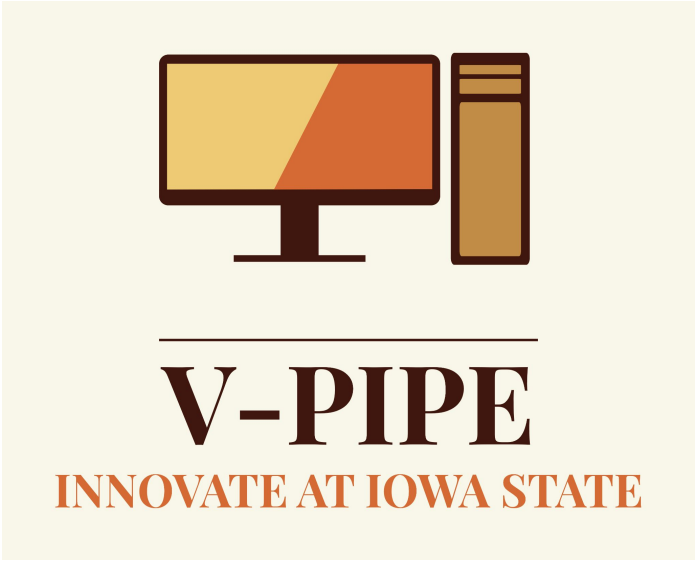
Lightning Talks

Week 7: Ethics and Professional Responsibility

Team Information

- **Project ID:** ssddec24-proj006
- [Senior Design Website]
- **Team members:**
  - Deniz Tazegul
  - Liam Janda
  - Taylor Johnson
  - Ritwesh Kumar
- **Client:** JR Spidell
- **Faculty Advisor**
  - Dr. Phillip Jones



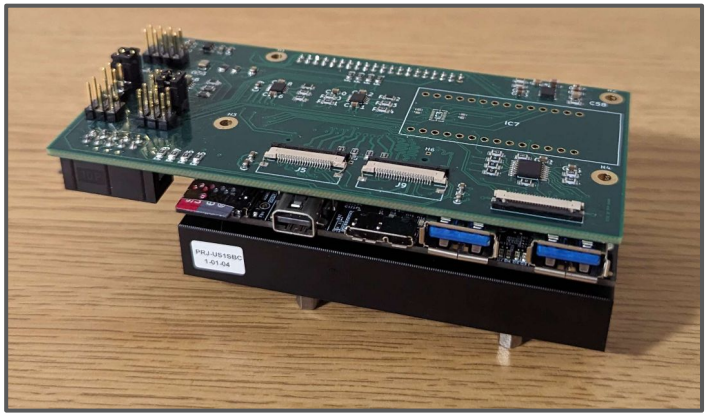
Project Overview

- Developing a FPGA-based video pipeline
  - MIPI-connected “off the shelf” camera module
  - Video monitor
- Augmented video → active displayport cable → monitor
- Software executes in Linux OS
- STRETCH GOAL: Pass video through a machine learning algorithm

IMX219 Image Sensor

Vocabulary

- **IMX219 image sensor:** camera
- **MIPI:** mobile industry processor interface
- **CSI:** camera serial interface
- **D-PHY:** physical communication layer
- **VDMA:** video direct memory access
- **DDR:** double data rate (memory)
- **FPGA:** field programmable gate array
- **PYNQ:** python productivity for Zynq (python embedded systems developers)



Ultra-96 FPGA Board

IDEALS Professional Responsibility

Area	Description
Work Competence	Perform work of high quality, integrity, timeliness, and professional competence
Financial responsibility	Deliver products and services of realizable value and at reasonable costs
Communication honesty	Report work truthfully, without deception, and understandable to stakeholders
Health, safety, and well-being	Minimize risks to safety, health, and well-being of stakeholders
Property ownership	Respect property, ideas, and information of clients and others
Sustainability	Protect environment and natural resources locally and globally
Social responsibility	Produce products and services that benefit society and communities

From the reading "Contextualizing Professionalism in Capstone Projects Using the IDEALS Professional Responsibility Assessment"

Broader Context Considerations

Area	Description
Public health, safety, and welfare	How does your project affect the **general well-being** of various stakeholder groups? These groups may be direct users or may be indirectly affected (e.g., solution is implemented in their communities)
Global, cultural, and social	How well does your project **reflect the values, practices, and aims** of the cultural groups it affects? Groups may include but are not limited to specific communities, nations, professions, workplaces, and ethnic cultures.
Environmental	What **environmental impact** might your project have? This can include indirect effects, such as deforestation or unsustainable practices related to materials manufacture or procurement.
Economic	What **economic impact** might your project have? This can include the financial viability of your product within your team or company, cost to consumers, or broader economic effects on communities, markets, nations, and other groups.

Communication Honesty

Why is communication honesty relevant to our project?

