

**Thesis Project Portfolio**

**Rapid Global Positioning from Monocular Data**

(Technical Report)

**Free Information in Expensive Books**

(STS Research Paper)

An Undergraduate Thesis

Presented to the Faculty of the School of Engineering and Applied Science

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In Fulfillment of the Requirements for the Degree

Bachelor of Science, School of Engineering

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## **Sociotechnical Synthehesis**

Information is the base of our era. Information defines the ways in which people today understand and interact with the world around them. It is vital in our society to understand how we get information and which subset is available to us. Being able to compile and derive data, as well as having access to the data in its original forms, is paramount.

My technical work was in deriving spatial data from a video feed and foreknowledge of the environment. Computer vision techniques have been in development for years now, but compiling vision data into usable packets is something that often needs to be done on a per-use basis. My work was to create a framework by which vision data such as object detection can be converted into relative or global spatial information on the target. This was done by processing image data through a machine learning algorithm to identify the location and size of a ball in frame, then adjusting for location and scaling based on the known size of the ball and camera angular view.

Tackling the issue from the other end, my STS research primarily focused on access to information and the ways that people have tried to capitalize on limiting that access. This research followed the path of the textbook through modernization into the information age. The research attempts to answer the questions: what makes a textbook so valuable? and why have prices risen so much recently while production costs have been declining to nothing? This process helped draw ties between profits and the ways that consumer choice interplays with the market; ie. the model accuracy of capitalism in the textbook marketplace. An interesting potential failure point of this system here is that the consumer is abstracted from the choice of the textbook via both the professors and the schools.

My technical work faced some hardships due to time limitations, especially with regards to a competition that the research team was competing in early in the spring semester. To compound that, some research time was lost due to complications with Covid-19. With that said, The project was successful in completing the basic goals of the research. While I am disappointed by an inability to expand the research to more complex cases, the model was successful. If I could attempt the work again, I would ensure that I had access to my work remotely regardless of complications. The STS research was mostly in finding a project; once I found research that I enjoyed doing, the paper practically wrote itself. The paper succeeded in fulfilling research goals. Another researcher might enjoy following up on this research once Covid-19 has been handled in our society. The upheaval of classical capitalism that is expected to follow may or may not affect the textbook industry and will be an interesting project regardless of what happens.