THE SMARTPHONE-ENABLED SLIT LAMP DEVICE

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Slit Lamp Device

- A slit lamp is a device used during eye exams, consisting of a microscope with a high-intensity light that can be focused as a beam through a slit.
- Ophthalmologists use this device to examine different structures within the eye to check for any diseases or abnormalities.
- The smartphone-enabled slit lamp device is cost-effective and widens accessibility for users to take eye exams outside of clinic, especially for cancer patients monitoring the side effects of treatment.

Slit Lamp Optics

- The traditional slit lamp consists of a light source and lens system to focus on the eye.
- Our system utilizes a commercially-available 10x macro-lens attachment that clips directly onto smartphones.
- A double convex lens is used to focus the LED light through the slit onto the patient eye.
- In the future, an ideal light system will be able to scan.

Slit Lamp Optics Diagram

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Lamp

- The lamp on this project is a simple LED diode which has a supported range from 9 Volts to 12 Volts.
- The lamp is powered by a 9/12 (need to finalize) Volt battery which is directly connected to the controller of the LED.
- The controller allows for Pulse Width Modulation (PWM) functionality with a potentiometer.
- The potentiometer on the controller changes the resistance passing through to the LED, which changes the intensity of the light.

Software Structure

- Our app utilizes React Native to facilitate rapid development and iteration.
- The app runs on both iOS and Android.
- The cross-platform Expo Go SDK, which simplifies the development process and supports quick testing on mobile devices.

Backend Integration

- Firebase powers backend for data storage and real-time messaging between clients and doctors.
- Allows for secure storage of user information and facilitates direct communication, including image exchange.

Camera Functionality

- Camera component utilizes Expo Go Camera SDK.
- Lacks features such as zoom, autofocus, and touchscreen focus.
- These functionalities had to be custom-developed, increasing the project’s complexity and development time.

Slit Lamp Optics Diagram

Future Work, References, and Acknowledgments

- There are several key pages:
  - Auth Screen manages user authentication, ensuring secure access
  - Home Screen as the main page
  - Camera Screen for high quality image capture
  - Chat Detail and Chat List Screens for communication with doctors
  - Profile Info Screen for detailed user info
  - Profile Screen allows users to update their personal data
  - Record List Screen for examination history

App Layout

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Slit Lamp Optics Diagram

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