- Effective communication between all team members, client, and faculty advisor is crucial for project success
- Ensure we meet deadlines

Engineers Collaborating

Communication Honesty (continued)

Team's approach to communication honesty:

- **Meetings**
  - **Client**
  - **Advisor**
  - **Team**
- **Content**
  - Project status
  - Ask/clarify questions
  - Receive feedback on past week accomplishments
  - Understanding of project's hardware/software tools

ISU Durham Hall

Telegram

Communication Honesty (continued)

Team's approach to communication honesty:

- **Advisor meetings**
  - Discuss project status
  - Ensure team is on schedule
  - Make sure team understands project hardware/software tools
  - Compile new questions to ask client for clarification

ISU Durham Hall

Communication Honesty (continued)

Team's approach to communication honesty:

- **Team meetings**
  - Discuss project status
  - Work on project as a team or individually
  - Complete class assignments during and outside of class

ISU Parks Library

Communication Honesty (continued)

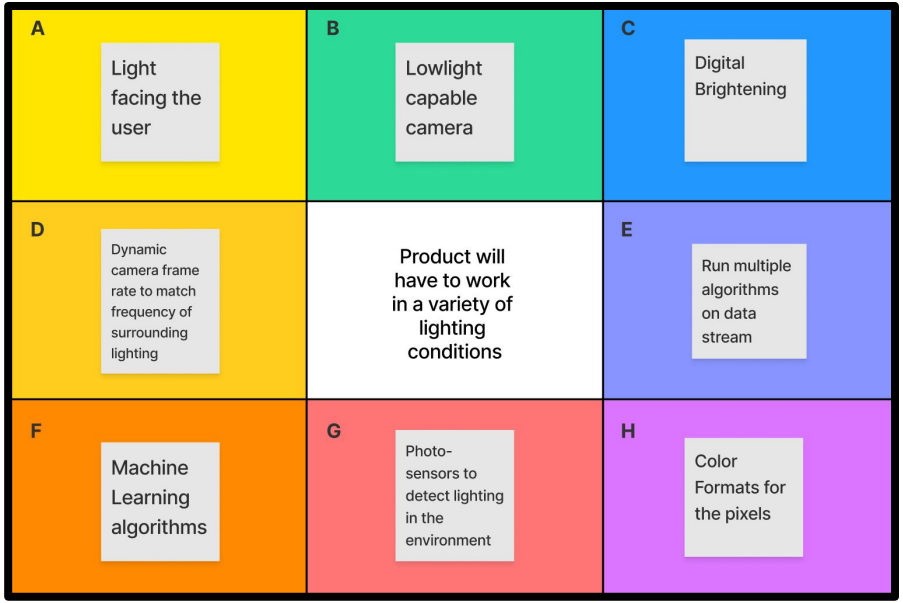
Upholding ethical and professional responsibilities for communication honesty

- Team members report project work with each other, the client, and advisor in accordance with the NSPE Code of Ethics
- Work is reported
  - Truthfully
  - Understandable to client, advisor, and team members

Work Competence

Why work competence is relevant to the project?

- Delivering a quality product in a timely manner
- Need relevant skills to deliver a functioning product according to the requirements & specifications
- Example: meeting lightning conditions



Project Lotus Blossom

Work Competence (continued)

Team approach to work competence

- **Client meetings**
  - Project block diagrams
  - Gantt chart for project workflow timeline
  - Integrating previous senior design project
  - Utilizing a higher quality image sensor
    - IMX219 instead of OV5647
    - image sensor

IMX219 Image Sensor

Work Competence (continued)

Team approach to work competence

- **Advisor meetings**
  - Monitor team project status
  - Suggest ways of improving project efficiency
    - Building a Linux image from scratch
    - Utilize Vivado and ILA (Integrated Logic Analyzer) to debug

Work Competence (continued)

Team approach to work competence

- **Team meetings**
  - Individual research on specific subsystems
  - Presentations for group members to see how the pipeline works
  - Research into existing PYNQ video pipeline documentation online
  - Discuss findings with all team members

Work Competence (continued)

Upholding ethical and professional responsibilities for work competence

- Team will modify its work competence approach to ensure the product is completed in a timely manner and of a reasonable quality in accordance with the NSPE Code of Ethics
    - The team does not have years of hardware design experience working with FPGAs

Work Competence (continued)

To ensure project is complete on schedule, the team will:

- Consult ECpE faculty for technical guidance
- Keep project documentation for use after the summer
- Ask client and advisor for feedback

Potential Ethical Issue Uncertainties

Ethical issue uncertainties

- **Sustainability:** how does this project relate to sustainability and protecting natural resources locally and globally?
  - **Power consumption:** Ultra-96 heating environment
  - **Data usage:** memory usage

Footnote 1 "Sustainable development" is the challenge of meeting human needs for natural resources, industrial products, energy, food, transportation, shelter, and effective waste management while conserving and protecting environmental quality and the natural resource base essential for future development.

NSPE Sustainability Definition