support the visually impaired community. In 2023, the department underwent a merge with the WidVision organization, Central Executive Office. The Central Executive Office is a volunteer-driven department tasked with promoting a favorable environment and providing updates on the status of the visually impaired community. The primary objective of the Central Executive Office is to raise awareness and drive change in support of individuals with visual impairments.



## Activity Performance

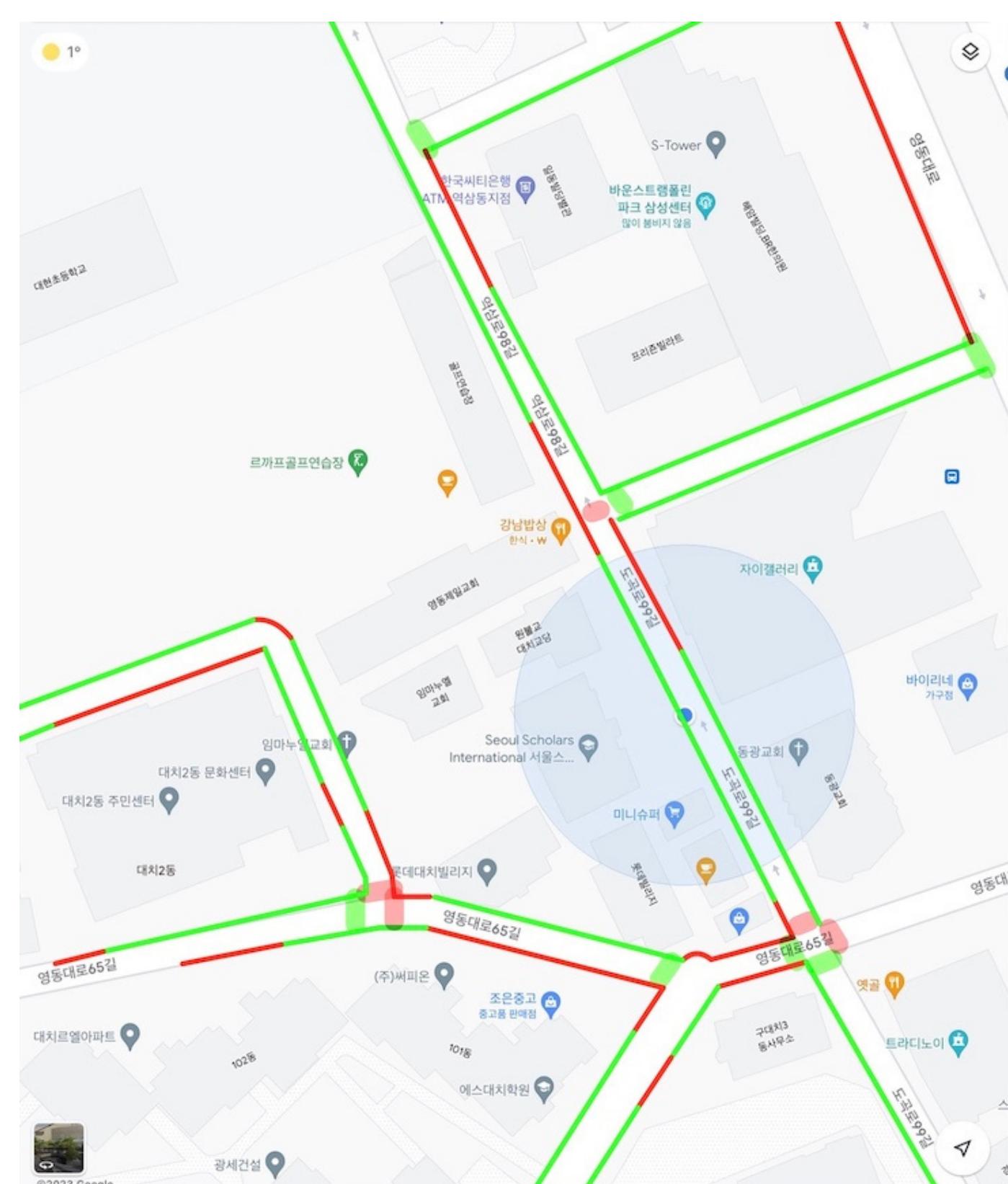
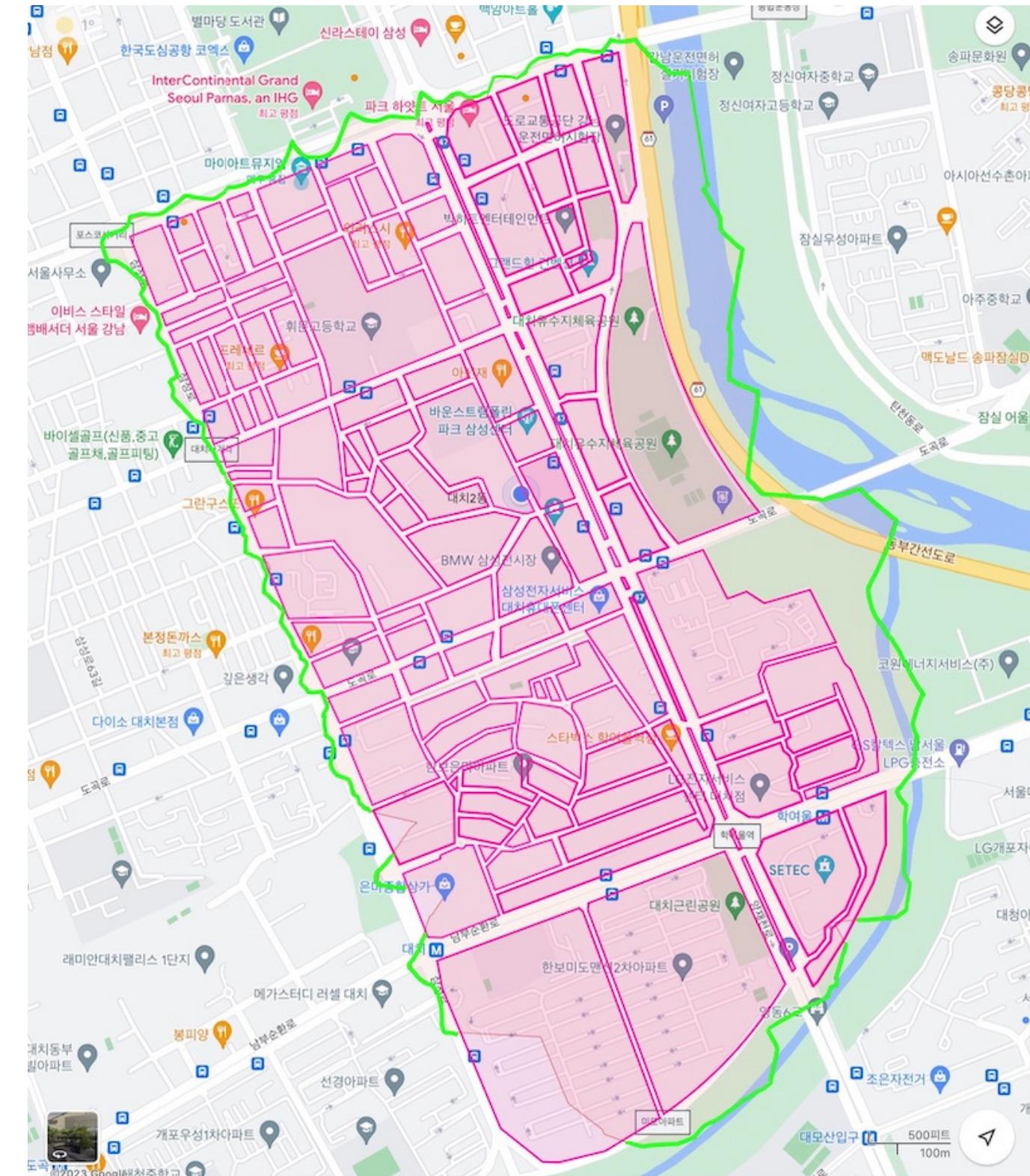
- campaigns for eye health management and prevention
- Analysis of installation status of braille sidewalk block and production of policy proposal report
- Business Plan for the Second Half of the Year:
  - Submission of Policy Proposal Report on Installation of sidewalk blocks
  - Submission of Braille Blocks Report to Gangnam-gu Office, city councilors, and district councilors

