

MEng Innovation by Design

2019/2020 Ideate-Prototype-Realize



Narendernath Baskar | Student
Prof. Mohan Rajesh Elara | Advisor

Framework For Selection Of Cleaning Robots Using Multiple Attribute Decision Making Approach

Why ?

Due to the increasing complexity in requirement and available features offered by various cleaning robots in the market, it is very important to have a framework to select more appropriate robot.

How ?

Provide standardized attribute-based specification pertinent to the stakeholder using Multiple Attribute Decision Making (MADM) approach, with quantified comparison and selection of best cleaning robots in the market.

What ?

A Framework outlining the standardized attribute-based comparison for Designers, Manufacturers, Suppliers and End Users to select the cleaning robot available in the market, that meets their needs.

Introduction

Cleaning robots are the machines that are used in the process of removing the visible and invisible unwanted substances from the working surface. These unwanted substances could be dry dirt, wet dirt, waste objects, infectious agents, chemicals, etc., Cleaning process includes dry vacuum, mopping, wet suction, dry foam, dry powder, hot water, chemical, air jet, disinfection, polishing, etc., The environment where the cleaning robot are deployed also ranges from industries, commercial building, offices, domestic, food courts, public parks, public roads, swimming pools, water tanks, ships, aeroplanes, etc.,

Reconfigurable pavement sweeping robot (Source: SUTD)



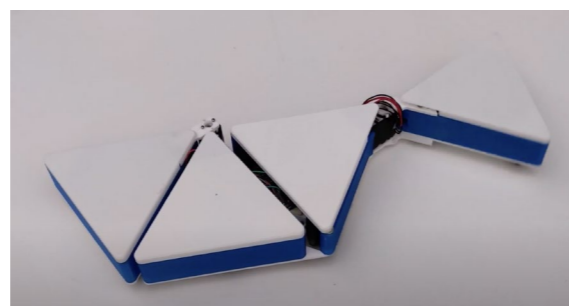
Commercial floor Cleaning robot (Source: Lionsbot)



UV-C Disinfection robot (Source: Lionsbot)

