

IOWA STATE UNIVERSITY

Department of Electrical and Computer Engineering

Application Exploration of 5G-and-Beyond Wireless Systems and Rural Broadband

Client/Advisor: Dr Hongwei Zhang
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Meet the Team



Samuel Rettig
Software Engineer



Vibhu Dhavala
Software Engineer



Cristofer Espinoza
Electrical Engineer



Caleb Kitzelman
Electrical Engineer



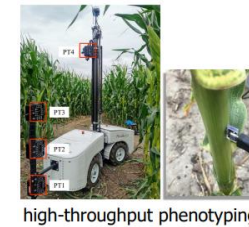
Jake Roskopf
Electrical Engineer



Andrew French
Electrical Engineer

ARA & Project Background

- What is ARA?
 - "... wireless living lab for smart and connected rural communities, enabling the research and development of rural-focused wireless technologies ..."
- Led by Dr. Hongwei Zhang



high-throughput phenotyping



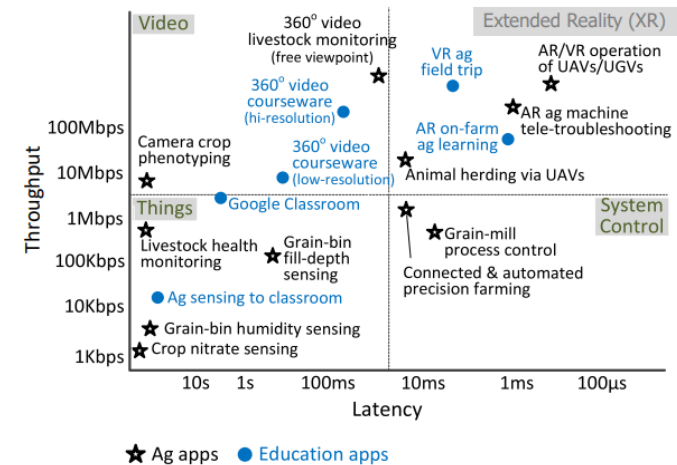
precision livestock farming



agriculture automation

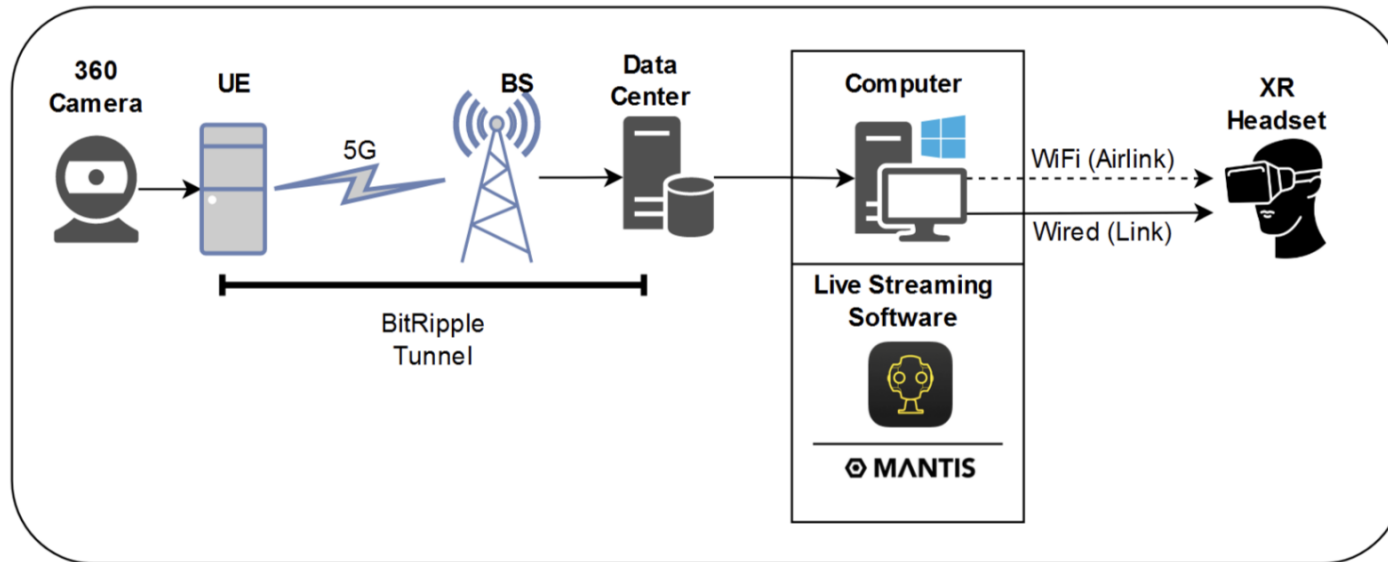


AR-based ag education (Blippar, 2020)



Project Summary

- Create XR Application in Unity
- Implement Data Collection to the Unity project



Semester Goals

Add the capability to stream Real-Time Streaming Protocol (RTSP):

- Using RTSP Unity Plugin
 - *Added into the Assets*
- Writing C+ Script to add stream to Unity texture
 - *Mostly done but tweaking for our application*
- UE with 360 camera uses RTSP
 - *Stream now available via link*
 - Extremely low latency
- Determine if ARA network allows for reliable real-time streaming

Semester Goals

Create an application in Unity to visualize 360 camera stream

- User experience (responsiveness, interfacing, ...)
- UI to switch between different camera feeds to reduce throughput and improve performance.
- RTSP will be more reliable as a result.