# Central Executive Office

TOGETHER WITH BLIND COMMUNITY

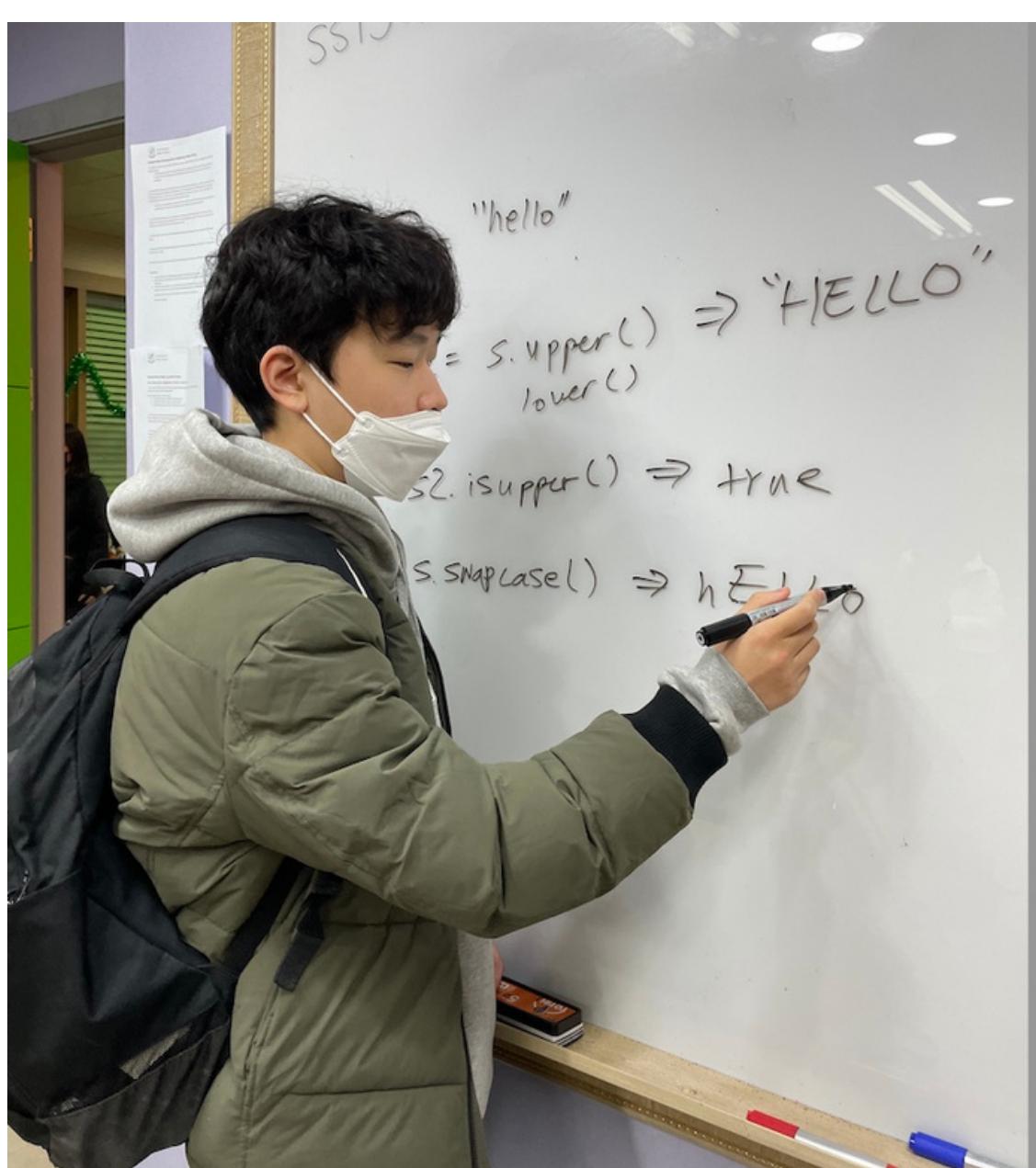
## Braille Block Project

The most recent project we are working on is creating a map indicating all the status of braille sidewalk blocks. Unlike ordinary pedestrians, visually impaired people cannot use visual information when walking, so they use sidewalk blocks to acquire walking information. When risk factors such as slopes or steep slopes exist, visually impaired people can recognize and respond in advance through sidewalk blocks. However, in some areas, even if sidewalk blocks are not properly installed or installed, they are installed in unnecessary places or not properly managed, making it difficult for the visually impaired to acquire walking information. Therefore, it is necessary to re-analyze the installation status of sidewalk blocks in Daechi 2-dong, Gangnam-gu, and propose policies to improve the safety and convenience of walking for the visually impaired. In this study, we analyzed the location and number of sidewalk blocks for the visually impaired to improve their understanding of walking and systematic management.



# Information Technology Office

## COMPUTER SCIENCE CLUB



The Information Technology Office at WidVision plays a crucial role in improving the lives of individuals with visual impairments through the development of innovative technology solutions. With a focus on eye health and well-being, the department conducts research in the field of artificial intelligence and creates software applications to support those with visual impairments.

Under the leadership of Sungju Park who has studied deeply in the fields of AI in ophthalmology, the IT Office is committed to advancing the field of eye health through cutting-edge technology. In addition, the department is responsible for overseeing technical aspects of the WidVision brand, including website development.

### Activity Performance

- Development of fundus disease diagnosis program using deep learning technology
- Manufacture of low-cost fundus camera using Arduino parts
- Business plan for the second half of the year:
  - Development of a glaucoma diagnosis program using cup-to-disc ratio calculation using deep learning
  - distribution of 50 fundus cameras to third-world countries

# Information Technology Office

## COMPUTER SCIENCE CLUB

Among the many projects that WidVision has undertaken, we would like to introduce two of our flagship products. The first is "Vision AI," a cutting-edge human eye fundus screening system that is based on advanced AI deep learning technology. The second is "Vision Capture," a low-cost non-mydriatic fundus camera that is designed to improve the early detection of ocular diseases in low-resource settings. At WidVision, we are committed to promoting inclusivity and improving the lives of those with visual impairments. Our innovative products and programs are a testament to our dedication to this cause, and we are proud to work alongside the blind community towards a brighter future.

### The Idea

One of our esteemed team members, Sungju Park, has been involved in volunteering at an ophthalmology clinic for more than 4 years. During her time at the clinic, she was deeply moved by the number of patients who were unable to receive treatment due to financial constraints. This unfortunate reality is not limited to the hospital where Sungju volunteered, but is also prevalent worldwide. According to the World Health Organization (WHO), there are 339 million individuals globally who are visually impaired, with 43 million among them being blind. Moreover, developing countries account for 90% of the visually impaired population, highlighting the need for external aid due to poor medical infrastructure and economic challenges.

