

EE / CprE / SE 491 – sdddec18-12

360 Webcams for Zoos and Aquariums

Week 02 Report: 2018.01.28 - 2018.02.03

General Information

Client: True 360 (Christopher James)

Faculty Advisor: Dr. Henry Duwe

Team Members:

<u>Name</u>	<u>Primary Role</u>	<u>Secondary Role(s)</u>
Nathan Cool	Front-End Engineer	Project Manager, Webmaster
Zach Newton	Front-End Engineer	Scrum Master, QA
Ian Jamieson	Back-End Engineer	Graphics Lead
Alan Negrete	Back-End/Database Engineer	Scribe, QA
Tarek (TJ) Yacoub	Embedded Engineer	Communication Lead, QA
Hosam (Sam) Abdeltawab	Embedded Engineer	Software Architect

Weekly Summary

This week was dedicated to researching and testing our candidate cameras in order to determine which one will be the most feasible for use in our project implementation. In addition to the Insta360 Pro and Ricoh Theta S cameras initially provided, our client purchased a Garmin VIRB and Ricoh Theta V for us to experiment with. We spent time learning how to use the cameras to stream live 360° video on YouTube, as well as searched for documentation on existing APIs/SDKs and other means of interacting with the cameras via programming.

Past Week Accomplishments

Nathan:

- Documentation
 - Created templates for our project plan and design document assignments.
- Research
 - Explored existing documentation for the Garmin VIRB 360
 - Explored existing documentation for the Ricoh Theta V
 - Tested the Ricoh Theta V
 - Was able to successfully set up a live 360° stream on YouTube using the camera and OBS Studio.

Zach:

- Repo/Documentation Management
 - Started discussion for choosing back-end tech stack.
 - Started discussion for choosing front-end tech stack.
 - Started looking at what it will take to implement CI/CD in GitLab.

Ian:

- Research
 - Spent most of the week researching various options for 360 cameras.
 - Received Garmin VIRB 360 and Ricoh Theta this week.
 - Attempted to connect the Garmin VIRB 360 to the internet.

Alan:

- Researched alternative options, received no response from Tardek nor Allie.
- Tested Garmin VIRB live streaming.

TJ:

- Garmin VIRB API
 - Tested out all the commands that the Garmin offers.
 - Created a live stream on YouTube.

Sam:

- Researched Garmin VIRB's API & SDK.
- Researched Ricoh Theta's API & SDK.
- Researched database & embedded systems technologies.

Recent Group/Client/Advisor Meetings

<u>Date, Time, Location</u>	<u>Participants</u>	<u>Details</u>
2018.01.29, 13:15 - 14:45, Marston 3112	Group + Client + Advisor	Prepared for the first Lightning Talk and assigned presenters. Discussed camera options and decided to purchase a Ricoh Theta V and Garmin Virb. Started organizing deliverables and scoped out our first two-week sprint.
2018.02.01, 15:30 - 16:30, Coover 3138	Group + Client	Continued discussion of camera options and roughly outlined the required components for the project (with client feedback).

Pending Issues

Nathan: My joint test of the Ricoh Theta V with Zach yielded a few peculiarities. First, the camera only connects via WiFi and USB (based only on our testing). When connected via WiFi, the camera and the device to which it is connected are not connected to the Internet, which could prove to be problematic. Additionally, the camera requires interaction with OBS Studio (as a middleman) in order to connect and stream live 360° to YouTube.

Zach: The next big thing to figure out is what front-end technologies we are working with so I can start to stub out a skeleton project with testing and such. Depending on Nathan's front-end opinions, we will need to do research on what is best for us and what we're trying to accomplish. CI/CD will be a new challenge for me, but will be extremely useful for ensuring smooth feature rollouts.

Ian: One of the main issues I've had this week is attempting to understand the Garmin VIRB API and how to control the camera through means other than their app.

Alan: Need to figure out how we will be able to start a live stream with the Garmin VIRB, without the use of a 3rd party application such as OBS/VLC. Will be doing more research on alternative open source libraries that allow RTSP streaming & live encoding to RTMP for youtube. A popular solution, FFmpeg, did not work, but I'll start doing research on OBS and if it's possible to use their API/Libraries to stream without the application.

TJ: The Garmin VIRB uses a RTSP (Real Time Streaming Protocol) to stream the live 360 feed. YouTube on the other hand uses a RTMP (Real Time Messaging Protocol). Therefore me and Alan were unable to live stream the feed directly on YouTube. As a result we tried to find other ways to achieve that, which are OBS and FFmpeg. We were unable to stream to YouTube through FFmpeg, but were successful on OBS.

Sam:

- Looking for an alternative for live streaming for the VIRB camera instead of streaming through WiFi.
- Couldn't interface with the VIRB at the beginning.
- Trying to find a way to control either of the cameras through the computer instead of the mobile app.

Individual Contributions

<u>Name</u>	<u>Individual Contributions</u>	<u>Hours This Week</u>	<u>Total Hours</u>
Nathan Cool	SEE PAST WEEK ACCOMPLISHMENTS	10	35
Zach Newton		6	21
Ian Jamieson		10	25
Alan Negrete		6	21
Tarek (TJ) Yacoub		9	24
Hosam (Sam) Abdeltawab		8	23

Upcoming Plans

Group:

- Discuss findings for both cameras.
- Research back-end solutions that will work best with the API of the camera that we choose.
- Research a solution to stream live on YouTube without the use of 3rd party applications. More specifically, something that encodes RTSP to YouTube's RTMP.
- Begin design documentation & project plan document.
- Start a rough draft UML diagram for the project, key points:
 - Authentication
 - Admin
 - Camera API & network management
 - Video timestamping

Nathan: Over the next week, I will be focusing primarily on the project plan, as it is due on February 11th. In the process of completing the project plan, I will work with Zach to decide what we will use to build the system's front-end components. Additionally, I will work with the rest of the team to discuss the collaborative components of the second reflection assignment, as it is due on February 12th.

Zach: Nathan and I will be meeting on Sunday morning to take a look at the Ricoh Theta. We will also probably discuss front-end a bit and document a synopsis of the discussion on the appropriate GitLab issue. After that, it'll be time to hopefully start drawing out screen sketches of the admin portal to run by Chris on Thursday. I will be doing CI/CD research here and there.

Ian: In the coming week, we will have a camera chosen and begin more intensive research of the product. I'm hoping that we can come to a consensus in this regard by the end of this weekend (2/4/18).

Alan: Work on the upcoming assignments for the class, then ensure that the VIRB/Ricoh Theta is the most feasible camera to use for this project. We will need to test the Ricoh's API soon to do a solid comparison between the two. After that decision I will begin to research backend frameworks that will work best with the API that we choose. Currently Node seems like a good option, given that there is an open source project for managing the VIRB using NodeJS.

TJ: Compare results with the other members who were doing tests on the Ricoh webcam. Talk about the issues I encountered with the VIRB to see if any other members have an idea of what to do. I believe it will be hard to decide on a camera by Monday unless the Ricoh yielded better testing results than the VIRB.

Sam:

- Choose the perfect camera for the job.
- Find a way to control the camera with the desktop computer and the mobile app instead of the mobile app only.
- Write code to start the livestream from the cloud instead of saving the live stream and posting it for storage problems.
- Find the embedded hardware that will work best with the chosen camera.

Additional Notes

- The Garmin VIRB is registered on the IASTATE network.