Sprint Status Update

Academic Supervisor/Client: Dr. Imali Dias

Team: The **BOYS**

Team Members: Saksham Behal, Tushar Sharma, Manav Singh

Dear Imali,

We look forward to reporting the progress of this sprint. Our focus in Sprint 2 has been on familiarizing ourselves with FPGA technology. Plus, we tried to do the serial communication with fpga through our host machine. Additionally, we have worked on conversion of decimal to image conversion.

During this sprint, our team has made significant progress in several key areas of our project, including image conversion, testing, version control, and communication with the FPGA. Here are the outcomes of this sprint:

- **Image Conversion Algorithm:**The team has successfully developed an image conversion algorithm in Verilog, which is a critical component of our project. The algorithm has been rigorously tested using a dedicated testbench to ensure correctness and reliability. It has demonstrated its ability to accurately convert images as intended.
- **Communication with FPGA:** Team has focused on establishing effective communication between the FPGA and our system, which is crucial for data to able to read by the FPGA..
- **Alternative Communication Approach:** A team member has initiated an alternative approach involving the use of an SD card to establish communication between the FPGA and a PC.

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Activities carried out during this sprint:

Activity	Team member/s responsible
• Successfully developed an image conversion algorithm and implemented it in Verilog. • Created a testbench to rigorously test the algorithm, ensuring its correctness and reliability. • Responsible for version control, ensuring that all code changes are properly documented and tracked.	Saksham Behal
• Focused on establishing communication between the FPGA and our system. • Conversion of decimal format to hexadecimal.	Tushar Sharma
• Working on an alternative approach, which involves establishing communication between the FPGA and a PC using an SD card. This approach provides a different avenue for data exchange. • Actively working on the implementation and testing of this communication method to ensure its effectiveness.	Manav Singh

Activities that will occur next Sprint:

Activity	Team member/s responsible
• Actively work on code optimization to improve the efficiency of our image conversion algorithm. • Advancement of existing code and further working on the adding of adding new features	Saksham Behal

• Working on the parallelism of code so that it takes less processing time. • Finding libraries that can be used for image processing and adding new features if possible. • Researching on the ways to implement ai (deep learning) for image conversion and enhancement.	
• Resolve the error while setting up serial communication.	Tushar Sharma
• Focused on making the presentation and the documentation • Implementing the alternative method using SD card	Manav Singh

Proposed amendments to Scope:

Project scope to ensure alignment with our goals and objectives:

1. **Expanded Focus on Parallelism**: Given the potential benefits of parallelism in FPGA-based image processing, we propose to expand our focus on leveraging parallel computing techniques. This will enhance the speed and efficiency of image conversion algorithms while maintaining accuracy.

2. **Incorporating Deep Learning**: To address the increasing demand for advanced image processing capabilities, we suggest incorporating deep learning techniques into our project. This will enable us to explore the potential of neural networks for image recognition and enhancement.

3. **Integration of Advanced Image Formats**: While we initially aimed to support basic image formats, we propose extending our project's capabilities to include support for advanced image formats commonly used in various applications, such as medical imaging (DICOM) and high-definition satellite imagery.

4. **Real-time Processing**: To cater to applications like autonomous vehicles and robotics, we suggest investigating real-time image processing capabilities. This will involve optimizing our algorithms for low-latency, high-speed processing.

5. **Scalability and Deployment**: We propose to consider the scalability and deployment aspects of our solution, allowing it to be deployed on a range of FPGA-based hardware platforms with ease.

6. **Security and Privacy Considerations**: Given the sensitive nature of some image processing applications, we will incorporate security and privacy considerations into our project scope, ensuring data protection and compliance with relevant regulations.

7. **Performance Benchmarking and Testing**: We emphasize the importance of rigorous benchmarking and testing throughout the project, not only in Sprint 2 but as an ongoing process. This will ensure that our solution consistently meets performance and accuracy standards.

Please let us know if you have any questions.

Sincerely,

The Boys