Many of those affected by visual impairment suffer from "avoidable blindness," which can be treated with simple eye care and surgery. This realization was the driving force behind Sungju's inspiration to develop a free eye disease diagnosis system and low-cost fundus camera to provide greater access to care for financially disadvantaged patients. Our product is designed to address the need for universal improved eye health welfare, helping to ensure that all individuals have access to the care they need, regardless of their financial circumstances.

# Information Technology Office

## COMPUTER SCIENCE CLUB

### Product Design #1: Vision AI



Our organization has developed Vision AI, an advanced AI program that leverages a sophisticated model to classify and analyze 24,000 fundus photographs into four categories (normal, cataract, glaucoma, and diabetic retinopathy) based on diagnostic data. This model has been integrated into a website, which provides an efficient and effective means of diagnosing fundus diseases. The machine learning algorithm utilized in this model is Convolutional Neural Network (CNN), which is specialized in image processing. The network has been configured using EfficientNet, and hyperparameter optimization has been used for fine-tuning. This approach has resulted in a highly accurate model, achieving an accuracy of 90.8%, as well as other outstanding evaluation results. Through this collaborative research, we aim to provide patients with detailed and accurate reports of their fundus disease diagnosis. Overall, Vision AI represents a significant step forward in the field of medical diagnosis, leveraging cutting-edge technology to improve the accuracy and efficiency of fundus disease diagnosis, and ultimately enhance patient care.

# Information Technology Office

COMPUTER SCIENCE CLUB

## Presentation: Vision AI

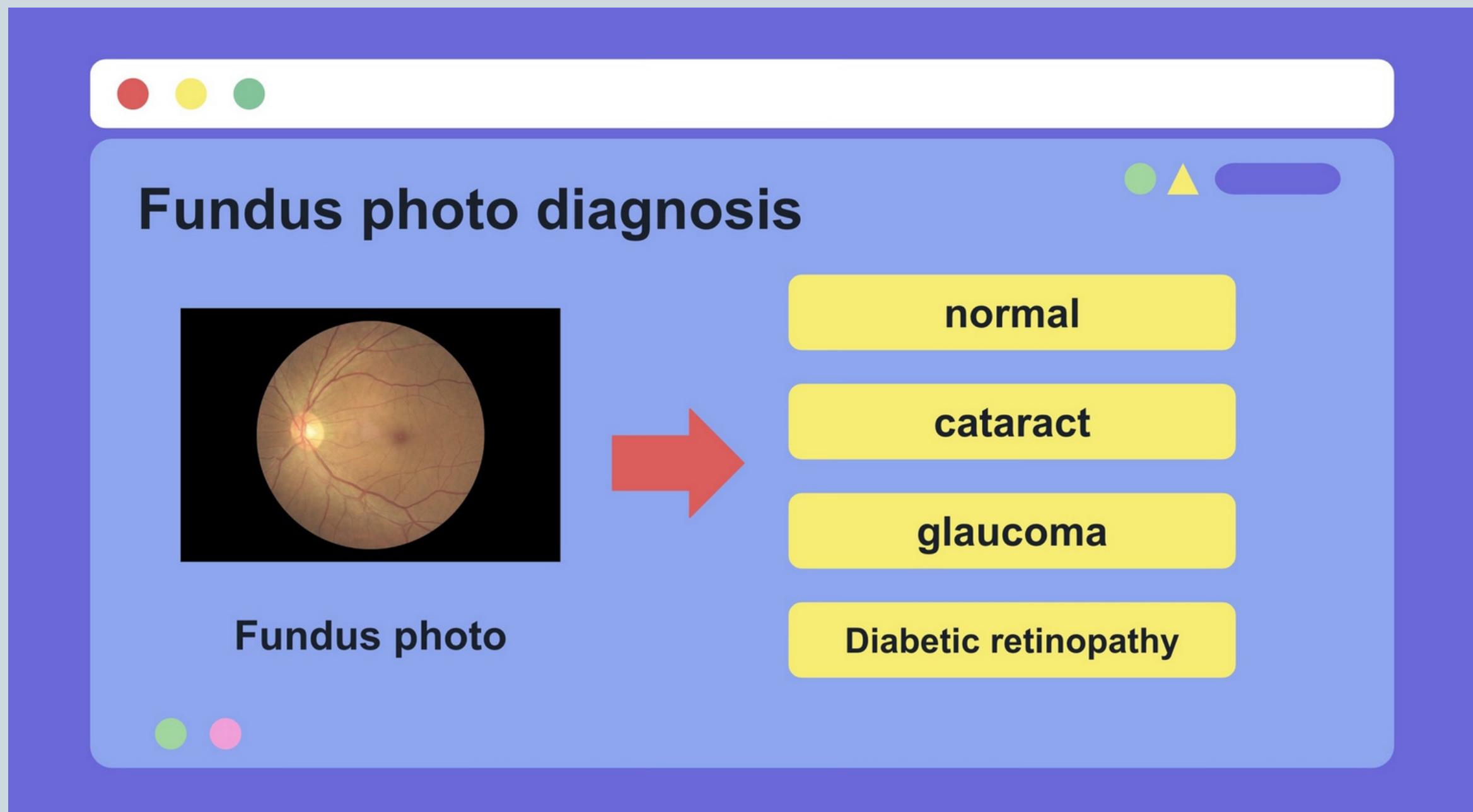
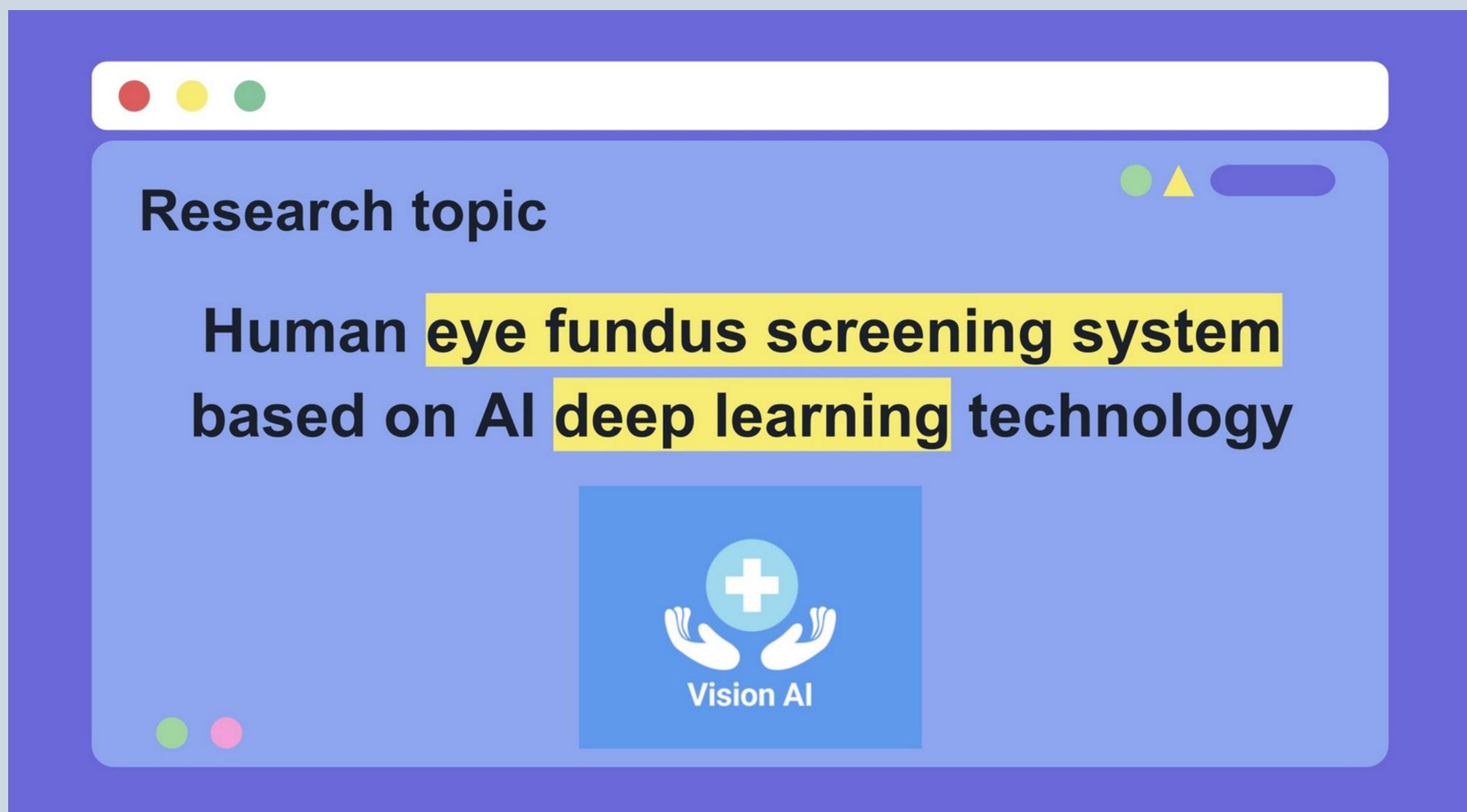
A presentation slide titled "VisionAI: Human eye fundus screening system based on AI deep learning technology". The slide features a dark blue background with white text. On the right side, there is a graphic of two stylized eye fundus images with blood vessels, connected by a network of lines representing AI processing. Below the title, the text "SSI G11 Sungju Park" is visible. At the bottom, there are three yellow folder icons.