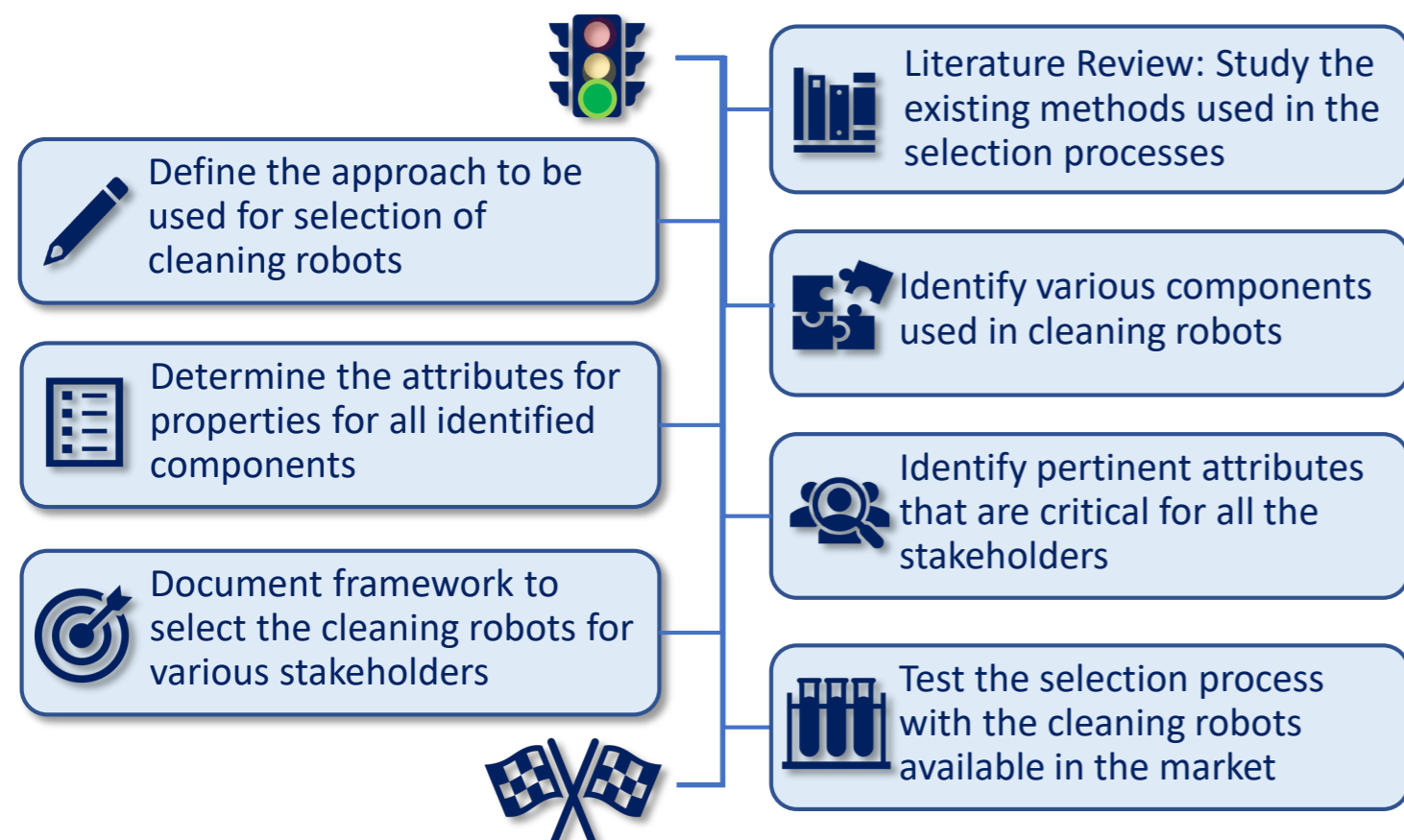


Shape shifting floor Cleaning robot (Source: SUTD)

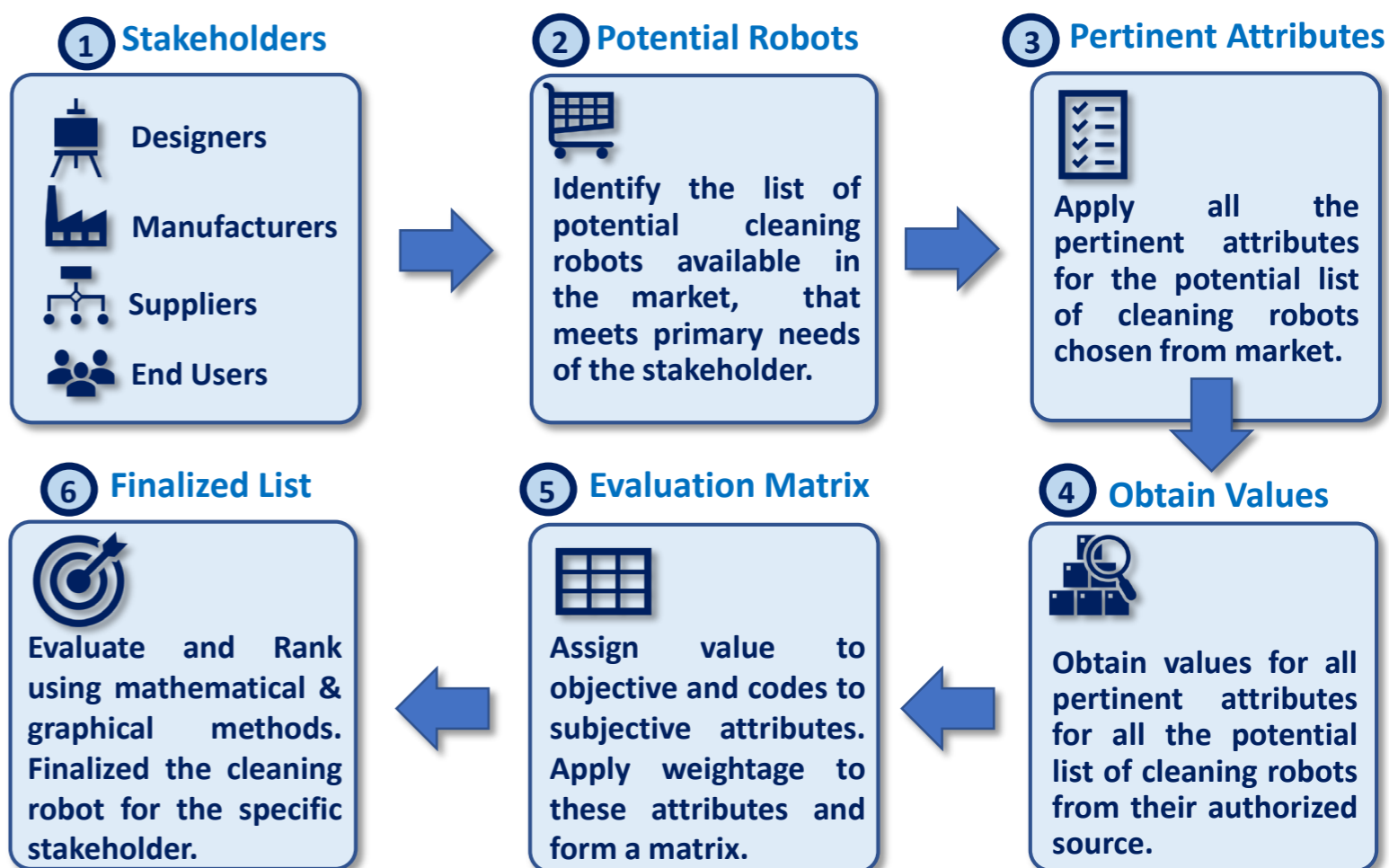


Considering the rapid increase in the user requirements and the technological advancements, there have been many cleaning robots that are launched in the market. To select a cleaning robot, stakeholder has to look at different aspects, that includes the material to clean, the environment to work, the cleaning process to use, etc., It is very difficult and time consuming process for the stakeholder to understand all these aspects and find the cleaning robot. Therefore a framework needs to be created, that is simple but can be applied for all stakeholders, to ease the selection process and reduces the decision-making time.