Collect network and video related data

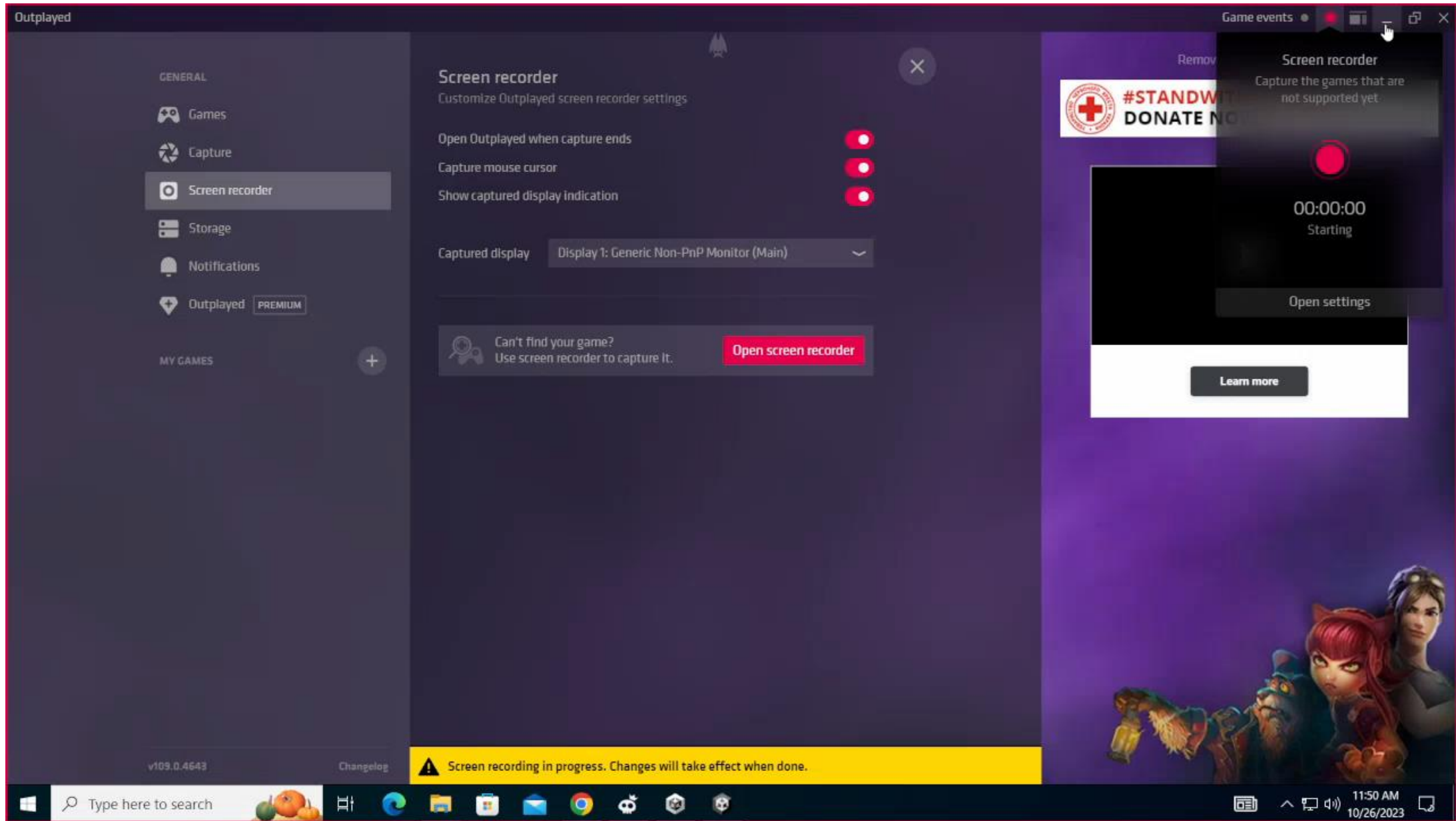
- Research different measurement tools (Unity, third-party, ...)
- Apply tool(s) to application
- Analysis reports

Technical Challenges

- Unity software
 - Application testing on XR headset
 - Data collection capabilities
 - RTSP Capabilities/testing
- Insta360 Pro
 - 2 camera setups
 - How to replicate in field vs development
- Streaming Protocol (HLS vs. RTSP)

Technical Challenges

- Data Collection
 - Compatibility of various pieces of software
 - Extent of data that we can collect
 - Application metrics, UE to client vs local



Timeline

Task	Aug.	Sept.	Oct.	Nov.	Dec.
Research into 5G XR and video streaming					
XR video streaming via RTSP protocol and research data acquisition method					
Create UI for application via Unity and implement data acquisition method					
Application improvement, including performance tracking metrics.					

The background of the slide is a photograph of the Iowa State University campus, featuring the Old Capitol building with its prominent dome on the left and other university buildings in the distance. The entire image is overlaid with a semi-transparent red filter. A thin horizontal line is visible across the middle of the slide.

Q&A

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