A presentation slide titled "Background info". It contains the text "4th industrial era" followed by a large red downward arrow pointing to the text "CAD technology (computer aided diagnosis)". To the right of the text is a photograph of a medical monitor displaying vital signs and a corresponding ultrasound image. Below the monitor is a URL: <https://www.frontiersin.org/research-topics/39224/computer-aided-diagnosis-based-on-medical-imaging-trends-and-future-research>.

# Information Technology Office

COMPUTER SCIENCE CLUB

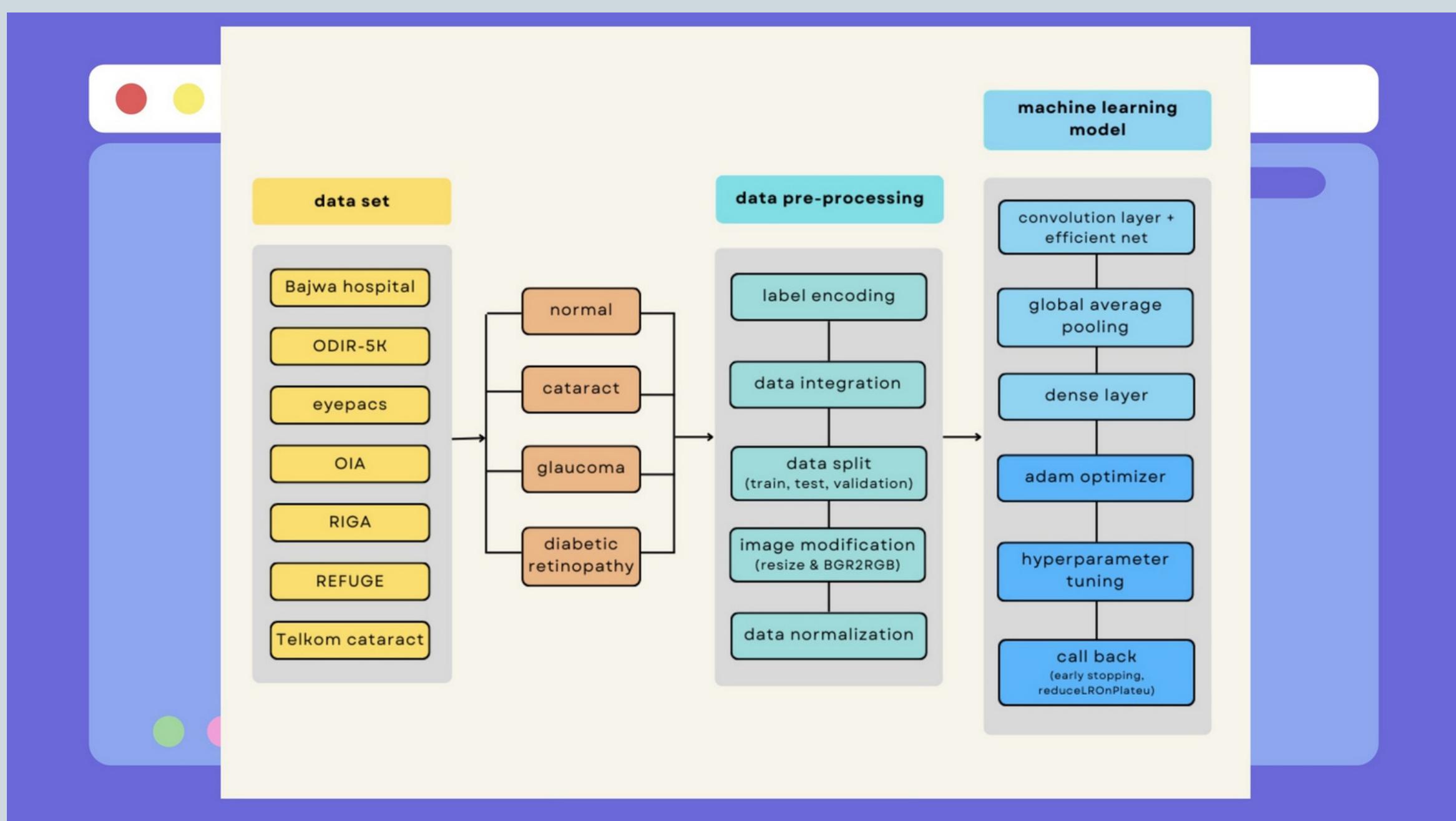
## Presentation: Vision AI



# Information Technology Office

COMPUTER SCIENCE CLUB

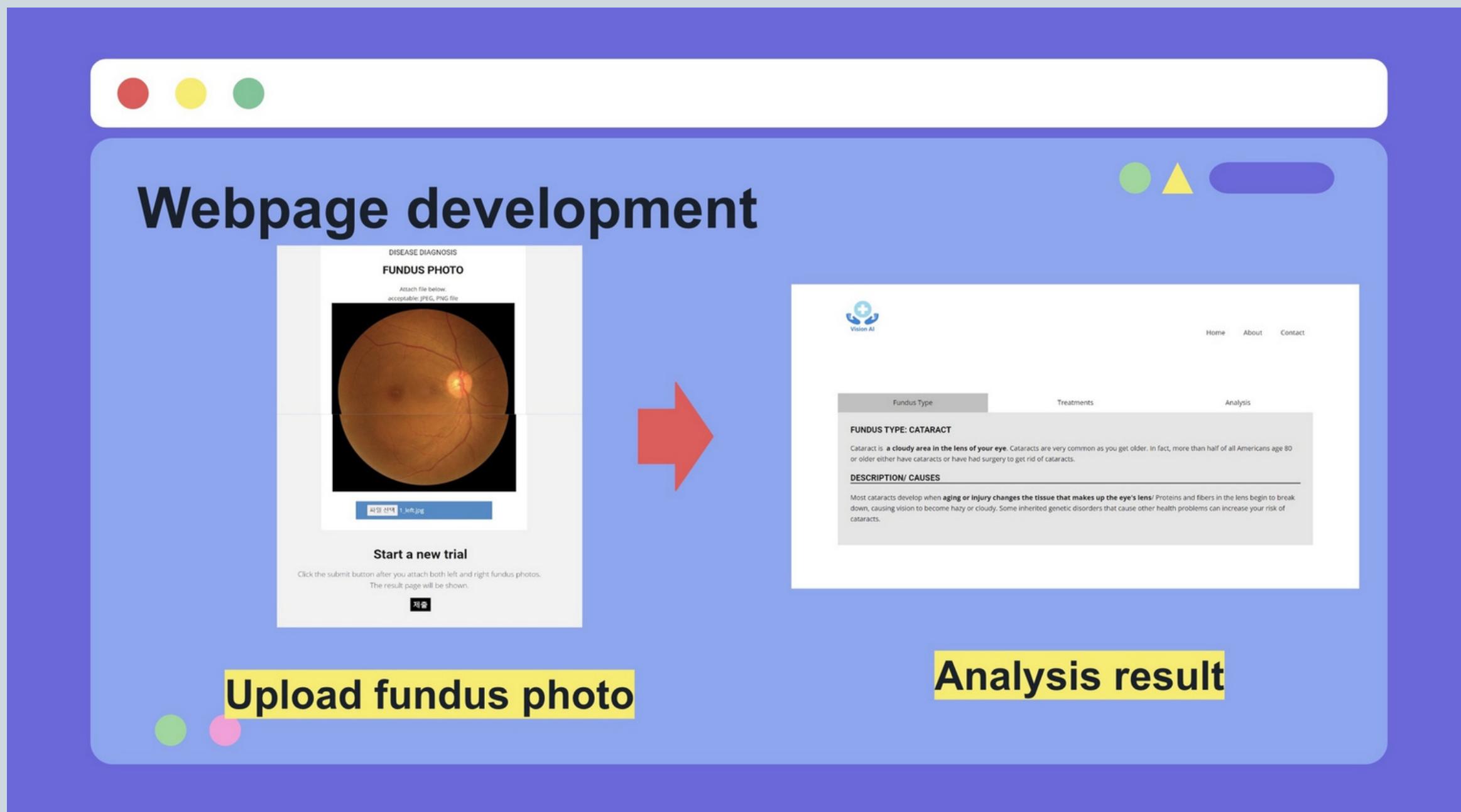
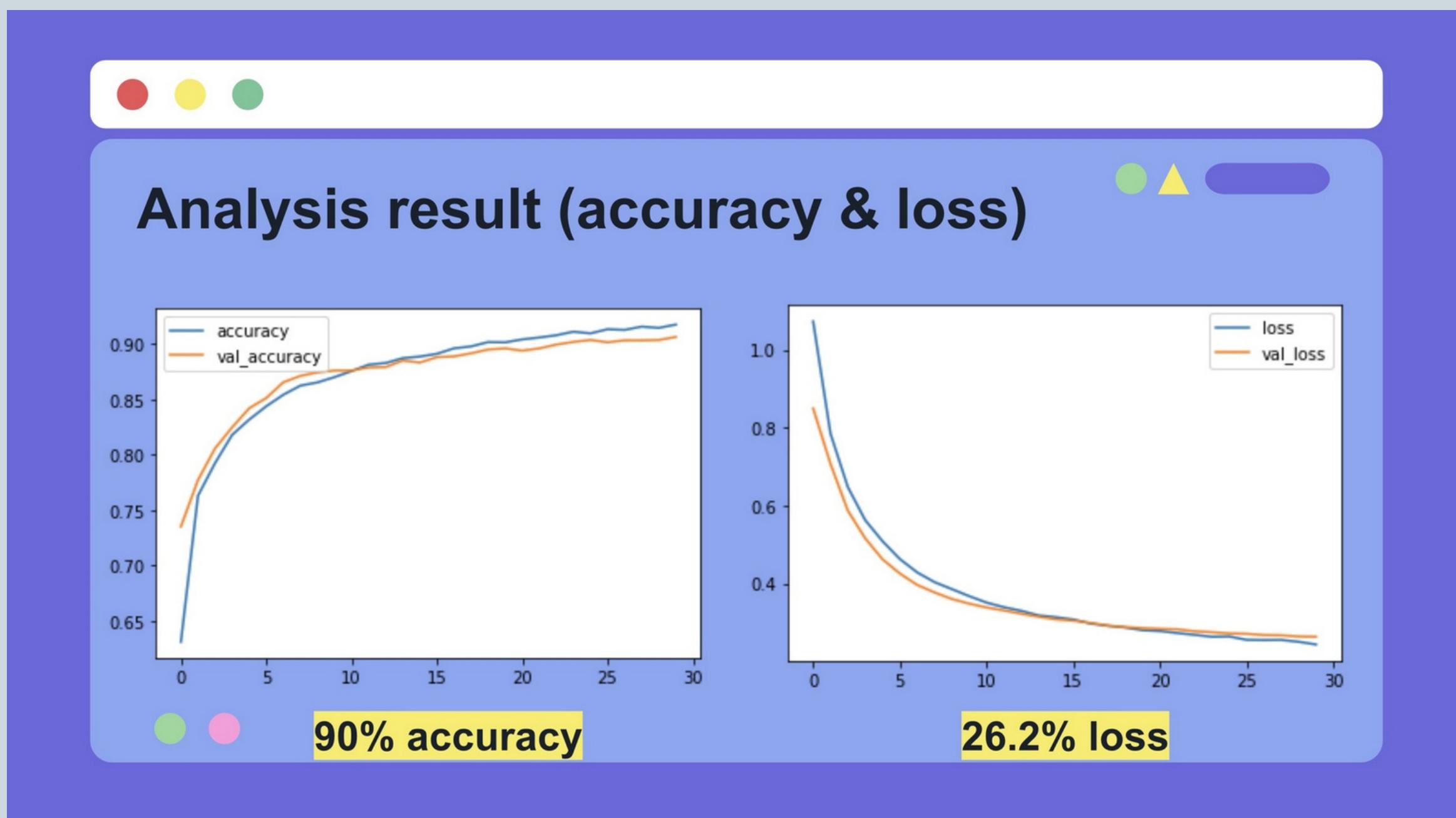
## Presentation: Vision AI



