1. Designers;
2. Clients:
3. Users:

**Problem definition;**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Questions** | **Answers** | |  | |
| 1.What should be the load capacity on sand drawing robot? | | Less than 2Kg | | Objective |
| 2.Robot should be movable or drawing surface? | | Either of one | | Objective |
| 3.How long should the robot be able to draw? | | 20-30 minutes | | Objective |
| 4.What should be the thickness of line drawn by robot? | | Adjustable | | Objective |
| 5.What should be the cost of robot? | | Less than 5000Rs | | Objective |
| 6.What should be the area that robot has to draw? | | 5 sq feet | | Constraint |
| 7.Should it pour on ground or sketch in sand? | | Pour | | Constraint |
| 8.What should be the type of power supply? | | Battery | | Constraint |
| 9. What type of pattern should the robot draw? | | Any type | | Function |

Obtain the information through basic survey and customer interaction and arrive at requirements

|  |  |
| --- | --- |
| **Observation and from Lit.Survey** | **Requirements** |
| 1. Based on the type of drawing | Robot should be able to draw any type of pattern |
| 2.Duration of drawing | Robot should be able to draw 20-30 minutes continuously |
| 3.Estimated cost | The robot should be available within 5000Rs |
| 4.Volume of pouring sand | Robot should be able to adjust the volume of pouring the sand |

1.1 **Identify client’s objectives**

**Step 1:** Prepare a list of design objectives

|  |  |
| --- | --- |
| Sl.No | Objectives |
| **01** | The load capacity of robot should be less than 2kg |
| **02** | Robot should be movable or drawing surface |
| **03** | The duration of drawing should be more than 20 minutes |
| **04** | The robot should be user friendly |
| **05** | The cost should be less than 5000/- |
| **06** | The volume of sand that has to be poured should be adjustable |
| **07** | The robot should be stable |

**1.2 Prioritize the identified design objectives**

Priority among various objectives is set through a technique called Pair-wise Comparison Chart (PCC)

**Prioritize the identified designs chart**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Sl no |  | Affordable | User friendly | Duration of work | Stable |  |
| 1 | Affordable | xxxx | 0 | 0 | 0 | 0 |
| 2 | User friendly | 1 | xxxx | 1 | 0 | 2 |
| 3 | Duration of work | 1 | 0 | xxxx | 0 | 1 |
| 4 | Stable | 1 | 1 | 1 | xxxx | 3 |

Rank the objectives in order of decreasing value of importance and the list is

1. Stable

2.User friendly

3 Duration of work

4.Affordable

*Based on the information gathered through interaction with client, initial survey and completing phase 1.1 the problem definition is formulated as follows*

*Problem definition v*ersion1.1

“The robot should be user friendly and stable while drawing and should be capable of drawing more than 20 minutes and available at affordable price”

***1.3Identify constraints***

1.The robot should be able to draw 5 sq.feet

2.The robot should pour sand ground

3.The power supply should be through batteries

*Problem definition v*ersion1.2

The robot should be able to draw on area of 5sq.feet, it should draw by pouring sand and it should work on battery

**1.3 Establish functions**

**1.3 Establish functions**

**1.**The robot should be able draw any kind of patterns

**1.3 Establish functions**

**01**.The robot should be able to draw any kind of patterns

*Problem definition v*ersion1.3

~~“~~The robot should be user friendly,stable,easy to handle and available at affordable price.It should be able to draw any type of patterns on 5 sq.feet area,and it should work on rechargeable battery , It should be able to work on any kind of surface ~~”~~