Linearizing the Clio Detector

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Abstract:

For this project, I had to calibrate the Clio infrared detector using Python code. Due to the detector’s light saturation, there was a non-linear data trend. Therefore, I had to write code to figure out how the data should be calibrated. I first obtained data where the exposure time was gradually increased. I had to read in every picture’s exposure and brightness count, and devised a way to linearize the pictures to correct them through an equation. I took the coefficients generated and calibrated another set by applying the generated coefficients. My biggest accomplishments revolved around learning Python and seeing how coding was applied in a scientific setting. I also learned about the process of data collecting and how that relates to work beyond my undergraduate career. Since the data set is now calibrated, we can fix more data sets from Clio, and use those to accurately measure the brightness of other stars and exoplanets found with this instrument.

Presentation Preparation:

SLIDE OUTLINE

* Slide 1: Project Name and My Name
* Slide 2: Adaptive Optics Introduction/Me talking about Calibrating, coding, and result of project
* Slide 3: Picture of Magellan AO system
* Slide 4: My Specific Project Introduction, i.e. what was I doing this year?
* Slide 5: Defining words like linearity, talking about how I learned to do this (python)
* Slide 6: Picture of my code
* Slide 7: explaining the rest of the coding process to audience, different steps of coding
* Slide 8: Results of my coding, what did it do in the end?
* Slide 9: Picture of raw counts and corrected counts, before and after
* Slide 10: Impact on extrasolar planets
* Slide 11: Thank yous to my mentor and the program
* No index cards during presentation, but signed copies of my more in depth report that I wrote (make a joke about this at the end)
* Come off as personable: not condescending towards audience when talking about more scientific topics
* For presentation (business casual): Tan chinos, light blue or white shirt, dark blue tie with tie clip, maybe a grey cardigan, dark brown belt and dark brown shoes with argyle or light brown socks
* For dinner (business dress): black FITTED slacks, dark blue shirt, black tie, maybe suit jacket
* 7 minutes of slide time: PRACTICE
* 1-2 minutes of questions, practice fielding questions from Katie, Kara, and parents for 3 diff. levels
* Needs more jokes: 15 sec anecdotes (at the beginning and at the end)? About the semester-long graph?
* But don’t try too hard with the jokes. In fact, don’t try at all. The funniest things are never the try hard ones.
* Strong beginning: MAKE AN IMPRESSION- What do I want my audience to think about me/ my presentation?
* Strong ending: WHY IS THIS IMPORTANT? -Extra solar planet discovery, adaptive optics is one of the most important components for modern telescopes
* Transitions between slides: what do I want to say in order to move onto the next topic?
* **DON’T READ THE TITLE OF THE SLIDE AS YOUR INTRODUCTION TO IT LITERALLY THE WORST THING**
* Titles should be about 3-5 words in length.
* No more than 3-4 bullet points per slide, or 2-3 bullet points on one half of the slide and a picture on the other part
* Sample goals from github (use these):
  + Astronomical Instrumentation, Adaptive Optics
  + Infrared Cameras (Detectors, Electronics, Computers, Dewars)
  + Data Analysis, Image Processing
  + Python
* Connect dewar filling to how infrared detectors need to be kept cool: Answer why was my hands-on work (besides coding) important to the project as a whole?

Core Content?

Much like the abstract, the core of your presentation will flow through a) statement of the problem, b) objectives, c) methods/activities/analysis techniques, d) results and e) interpretations of the results and their significance/use/impact.

* Look off of abstract for this one

Audience?

The audience will be scientifically aware (other Space Grant students, mentors, parents, etc.), but will not necessarily be versed in the jargon of your specific topic. Therefore take care to define technical terms and spell out acronyms.

* Adaptive optics: define terms towards the beginning

How long and how many slides?

Presentations at the Space Grant Symposium are 7 minutes long with 1-2 minutes for questions afterwards. How many slides depends on your pace, etc., but a general rule of thumb is one minute per slide. In the Symposium, your presentation will last 7 minutes, so start out targeting no more than 7 slides. (You might have more slides if you have images which illustrate something well, but do not require much air time.) Avoid prolonged discussion on any one slide. Timed practice runs will help you fine tune your presentation length and number of slides.