# Information Technology Office

COMPUTER SCIENCE CLUB

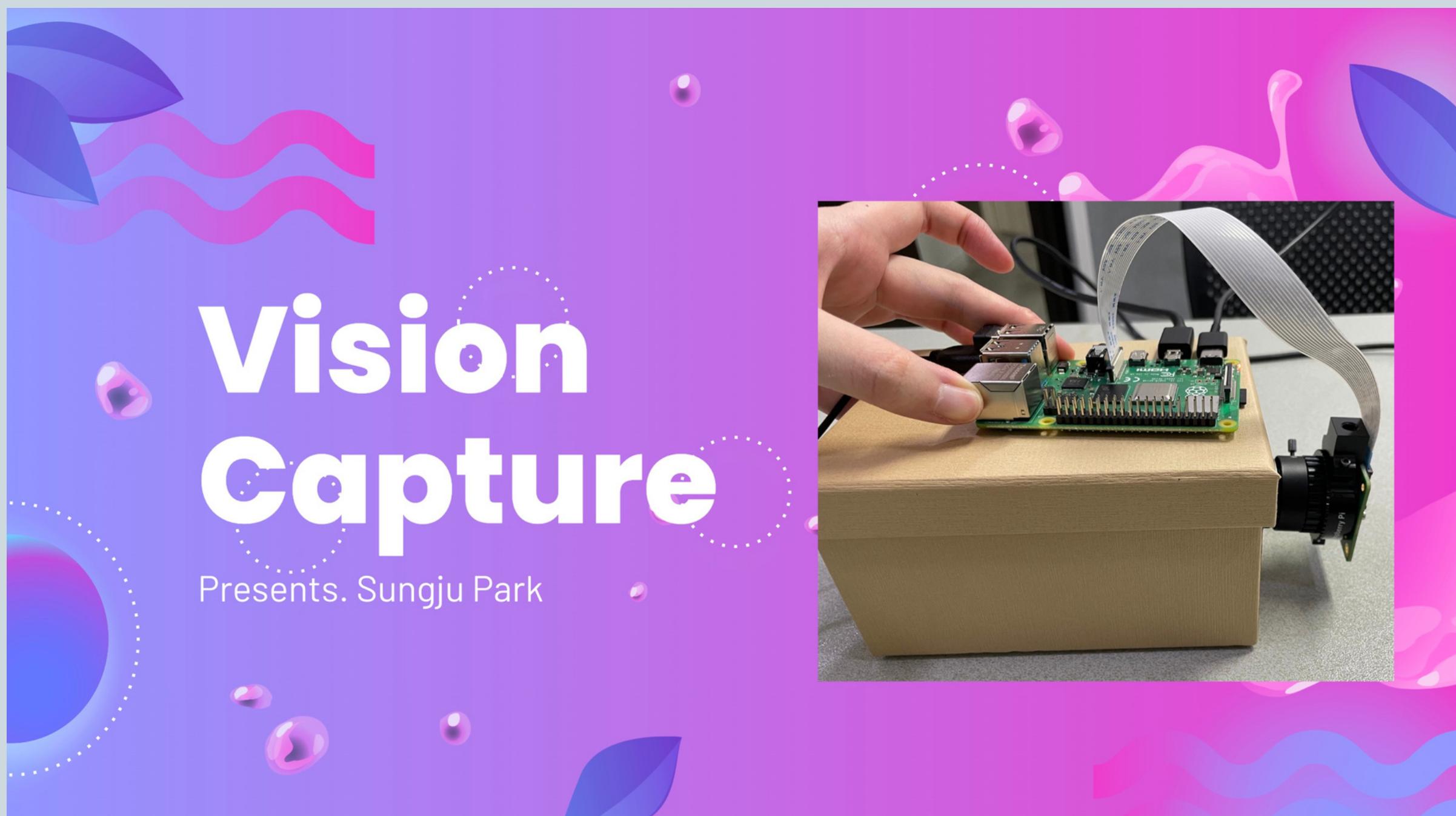
## Presentation: Vision AI



# Information Technology Office

COMPUTER SCIENCE CLUB

## Product design #2: Vision Capture

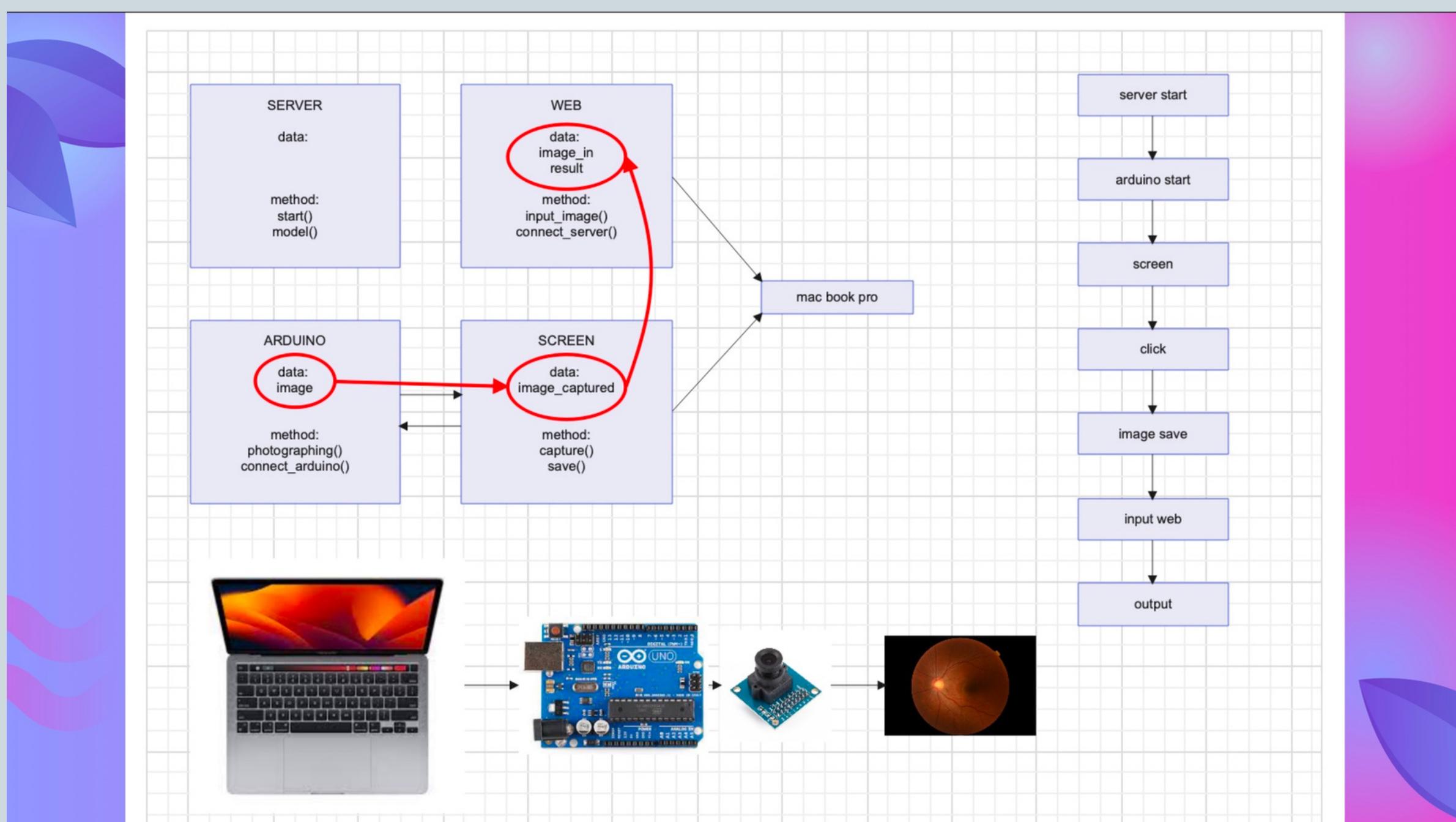


Vision Capture is a low cost non-mydriatic fundus camera designed to allow patients to capture their own fundus images without the need for mydriatic drugs. Traditional fundus examinations require the use of mydriatic eye drops and the expertise of an ophthalmologist using an ophthalmoscope or lens, which can take up to 40 minutes. Eye fundus cameras are commonly used for this purpose, but they can be prohibitively expensive. To address this issue, our team developed a low cost alternative using affordable materials. The camera utilizes an Arduino Uno, camera module, and convex lens to capture high-quality fundus images. By providing a cost-effective option for fundus imaging, we aim to increase accessibility for patients and doctors alike, facilitating more efficient and accurate diagnoses.