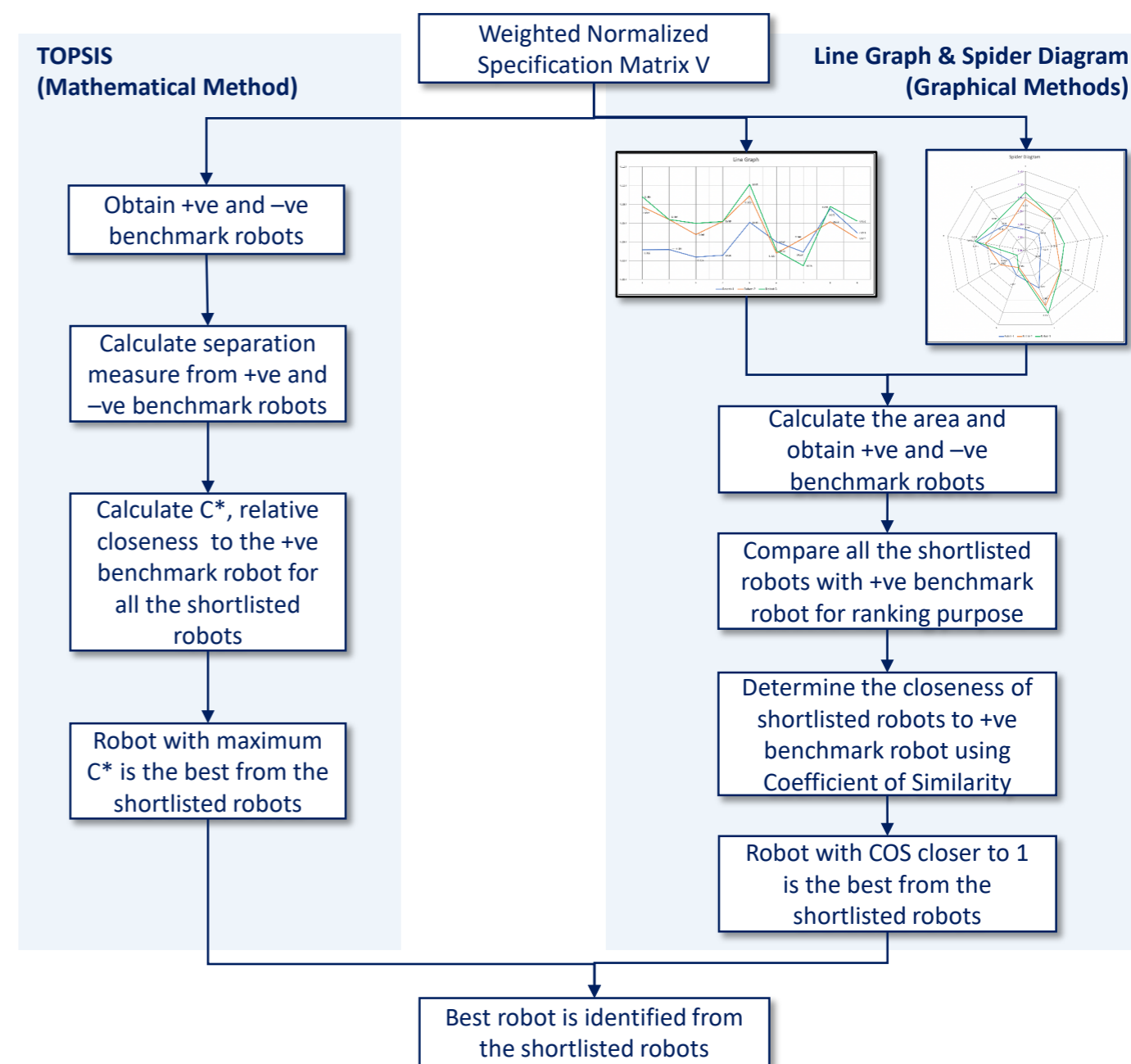
Ideate-Prototype-Realize



Selection Process



Evaluation and Ranking Methods



Conclusion

The framework helps the stakeholder with a simple and easy selection process. This avoids time and effort for stakeholders spending on exploration and research, to identify their appropriate critical attributes for their selection process. Though the process defined in this framework is specifically for selecting cleaning robot, this framework can be extended for any other robots with the refinement to the properties and pertinent attributes for the type of robot that are involved in the selection process.