

Poster Reference Guide

ELECOMP Capstone

Overview

This document serves to assist teams with design of their posters for the ELECOMP Capstone Design program. Its aim is to explain the poster template, your responsibilities in working from the template, and further explain what design changes you are at liberty to make. The poster used for reference is from Acumentrics' Project FaultLine from the 2019-2020 academic year.

Template Usage

The poster template, as provided, requires modification by the capstone team. These modifications generally involve replacing text with your own. However, there are some visual modifications to be made.

Title and Header

Your Main Title Here

Your subtitle will go here, use it to describe your project if necessary

Team Members: First Last 1 (CPE), First Last 2 (CPE), First Last 3 (CPE), First Last 4 (ELE), First Last 5 (ELE), First Last 6 (ELE)

Technical Director(s): The name of your Technical Director/Directors

FaultLine
Power Signature Analysis for Fault Detection and Predictive Maintenance

Team Members: Daniel Forman (CPE), Brianna MacDonald (CPE), Dominick Barata (ELE), Lucas Halkidis (ELE), Cydis Embria Ludviksdottir (ELE)

Technical Director: Brenden Smerbeck (*17)

- Main Title: Self-explanatory, replace the title with your own
- Subtitle: Replace with your subtitle if its relevant. If not, delete the subtitle.
- Team Members: Insert your team members names, followed by their engineering discipline.
- Technical Director
 - Do **not** include the parentheses. If you have only 1 technical director, remove the **(s)**. If you have more than one, only remove the parentheses (Technical Directors)
 - If your technical director is an alumni of the program, provide their graduation year after their name and enclose the year in parentheses
 - If you have Consulting Technical Directors, add a pipe before adding their name
 - Technical Directors: John Doe, Jane Doe | Consulting Technical Director: Jim Doe
- Company Logo: **Delete BOTH "Your Company Logo" and the parentheses.** Replace this with the company logo. The logo should be of legible size and not take up the whole space.

Key Text Sections

The image shows two examples of poster text sections. Each example consists of a blue header box with white text, followed by a white content box with blue text, and a word count at the bottom.

PROJECT MOTIVATION
Similar to the one-pager, here you will describe the motivation for your team's project. You can also describe any overview items to better acquaint people with the product, the company, etc.
Word Count: Approx. 160 words

ANTICIPATED BEST OUTCOME
The best anticipated outcome is :
• You can choose to either create a list or write in a paragraph
• To describe your team's best outcome
• A list would be easier for viewers to read
• Ideally, you'll use this sections to define the points you'll speak about in your key accomplishments
Word Count: Approx. 50(list) - 100 (text)

PROJECT MOTIVATION
All electronic devices require energy to operate – which can be derived to a voltage and current value. In these electronics, power consumption changes over time; appliances consume a varying amount of power depending on their intended action. By analyzing power consumption, a system can uniquely identify specific device characteristics. Through learning this "power signature", a system could identify abnormal device behavior and notify users to prevent catastrophic failure. Due to the deployment of Acumentrics' systems in secure environments, data collection will not occur in the field. Therefore, most cases of failure analysis occur upon the return of the system to the company, usually after system failure. Similar to earthquake prediction - accomplished by analyzing characteristics at notable fault lines - the goal of the project is to be proactive instead of reactive. By leveraging machine learning, we hope to be able to predict electromechanical failures.

ANTICIPATED BEST OUTCOME
The Anticipated Best Outcome is:
• A functional prototype capable of modeling a single connected device and detecting abnormalities in behavior
• The system must be non-intrusive and rely solely on the power signature of the connected device
• If the above is accomplished, the ideal outcome would be a prototype that can perform the above action for multiple devices connected on the same line, with unique identification of each device based on its signature.

