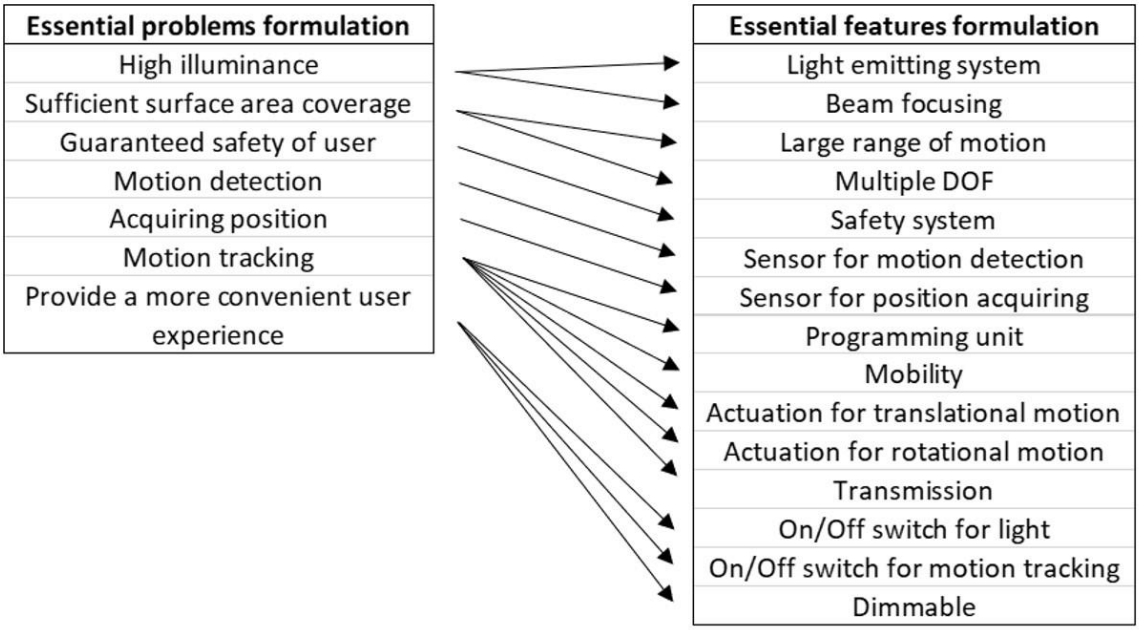

Figure 1: essential problems and features.

Features	Means			
Light emitting system	LED	CFL	Halogen	Incandescent
Beam focusing	Lens	Mirror	Lens + Mirror	
Large range of motion	Linear guides	Rotating structure	Repositioning the base of the lamp	
Multiple DOF	1D translation	2D translation	3D translation	1D translation and rotation around axis
Safety system	Collision prediction using (proximity) sensors	Enough space between user and product at all times		
Sensor for motion detection	Thermal camera	ToF sensor (infrared proximity sensor, sonar, etc)	Infrared motionsensor	Camera for image recognition
System for position acquiring (already decided that narrow beamed Lidar ToF sensors will be used)	Array of ToF sensors (static or rotating)	ToF sensor fixed on desk	ToF sensors attached on moving lamp	Camera for image recognition
Programming unit	Arduino	Raspberry Pi	External computer	
Actuation for translational motion	Stepper motor	Servo motor	Linear Motor	
Actuation for rotational motion	Stepper motor	Servo motor	Manual	
Transmission	Belt	Rack and pinion	Infinite screw	
On/Off switch for light	Button	Switch	Sensor for motion detection	
On/Off switch for motion tracking	Button	Switch		
Dimmable	Potentiometer	Slider	Photoresistor (LDR)	Phototransistor

Figure 2: Morphological chart.

