Chapter III - METHODOLOGY

3.1 Introduction

Briefly restate the main objectives of the prototype you aim to develop.

3.2 Methodology By Objective

This section is the core of your methodology. For each design objective of the prototype development, detail the following steps:

3.2.1 Design Objective 1

Clearly state the specific objective you aim to achieve within this part of the prototype. This objective should be directly linked to the overall functionality of the prototype.

3.2.1.1 Theories and Concepts

Discuss the relevant theories and engineering concepts that underpin the design choices for this objective. Explain how these theories are applied in the development process. Cite relevant literature that supports your theoretical approach, whenever possible.

3.2.1.2 Hardware Components

List and describe the essential hardware components required to achieve this objective within the prototype. Explain the rationale behind the selection of each component (e.g., functionality, cost, performance). Explain how these components help achieve the objectives and how they will be integrated within the overall prototype (mentioning relevant modules if applicable). Provide schematic or circuit interconnection diagrams.

3.2.1.3 Software Components

List and describe the software modules or processes that will be developed to achieve the objective.

- Identify and describe any software components needed to achieve this objective (e.g., control software, data acquisition software).
- Explain the functionalities of the software and their role in the prototype's operation.
- Describe the process flow including the input types and sources, and output types and destination.

Provide a flowchart or pseudocode to support your discussion.

- Briefly outline the software development process, including any coding languages or tools used.

3.2.1.4 Testing

- Describe the specific testing procedures designed to validate the achievement of this objective.
- Explain how the tests will measure the performance or functionality related to the objective.
- Specify the data collection methods during testing (e.g., sensor readings, performance metrics).
- Briefly mention the data analysis tools that will be used to interpret the test results.

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3.3 Integration and Overall Testing

Explain the process of integrating all hardware and software components into the complete prototype.

Describe the overall testing procedures designed to validate the functionality of the entire prototype against the main objectives.

Mention any additional tests needed to assess the combined performance of the system.

3.4 Conclusion

Briefly summarize the key aspects of the methodology for developing the prototype. Reiterate the connection between the methodology and the achievement of the overall project objectives.