* 10 slides, 7 minutes

Opening?

Most presentations use the title slide to begin: title, your name, and key acknowledgements (your mentor's name and affiliation and folks who worked with you directly), the name/place of the symposium and the date. Somewhere on the edges of this slide it is a good idea to put logos of organizations key to the research, including the Space Grant logo (a number of versions are available at https://spacegrant.arizona.edu/about/logos). Since Space Grant is the primary sponsor, it is common to place the Space Grant logo in the bottom corner of all subsequent slides as well.

* In the slide outline

Outline of Presentation?

It is a good idea to briefly summarize what you are going to present at the beginning. It helps focus the audience and organize your own thoughts. This can be done verbally on the opening slide, or as a bullet list on the second slide. Which depends on your style, comfort and pace.

* Sum up project on second slide
* Telescope→Pictures→Computer→Program→Graph (Took me 5 months for steps 3-5)

Closing?

Generally presenters close on the second to last slide where they discuss their interpretations, giving some insight of future directions. After completing that slide, they advance to a "Thank you" slide that offers the opportunity for questions.

* Insight on second to last slide, thank you’s on my last slide

Questions not covered in my main presentation slides?

If you have something technical or complicated that you feel is too detailed for the main presentation, but which might come up in questions, it is ok to have prepared an extra slide that you place after your "thank you" slide (in other words, a slide kept in reserve, just in case).

* What common questions will pop up?

Positive vs. Negative?

Research, R&D, science education and science writing all have moments of success surrounded by periods of trial and error -- and frustration! While your presentation may include mention of the challenges overcome and not overcome, the focus should be on those elements that you did do and which moved things forward rather than those things which had to be discarded for whatever reason.

* Took me 5 months to get it right

Images?

Images are excellent, particularly where they aid comprehension. They often are better than strings of detailed text. They can be core to a slide or used to add clarification and break up text. (It is important that you credit the source of the image on your slide.)

* Graphs, pictures, diagrams (1 of each)

Backgrounds and Text Colors?

Background colors have the potential to add energy to a presentation, but should never be permitted to impede comprehension. Be careful about standardized, fancy backgrounds – some are distracting to the audience and others take up far too much real estate without adding to your message. Many presenters use a simple background (basic white with black text or dark blue with white or yellow text), using images and the actual words chosen to provide energy to the slides. (Red text is generally very difficult to read regardless of the background.) Ask someone good with colors to comment on your choices. A simple test? Flash a slide to someone who has never seen your presentation and ask them what they saw first – if it anything other than your main message, change your slide!

Animations?

PowerPoint animations (e.g. flashing text, appearing and disappearing bullet points, fancy slide transitions, etc.) should be used very carefully if at all: avoid anything that can distract the audience from your message and impede comprehension, or that forces your audience to look at specific text. What you really want is for the audience to concentrate on what you are saying, while taking in / reading the slide at their leisure.

Capture images, screens, windows, parts of screens, etc.?

Capturing images of websites is fairly easy in most browsers: right click the image, and either “copy” or “save” the image. (Remember to credit the source in your PowerPoint either on or next to the image, including who took the photo and the web page you borrowed it from.) Capturing windows, screens, and parts of screens can be a bit more tricky. There are a number of simple methods (e.g. Ctrl + Print Screen key on many keyboards provides these functions). There are also a number of freeware or shareware applications that make this very easy and fast, such as ScreenRip (<http://www.progency.com>).

Font Type?

Sanserif fonts lend themselves well to computer projection. Computer projectors rarely handle light, thin lines well. It is therefore recommended that presenters avoid serif fonts (which are wonderful for documents, but hard to read when projected onto a screen).

