Project title
Project Proposal

Author 1

Author 2

Author 3

Author 4

Department of Computer Science and
Engineering
Texas A&M University

January 13, 2020

Contents

Executive Summary (1 page; 5 points)

The executive summary is a brief description of the project. The purpose is to give a quick overview of (1) need, goal and objectives, (2) design and implementation, and (3) expected results and benefits of the project. The intended audience of the executive summary is a program director, someone who makes decisions about which projects will receive funding. Since the executive summary is a summary, it should be written last.

1   Introduction (1 page)

1.1   Problem Background (5 points)

Describe the general scope of your project, and the specific problem that your project is addressing. Go from general (e.g., search and rescue robotics) to specific (e.g., GPS navigation). In most of the senior design projects, the problem background is an area of research or an application domain within computer engineering.

1.2   Needs statement (5 points)

After you have introduced the problem domain, it is time to define a specific need that your project will address. Articulate the need as an expression of dissatisfaction with the current situation.

1.3   Goal and objectives (5 points)

The goal is a brief, general, and ideal response to the needs statement. The need describes the current, unsatisfactory situation; the goal describes the future condition to which we aspire. The goal statement is so ideal that it would be difficult to decide when it was achieved. It rather establishes a general direction for the design mission. In contrast, the objectives (there will likely be more than one) are quantifiable expectations of performance. The objectives should also include a description of the conditions under which a design must perform. Specifying the operating conditions will allow you to evaluate the performance of different design options under comparable conditions.

1.4 Design constraints and feasibility (5 points)

Describe the constraints (e.g., technical, physical, economical, temporal) that you have to work with. In many cases, your needs statement will have already identified some of the constraints that your design will have to meet. Assess the extent to which your project objectives can be accomplished.

2 Literature and technical survey (1-2 pages; 10 points)

Describe prior research and development efforts that are specifically related to your problem, your needs statement, and your goals and objectives. This is not meant to be a comprehensive survey of an engineering discipline, but a concise overview of the most significant results that are tightly related to your project. As a guideline, this section should include a review of not less than five commercial products or research projects. This review should conclude with a statement that explains the extent to which your proposed design relates to these other products/projects (e.g., is it better? or faster? or cheaper? does it target a new niche market?).

- Existing product or project 1

- Existing product or project 2

- Existing product or project 3

- Existing product or project 4

- Existing product or project 5

3 Proposed Work

3.1 Evaluation of alternative solutions (1 page, 15 points)

This is a critical aspect of your proposal. For any goal there are likely many alternative solutions. In most cases, the alternative solutions will emerge from your literature and technical survey. What you have to do here is analyze the pros and cons of each of these solutions (and hopefully additional solutions you come up with), and justify your decision to opt for a particular solution. As a guideline, this section should include not less than five alternative solutions:

- Alternative solution 1

- Alternative solution 2

- Alternative solution 3

- Alternative solution 4

- Alternative solution 5

3.2   Design specifications (3-4 pages, 15 points)

Once you have identified a solution that addresses the needs of the project, it is time to present the specifics of your design. Start with a high-level block diagram of the system (i.e., 5 building blocks or modules), followed by a description of each module. This description should include techniques (e.g., algorithms, devices), parts (e.g., hardware, software), and the "glue logic" that will make the system work. Your proposed design should build support for the feasibility of your project.

3.3   Approach for design validation (1 page, 10 points)

This is a very simple but important aspect of your project. How will you test that your system does what it was designed to do? Does it solve the stated need? The validation tests should be consistent with the conditions under which your design must perform, as stated in the project objectives.

4   Engineering standards

4.1   Project management (1 page, 10 points)

Briefly list the qualifications of the team members and decide who will be in charge of each of the different areas in the project (team leader, systems design, software design, hardware design, finance and purchases, testing, technical reporting, etc.) Describe the mechanisms that will be used to manage the project as a team (e.g., brainstorming sessions, tracking progress). A regular work schedule should be included here, showing the times when the team will meet in the lab to work on the project (in addition to meeting times).

NOTE. Each person in the team should have technical responsibilities. For instance, it would not be acceptable that one person handles only purchasing and documentation but does not perform any development work.

4.2   Schedule of tasks, Pert and Gantt charts (1 page, 5 points)

Break down the project into clearly identified sub-tasks, analyze dependencies among them, identify critical paths, and design a feasible schedule for accomplishing these tasks.

4.3   Economic analysis (1/2 page; 2 points)

Some economic issues were already considered during the analysis of constraints and the itemized budget. Here you provide a further economic analysis, were your system to become a commercial product:

- Economical viability: potential marketability of the system, expected volume production costs (as opposed to prototyping costs)

- Sustainability: are system parts available from more than one vendor? What maintenance and support will the product require?

- Manufacturability: what is the effect of component tolerances on system performance?, worst- case analysis, expected production yield, testability and compliance to regulations (e.g., FCC)

4.4   Societal, safety and environmental analysis (1/2 page; 2 points)

What is the potential impact of your project to society, both beneficial (e.g., quality of life), and detrimental (e.g., loss of privacy)? What are the safety precautions that you have to take when working on the project (e.g., personal injuries, damage to the equipment/facilities)? What is the potential environmental impact of your project (e.g., pollution) and how will you minimize it?

4.5   Itemized budget (1 page; 3 points)

Detailed budget of all costs expected to be incurred during the project (e.g., parts, fabrication services).

5   References (2 points)

Here you acknowledge all the documents that you used as references throughout the text. Please use the IEEE reference format (`http://www.ieee.org/documents/ieeecitationref.pdf`)

6   Appendices (1 point)

6.1   Product datasheets

Include product datasheets that may be particularly relevant to your proposed work. Say you want to use a certain type of microcontroller, because it has just the right combination features (e.g., types of I/O ports, or power consumption, etc). You would then attach datasheets for this product. NOTE: including a data sheet does not replace the need for explaining how the component works and how it will be integrated in the system (section 4.2).

7   Bios and CVs

Include a brief bio-sketch and CV for each team member. The bio-sketch is a brief summary of your professional / educational accomplishments, whereas the CV is a more comprehensive and detailed (itemized) description of you qualifications. Browse through some of the IEEE Transactions (`http://ieeexplore.ieee.org/`) for examples of typical bio-sketches.