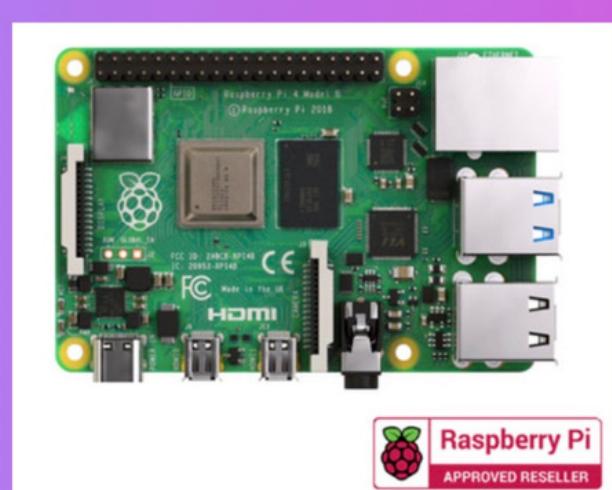
# Information Technology Office

## COMPUTER SCIENCE CLUB

### Product design #2: Vision Capture



### Materials



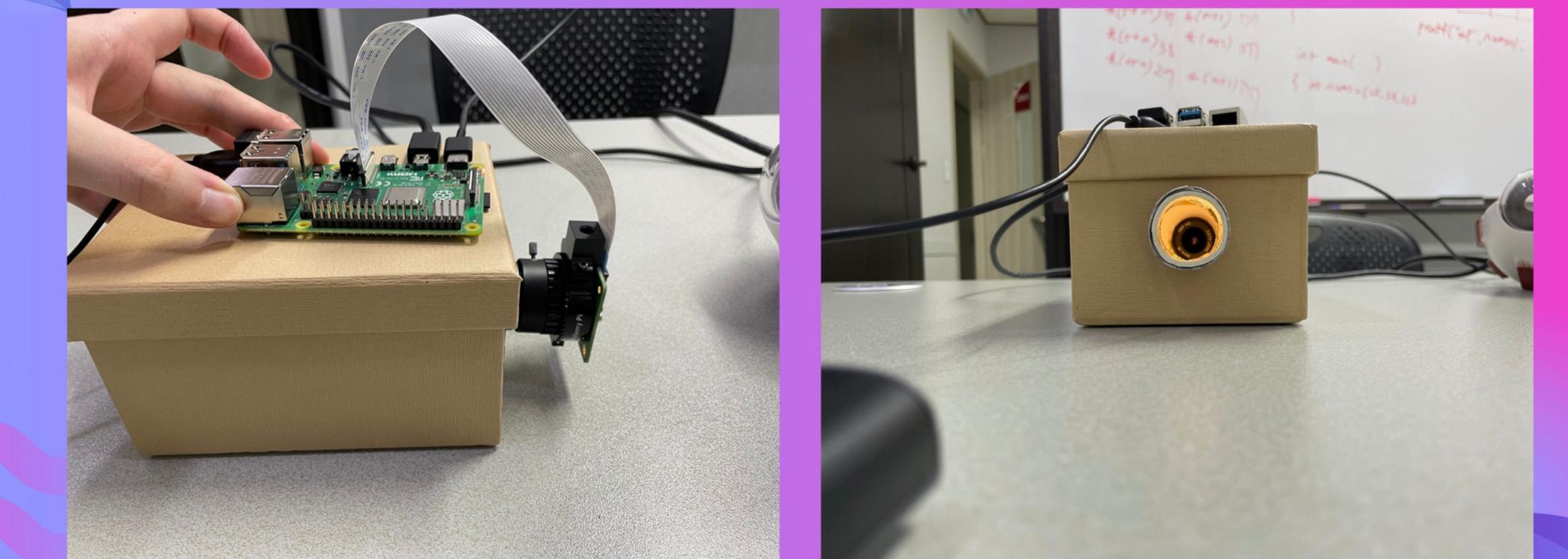
1. Micro SD card (128 GB)
2. Raspberry Pi 4B model
3. Raspberry Pi 16mm Telephoto Lens for High Quality

# Information Technology Office

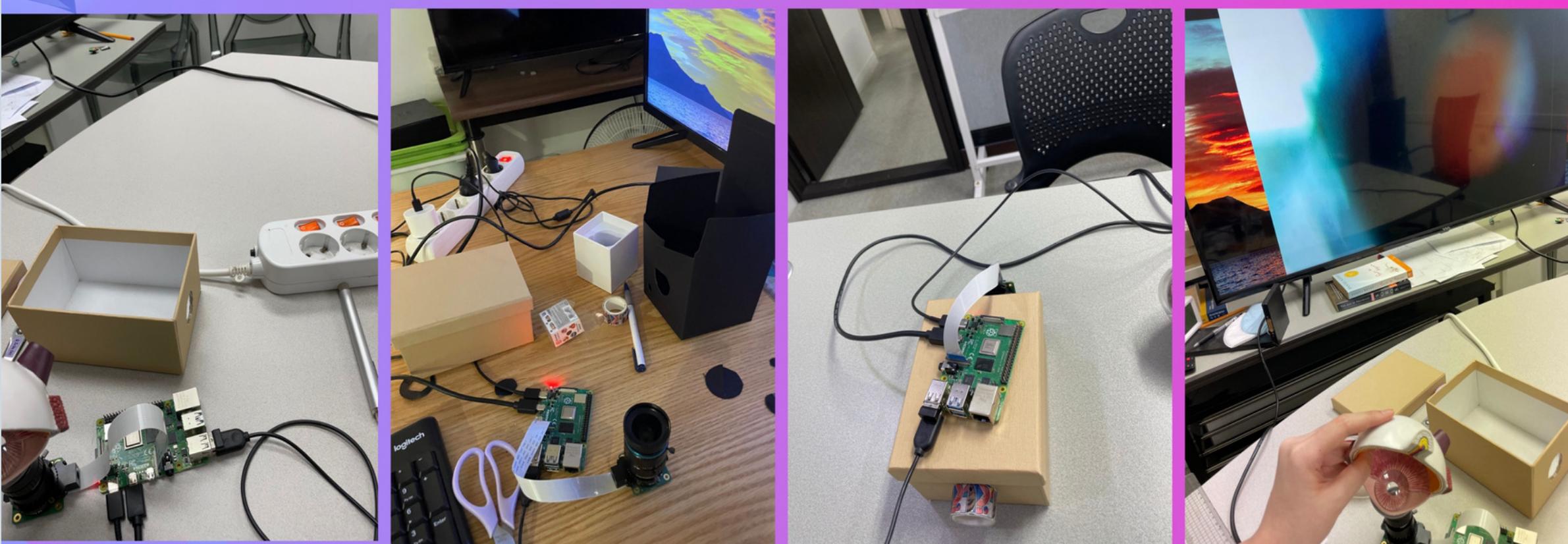
COMPUTER SCIENCE CLUB

## Product design #2: Vision Capture

### Product



### Progress



# Public Relations Office

## NEWSPAPER CLUB

VOLUME 02 ISSUE 03

MARCH 2023

### SCHOLARS TIMES

Religion - World News - Dentistry - WidVision



SEOUL SCHOLARS INTERNATIONAL

The PR(public relations) Office is a department that publishes stories of Widvision through newspaper articles and raises awareness. Representative media promotional activities include presenting the business plan of WidVision or producing articles during events. In addition, the department writes articles on the overall status of eye health and the improvement of treatment for the visually impaired.

The Public Relations Office is tasked with raising awareness and promoting the work of WidVision through various media channels. The department's primary focus is to disseminate information about the organization's initiatives and projects to a wider audience, including the publication of stories and articles in newspapers and other media outlets.

