20/11/2018

RaLaZaBa ELECTRONICS

6th Weekly Report

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Done

We tied to correct our mistakes about proposal report. What we did is that

- We defined our functional requirements.
- We defined our objectives and their metrices.

We worked on concept generation and produced some ideas for our requirements and methodologies.

We purchased distance measurement sensor and trackball mouse for experimental purposes.

We talked about the topics of standard committee which are about color, height and shape of the objects.

We made the task distribution. Nail and Selman will study SolidWorks. Ali, Anil and Enes will work on Simulink to create a simulation environment of the design.

To Do

We will make brain storming on the candidates of solution method to converge the our design.
We will test the sensors.

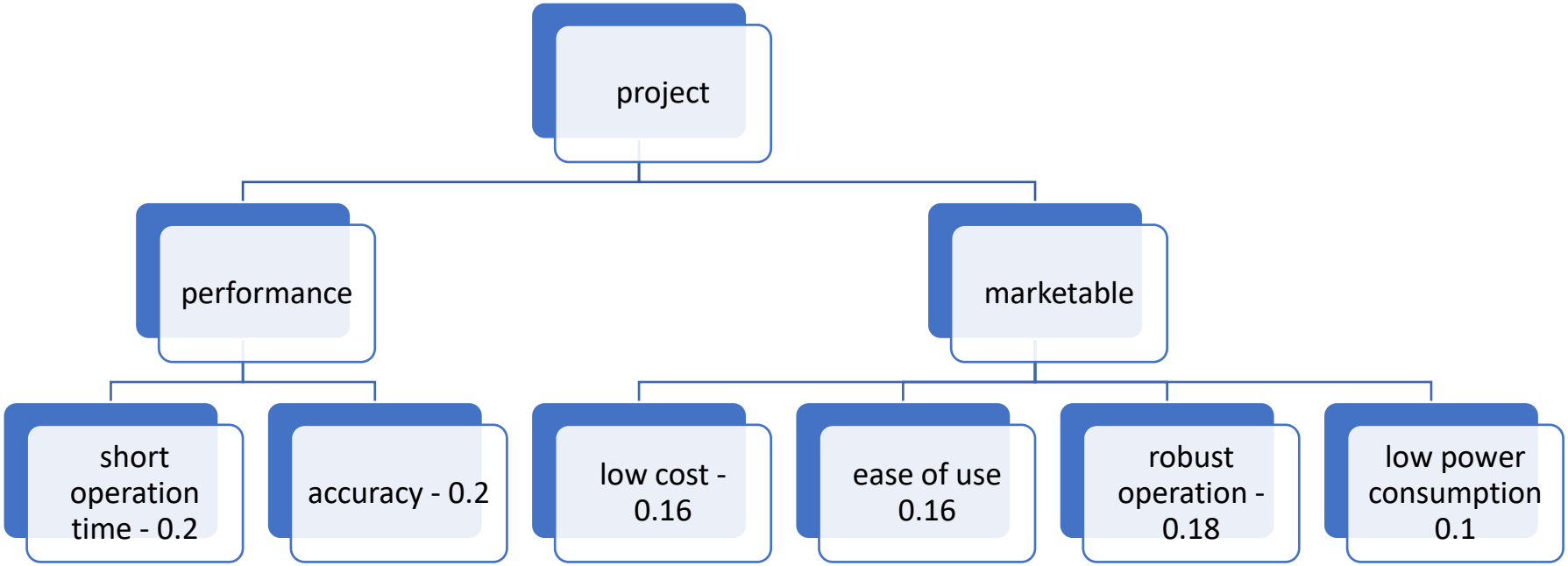
Objectives

1. Accuracy
2. Cost
3. Ease of use
4. Operation time
5. Power consumption
6. Robustness

Functional Requirements

Motion in 2D directions
Since the problem defined as mapping of a planar environment, our robot should move on ground plane.
Determining self position
For this requirement, the device is supposed to determine its position during the operation.
Measurement of environment
The device is supposed to obtain the position information of the intended plane by taking measurements of the environment.
Data processing and transmission
In this requirement, the robot should projectile the measured data to given reference point and send it to the monitor.

Objective Tree



	Short Operation Time	Accuracy	Low Cost	Ease of use	Robust operation with changing environment	Low power consumption
3	<5 min	Understand how many objects are in field, their shapes properly and determine their positions correctly	<50 $	User friendly GUI and live mapping	Works properly in laboratory and fair field for both dark and sunlight conditions	<10 W
2	5-10 min	Understand how many objects are in field and their shapes properly, but cannot determine their positions correctly	50-150 $	User friendly GUI but long update duration of data	Works in laboratory everywhere but sometimes cannot operate properly on fair field ground	10-20 W
1	10-15 min	Understand how many objects are in field but cannot determine their position and shapes correctly	150-200 $	User friendly GUI presenting data transmission at the end of operation	Works only at specific conditions in laboratory	20-50 W
0	>15 min	Number of objects, their shapes and their position cannot be determined correctly	>200 $	No user-friendly GUI and no real time data processing	Sometimes works, but sometime does not work in any condition	>50 W

Operation Time: This objective means the required time for finishing the mapping task

Accuracy: how accurate our robot for tasks such as determining positions, shapes and number of objects. For now, we do not have ability to quantitate numbers for error rates since we have not make experiments yet. After experiments, we will also define some error range which are important for our project.

Low cost: this objective is also important for us and we will try to reduce costs by determining our solutions.

Ease of Use: The GUI which will show us the map of the environment should be user friendly and if data processing is online, this is plus for our project.

Robust operation: This is most important objective for us since we want our robot to operate in any environmental conditions.,

Low Power Consumption: We will try to reduce power consumption as much as possible. This will reduce the cost and also will increase the expected lifetime of the device.

Motion in two Direction	Robot moves and scan the field randomly	Robot moves according to a specific algorithm		
Self-Localization	Robot take reference as starting point and makes vector addition during motion	Robot takes references as the walls	Robot uses GPS to position	Robot gets self-position by taking reference according to objects
Objects Localization	Robot finds distance of objects using vector addition to reference point	Relative positioning according to surrounding objects		
Data Processing	Onboard processing and online updating of map	Map generation at the end of the operation		
Processed Data Transfer	Output can be stored in a storage element and at the end of operation map can be taken	Using Bluetooth, map can be transferred to screen	Using Wi-Fi, map can be transferred to screen	Using RF link, map can be transferred to screen