PURDUE UNIVERSITY

CAPSTONE/SENIOR DESIGN EXPERIENCE 2018

Virtual Reality Video Process

Agricultural & Biological ENGINEERING

Luke Price (Agricultural Systems Management)

Introduction

Problem Statement

Designing an affordable means to collect a simulated VR video input from agricultural equipment to establish an initial series of educational materials for field operations.

Background

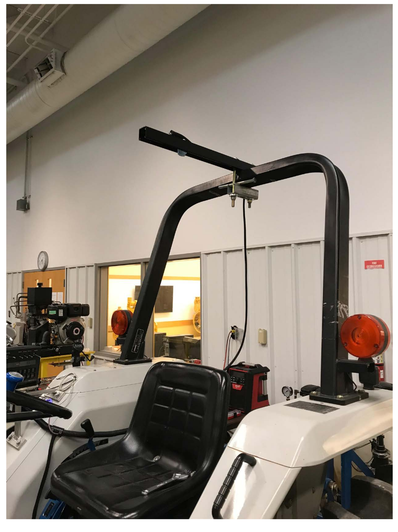
- Virtual reality (VR) is a computer-generated simulation of three-dimensional (3D) image or as an environment that can be interacted with or appear as if an individual is there in the current situation.
- Video from a 360° camera has the capability for viewing like VR in regard to the capability of viewing the video through a head set, however it is not an interactive environment like true VR

Changes During Project

Camera mount design from a two point connection to the ROPs to a single connection to decrease weight of the mount to minimize vibrations.

Camera Mount

Channel allows for camera adjustability Toward the front or rear of the machine.



Data Processing

1. Turn on camera
2. Connect Camera to iPad via Wi-Fi
3. Select desired video format
4. Record session
5. Import Video (automatically flipped)
6. View and quick edit on the iPad
7. Export to computer via cable connection from iPad to computer

Impact and Sustainability

Benefits

- Improved classroom learning
- Save money by limiting field trips
- Ease of use and data processing
- Wirelessly transfer data from camera to the iPad for editing
- Live stream Capable in 1080p or 4k resolution

Disadvantages

- Limited to flat screen viewing
- Limited vibration control ability
- Only a stepping stone to true VR

Constraints

- $1,000 Budget
- Must be accessible to all student with no special equipment
- Robust and simple design

Recommendations

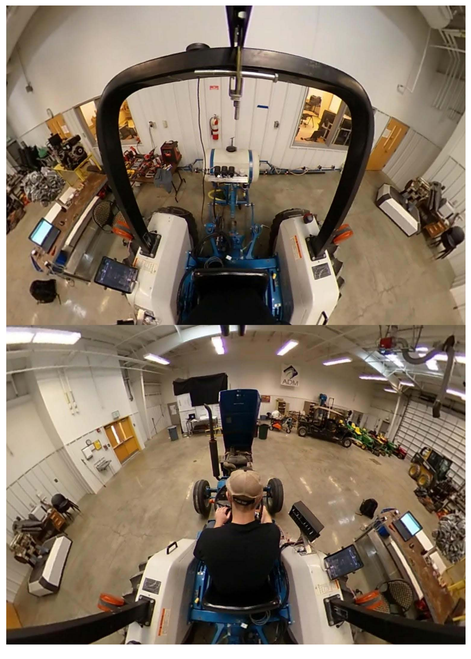
Implementation of vibration damping material.

Alternative Solution

Production Agricultural Drone 360° System

- 360° video camera suspended from a drone

Results



Economic Analysis

Item	Cost	Specifications
Ricoh Theta V	$400.00	Soft case and USB cable
Ipad Mini	$330.00	USB cable and charger
Ipad Mini Case	$30.00	Water, dust and drop proof case
Ipad Mounting System	$60.00	Heavy duty metal
DC Power Socket	$8.00	Outdoor proof
Dc Socket Charger	$20.00	Delivers power to iPad & camera
Wiring	$34.00	12 & 16 Gauge
Camera Mount Material	$10.00	Metal Channel
Miscellaneous Supplies	$8.00	Nuts & bolts, electrical Supplies
Total	$900.00	

Schedule

	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Access Project Status									
Access Ford tractor for familiarity									
Begin Camera mount design									
Feasibility Pitch									
Management Plan									
Order Camera, iPad, and iPad Mounting System									
Preliminary Camera, and iPad testing footage off of tractor									
Obtain space at ADM									
Mock up Assembly of all system components on the for tractor									
Tractor Modifications (electrical and ROPS systems)									
Obtain any other need supplies for final assembly									
Have Camera mount made									
Final Assembly									
System testing									
Take Operational footage									
Create Processing and Trouble shooting manuals									
Wrap up									
Poster and Presentation									
Final report									

Future of VR

Seeing how virtual reality is just now catching on and taking-off, it will soon be possible for students in the classroom to be able to put on a headset with a specific program and be able to simulate the operation of these pieces of equipment.

Final Solution

The ROPs will hold the camera mount that holds the camera suspended over the operators head. The Electrical system of the tractor will serve as a constant power supply to the camera an and iPad wiring connected to the battery power a USB station for the camera and iPad cords to plug into.

Sponsor:
Agricultural and Biological Engineering, Purdue University

Technical Advisor:
Dr. Jain Jin

Instructors:
Dr. Stwalley

Acknowledgements:
Dr. Jain Jin
Dr. Stwalley

PURDUE AGRICULTURE
PURDUE UNIVERSITY

PURDUE ENGINEERING
Think impact.