### Activity Performance

- Distribution of articles about eye health
- Business plan for the second half of the year:
  - interviews with eye health workers, interviews with ophthalmologists and faculty

# Public Relations Office

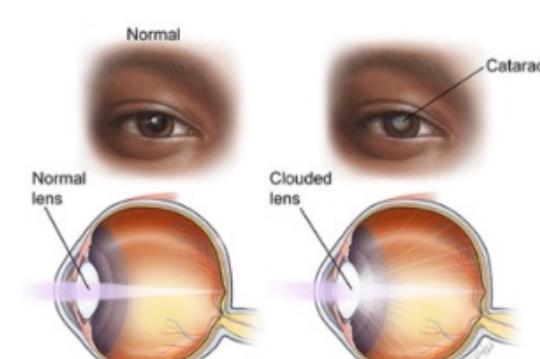
## NEWSPAPER CLUB

VOLUME 2, ISSUE 3

### EYE DISEASE REPORT #1

#### CATARACT

WRITTEN BY SUNGJU PARK



**ALL ABOUT VISION**

**SECTION 4: WIDVISION**

VOLUME 1, ISSUE 2

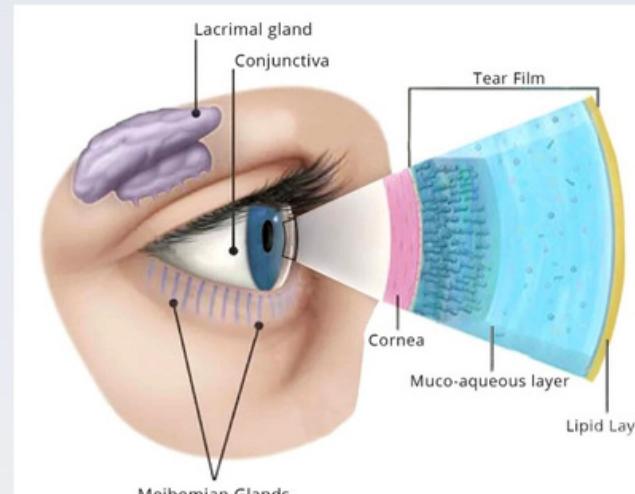
### EYE DISEASE REPORT #1

If you are having difficulty seeing clearly or experiencing any blurriness in your vision, it may be time to schedule an appointment with an eye doctor in your area. These symptoms could be signs of cataracts, which is a common eye condition that affects millions of people worldwide. Cataracts occur when the lens of the eye becomes opaque, resulting in impaired vision and blurriness.

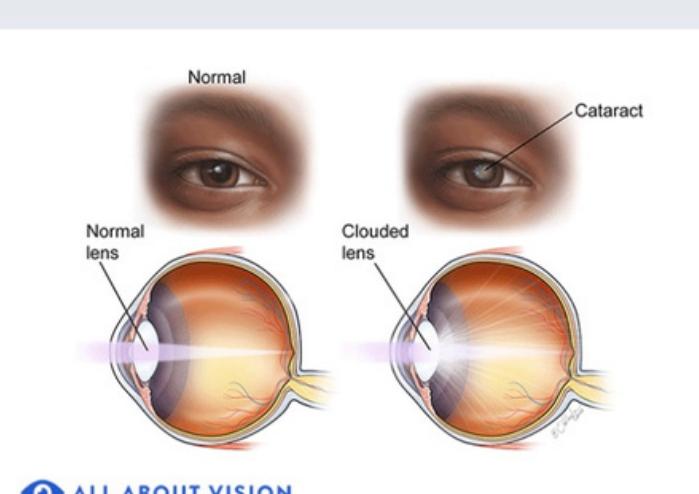
There are several factors that can increase the risk of developing cataracts, including age, genetics, smoking, excessive alcohol consumption, and underlying medical conditions like diabetes. Aging is the most significant risk factor for cataracts, as changes in the lens due to age can lead to the condition. Other factors such as eye injuries, long-term medication use, and radiation exposure can also contribute to cataract formation. Therefore, a comprehensive eye examination by a qualified healthcare provider is essential to identify any underlying vision issues and assess the risk of developing cataracts.

Cataract disease is a significant public health concern, with over 20 million Americans over the age of 40 currently diagnosed, and this number is expected to double by 2050. Globally, cataracts account for approximately 50% of blindness cases, with developing countries experiencing the highest incidence rates. Early diagnosis and prompt intervention are critical to managing cataracts effectively.

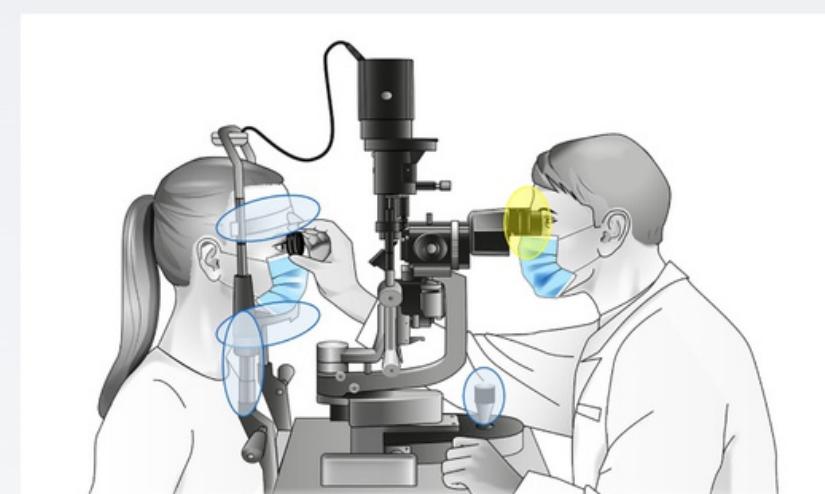
Fortunately, there are treatments available for cataracts. Surgery is the most effective option, involving the removal of the affected lens and replacement with an artificial one. The procedure begins with the administration of local anesthesia to the eye area to minimize any discomfort during surgery. A small incision is then made in the cornea, and an ultrasound probe is inserted through the incision to break down the opaque lens into smaller particles that are removed from the eye using suction. A synthetic lens implant is then inserted into the same position as the natural lens, and the incision is closed with a small self-dissolving suture.



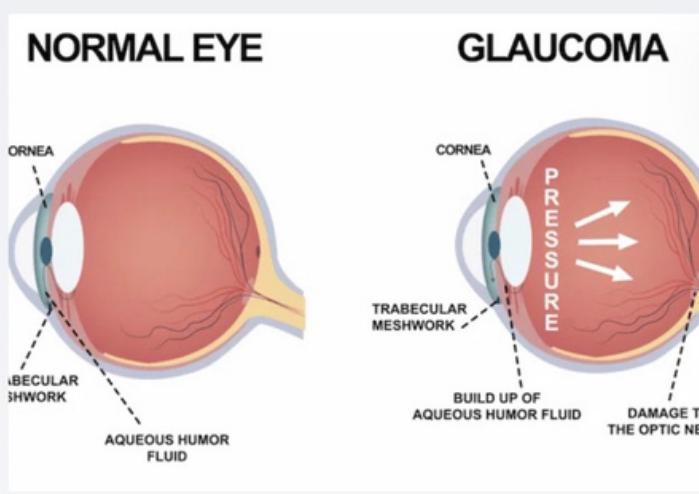
**Eye Disease Report: Dry Eye Disease**



**Eye Disease Report: Cataract**



**How Eye Tests Work**



**NORMAL EYE**      **GLAUCOMA**

**Eye Disease Report: Glaucoma**

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# WIDVISION

Non-Profit Organization



## STUDENT ENGAGEMENT

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