These sections make up the majority of the poster. The sections will be composed of your original content. Formatting guidelines include:

- **Font:** Use the same font for all content boxes. The headers use Trajan Pro – a premium font. If you do not have access to the font, the font will be added after submission.
- **Font Size:** Use the same font size for all content boxes. If you must change the font size, make it a small change (.5, 1.0 difference).
- **Spacing:** Do not use large line spacing. This wastes space and make the poster look sparse. Rather, use spacing before and after paragraphs or manipulate the size of the boxes to add additional space for other sections and/or images.
- **Justification:** Use left and right justification whenever possible. This keeps things neat.
- **Margins:** Use margins to create or remove space for text. If you have more text than can fit, reduce margin size or increase the size of the boxes. Sufficient margins make the section readable and not appear too dense.
- **Box Alignment:** If you modify the size of the boxes, ensure that:
 - If you resized a section on the left side of the page, the left side remains aligned for all boxes

Quick Tip

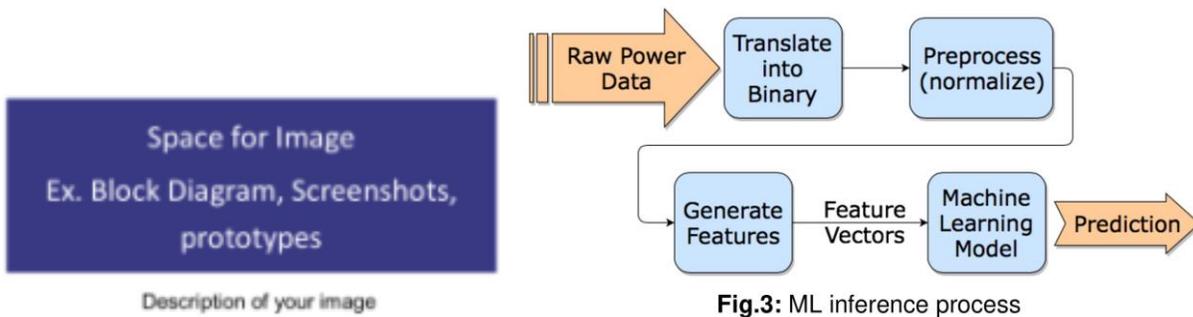
- In lieu of bullets, you can use bold headers as well to specify sections

KEY ACCOMPLISHMENTS

Appliance Selection: A fan was selected as our target appliance due to its low-cost, easily inducible electromechanical faults, and complex power load. Since the appliance has both real and complex power components, the power signature of the device will be more unique.

Fault Mode Induction: In order to train the ML model it was necessary to induce unique fault modes into the target appliance. Over the course of the two semesters, our team induced three fault modes within the target appliance. First one increasing the load to the motor where five quarters were attached to one blade. Second decreasing the load where a single blade was removed from the fan. The last one was burning the motor by holding the blades still for thirty seconds, repeated for 20 iterations.

Figures



There are several spaces marked for use in placing your figures. These should be clear images that relate directly to a text portion of the poster. As a general guideline, you should number these figures. At the end of the related portion of text is found, indicate the figure to be referenced like so. **(Fig. 3)**

Note that the rectangles on the template are not required and were merely added as placeholders. Should you decide to use the rectangle ensure you do the following:

- Note the width and height of your image and the measurement unit (pixels, inches, cm, etc.).
- Select the rectangle you'd like to use as a frame and set the width and height such that it is an even frame around the image. This is easiest when calculating in terms of pixels. If you do not do this, the frame looks misshapen.

Modifying Template Structure

The template is, ultimately, a template. As such, you are at liberty to modify sizing of elements to suit your needs. However, the overall structure of the poster must remain the same. Example modifications that are acceptable include but are not limited to:

- Reducing width of yellow sidebar to allow for larger text and figures
- Reducing height of key text sections to reduce whitespace
- Reducing space slightly between title/subtitle and student names to increase available space

At no time should the header or footer bar be modified.

Note

After your poster is submitted, it will be revised to match the other posters. Any spelling or grammatical errors may not be edited, so review your poster before submission. If low quality images are used or there is an issue, the team will be contacted to provide new images or resolve the issue.

ADDITIONAL NOTE

Ensure that your pictures are **high resolution**. The ideal poster size is 36x24 inches, and low-quality images will negatively affect the appearance of your poster. See the ELECOMP website for a guide on using high-quality images.