Encouraged: sanserif fonts (a category of typefaces that do not use serifs, small lines in or at the ends of characters). These include, among many others, Arial, Helvetica, Avant Garde, and Geneva. Why? Easier to read when projected. Discouraged: serif fonts (typefaces that use serifs, light lines or curves called serifs projecting from the top or bottom of a mainstroke of a letter). These include, among many others, Times Roman, Courier, New Century Schoolbook, and Palatino. Why not? Light lines do not project well, making them harder to read.

Font Size?

Too many words in tiny font sizes should be avoided! Specific font sizes will vary, but generally slide titles should be larger (e.g. 40pt), while bullets can be smaller 32 or 28pt. Avoid using smaller than 24pt, other than information less critical to topical comprehension (e.g. providing credit for a photo). The only exception is where text is used as a visualization to illustrate a concept or an activity and the details therein are not essential for comprehension. For example, a snapshot of a table with numbers used to illustrate a concept like "Database Development" or "Statistical Analysis" if and only if you do not expect the audience to read the table.

How Best to Present?

The answer to this comes from practice. When you practice alone – something recommended as you form the presentation -- make sure to speak out loud (full voice) and, in at least one run through, watch yourself in a mirror. Next, do a practice run with people who you know well (comfort is important at this stage, as is an audience which is not versed in the specific topic you are presenting as they will catch jargon and technical terms that need to be defined). Finally, do a practice run with your colleagues where you work. In all practice runs, it is very important to pretend that each run is a live presentation. Before starting, ask your audience to do the same, and ask them to note any suggestions which you can discuss afterwards. Remember to time each practice run so that you eventually are able to consistently complete in 7 minutes.

Strong beginning and strong finish?

Memorization rarely if ever helps a presentation. However, having a strong beginning and strong finish can make a world of difference. These get you rolling, reduce nerves because you are rolling, and help you gracefully off the stage!

Transitions?

Rather than memorizing what you will say on each slide, identify the transitions you want between slides. Two complimentary methods work well: a) plan for the last thing you say on a slide to be the opening for the next slide, and/or b) place something on the slide (a word in the last bullet or an image) that cues you as to what is coming next. Good transitions lead to good presentations and are much more effective than rote memorization.

Delivery?

Your slides should speak for themselves -- so face your audience (rather than the screen) and avoid reading your own slides out loud or to yourself. Eye contact is very helpful for communication, and walking, gestures, and occasionally (too much can be distracting) directing audience attention to a particular aspect of a slide (e.g. with a laser pointer) can add energy and focus to a presentation. Some presenters use notecards, but a much more effective method is to use cues in the slides to prompt what you want to say. (For example, you may have a slide which has the title "Methods" with an image of your laboratory (or classroom or newsroom), a field site, or some key piece of equipment accompanied by a succinct list of major methods, activities and/or analysis steps. Use the title or the image to cue your discussion and summarize the major points. Important information that you do not have time to discuss directly during the presentation can and should be included in the list. Let the slide address the general substance of what you are saying and the related details you do not have time to say. In this example, if any particular method requires more explanation because it was essential to achieving results, have a follow up slide highlighting / explaining that particular method.

Questions?

At the end there is generally 1 to 2 minutes for some questions. Most of these you will be able to answer directly, however you always have the option to move back through your presentation to support your response with a particular slide when needed.

Presentation Slide Specific Notes:

Slide 1: Introductory Slide, introduce myself, my mentor, my project

Slide 2: What’s the big idea? Define adaptive optics and what I generally did

Slide 3: Picture of Las Campagnas and picture of me doing science: Where the instrument is located, and what hands on work looked like

Slide 4: Introduce Clio, what steps I took to help out Clio, and hands on work I did

Slide 5: Define relevant terms for the project

Slide 6: Show my code, which really doesn’t tell audience anything. Note that.

Slide 7: Explain the coding process that I took

Slide 8: What did I spend 4 months doing? How did I apply those results to other pictures?

Slide 9: Show how the data was corrected, mark that it wasn’t much of a change, so why was it necessary?

Slide 10: Proceed to lay the smack down on why this stuff is necessary to adaptive optics as a whole

Slide 11: Thank everybody everywhere, take questions

Common Questions and their answers: