

# Alcon Truevision Vision Statement

**Team Name:** Surgeon City

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## Project Importance

There is a lot of noise in a surgery. Since surgeries can take a long time, there should be a way to condense the surgery into a highlight reel. To do this, we need to remember what the surgeons are saying to one another while ignoring the ambient noises such as beeping from machines. This can help in training new surgeons through condensing a large video into an easier to digest report. There is a related field called Video Content Analysis (VCA) that studies this problem of trying to figure out the sequence of events that occur in a video.

## Projected Project Outcomes

The projected outcomes from our project will be recording surgeries for future analysis in both performance and educational use, and providing information for surgeons during the operation (such as closed captioning). The other goal that we had was to analyze the objects used in the surgery for further analysis.

## Project Milestones to hit

The first milestone would be to get the basic input/output to work. Video in, analysis of the video as the output.

Then we would need to continue this by making sure that our program would be able to analyze a constant input of video. The analyzation will be outputted in an easy-to-read format, whether it be the closed captioning or the report at the end.

Before we can do this, we would need to meet with our mentors at a weekly basis to make sure that we are on task, plan the technology that we can or will use, research the technology that would allow us to accomplish our tasks, then set up a sprint task force that would make sure that everyone would know what their responsibilities are.

## What tasks we would need to accomplish

- Audio Processing
  - ❑ Firstly, ignore the unnecessary noise.
  - ❑ The main part will be to use signal processing techniques to identify what words are being said and to transcribe them in text.
- Image analysis
  - ❑ Given an image or video, there should be a way to see and identify the common items used, like scalpals, pencils, or even people moving around in the video
  - ❑ We could use some database and machine learning to better identify the items to make the highlight report, this would help the user get some idea on what tools were used

## Questions for the Project:

- How is it done now and what can be done to better improve it?
- What is the workflow of surgeons during a surgery?
- What are some issues that could result during our project?
- How to track anything in the video?
- Analyze the video or lots of images?

## Possible Technology:

- Python
- C++
- Visual Studio
- Machine Learning
- Natural Language Processing

## Process Model:

For this project, we will follow the principles of Agile software development. We will keep track of our tasks with Trello. Then we will research the technologies that we will use and from there we could do our implementation. We will see what stretch goals can be accomplished after the implementation.