

**Title of Seminar Report**

**Seminar Report**

**Submitted by**

**Your Name**

*in partial fulfilment of the requirements for the award of the degree of*

**Bachelor of Technology**

*in*

**Mechanical/Production Engineering**



Department of Mechanical Engineering

NATIONAL INSTITUTE OF TECHNOLOGY CALICUT

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# ACKNOWLEDGEMENT

Students have the freedom to decide, whether acknowledgement is to be given or not. However, it is recommended to give acknowledgements according to the standard practice. It shall be a single page write-up in paragraph format containing a maximum of 200 words. Proper acknowledgement shall be given to any external agency, which has significantly contributed (funding or by any other means) to the work carried out for the seminar report.

**Student Name**

# CERTIFICATE

This is to certify that the report entitled "*Title of seminar Report*" is a bonafide record of the Seminar presented by **Name** (*RollNumber*) in partial fulfillment of the requirements for the award of the degree of **Bachelor of Technology in Mechanical Engineering** from **National Institute of Technology Calicut**.

Faculty in Charge

(ME3099D - Seminar)

*Dept. of Mechanical Engineering*

Professor and Head

*Dept. of Mechanical Engineering*

Place: NIT Calicut

Date: DD Month YYYY

# ABSTRACT

Abstract shall be a one-page (maximum one page)) write-up giving the summary of the seminar report. It shall be written in paragraph format (maximum 3 or 4 paragraphs) containing approximately 200 words. The abstract generally contains the significance of the work, objectives, methodology and the major findings. Keep in mind that, it is from the abstract, the reader decides about the relevance of the work to him, and whether to go ahead with reading the report.

# List of Abbreviations

|     |                             |
|-----|-----------------------------|
| AI  | Artificial Intelligence     |
| ML  | Machine Learning            |
| NLP | Natural Language Processing |

# List of Symbols

|          |                               |
|----------|-------------------------------|
| $\alpha$ | Alpha (Coefficient)           |
| $\beta$  | Beta (Regression Coefficient) |
| $\Sigma$ | Summation                     |

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# Chapter 1

## INTRODUCTION

### 1.1 Preamble

[Add Your Preamble]

### 1.2 Problem Definition

[Add Content here]

### 1.3 Outline of the Report

[Add Content here]

# Chapter 2

## LITERATURE REVIEW

### 2.1 SECTION HEADING

[Add your content]

# Chapter 3

## TOPIC SPECIFIC TITLE

### 3.1 THE VACUUM CLEANER'S TASK

To clean an empty room, two motion trajectories can be used: spiral and zigzag. The vacuum cleaner robot is tasked with sweeping every accessible area in the entire space while avoiding obstacles. If the robot passes by an area position, it will be cleaned; if it has not been cleaned yet, it will be. The path planning of the coverage region (PPCR) is a task in which the robot must sweep all available free area while avoiding obstacles with an effective trajectory. This efficient path should be short in length and contain the fewest number of turning angles and revisiting cells possible.

### 3.2 The environment modeling

An crucial component of the vacuum cleaner robot's duty must be ensured before it can begin, and that is the modelling of the surroundings. The environment modeling is based on the workspace map, which is created using sensory data gathered from various sensors such as a camera, an infrared sensor, and an ultrasonic sensor. To make the robot's movements easier, the workspace is divided into discs in the shape of a cleaning robot rather than rectangles or squares. The diagonal length of a discrete area represented by that disc cell is considered equal to the diameter of a sweeping robot. Each disc symbolizes an impediment or a free position in the environment for the robot to inhabit. There are a maximum of eight surrounding position  $j$ th for each connection.

# Chapter 4

## TITLE OF SOME IMPORTANT CONTENTS

[Small Introduction]

### 4.1 SECTION TITLE

The global path planning for the coverage region is defined as the path taken by the robot from a start position  $P_s(x, y)$  to an exit position  $P_e(x, y)$  while passing through all accessible places and avoiding obstacles. To get this global path, partition it into mini-paths, the latter of which must not exceed the sensor's range, as shown in Fig. 4.1.

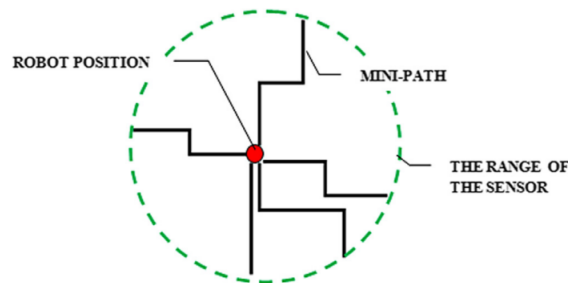


Figure 4.1: The path planning method

[Add your content and learn how to add images from the example above]

# Chapter 5

## RESULTS AND DISCUSSION

### 5.1 RESULTS

Add Content Here

### 5.2 ANALYSIS

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# Chapter 6

## CONCLUSIONS AND SCOPE FOR FUTURE WORK

### 6.1 CONCLUSIONS

Add Content Here

### 6.2 SCOPE FOR FUTURE WORK

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# References

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