Criteria	LED	CFL	Halogen	Incandescent
Durability	4	3	1	1
Cost	1	2	3	4
Consumption	4	3	2	1
Environmental impact	4	4	2	1
Responsiveness	4	1	3	3
Total	**17**	13	11	10

Criteria	Cartesian robot	Robot arm	Rail with orientable lamp
Safety	0	2	3
Range	3	1	3
Cost	1	4	2
Easy to set up	0	3	2
Stability	2	3	4
Total	6	13	**14**

Criteria	Belt	Rack and pinion	Infinite screw
Friction	4	2	1
Rapidity	4	3	1
Cost	4	0	2
Precision	1	3	4
Noise	4	2	2
Solidity	1	4	4
Vibration	3	1	2
Total	**21**	15	16

Criteria	Arduino Uno	Raspberry Pi 4
CPU architecture	8-bit	64-bit
RAM	2 kB	4 GB
Clock speed	16 MHz	1.4 GHz
Power consumption	200 MW	700 MW
Cost	€ 11,49	€ 59,95
Availability	Not a problem	Very limited

Figure 3: Gradings of different means.

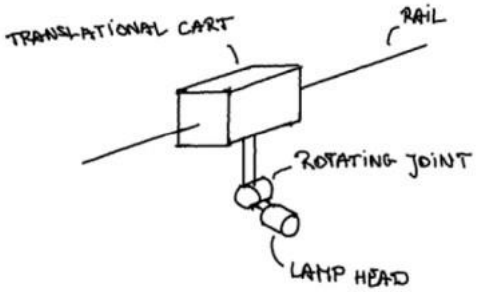

Figure 4: kinematic diagram

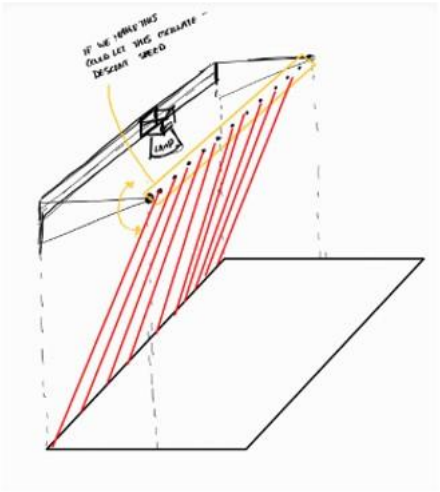

Figure 5: Concept 2, an array of TOF sensors, rotating or not.

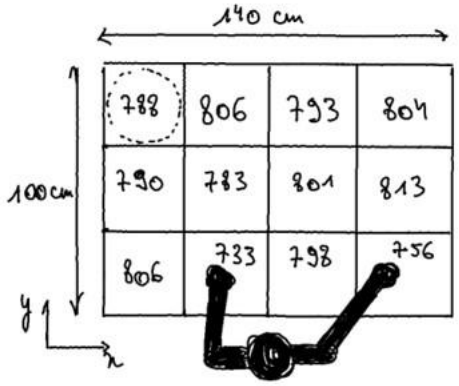

Figure 6: Scan of the desk by array of TOF sensors in concept 2.

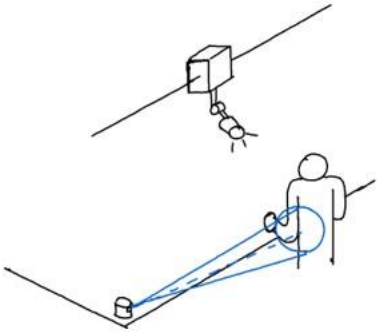

Figure 7: Concept 3.

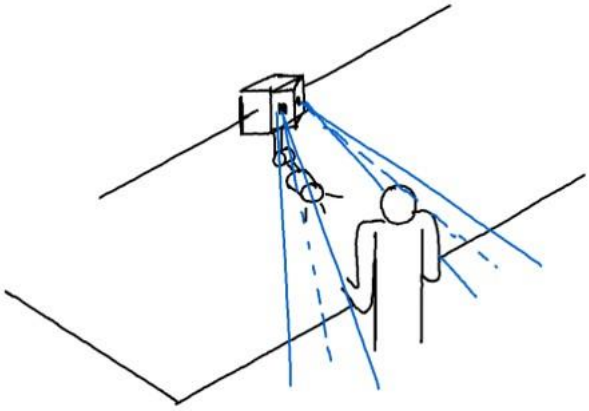

Figure 8: Concept 4 with the remark that in the actual concept the FOV's of both sensors overlap.

Pts	Meaning
0	Unsatisfactory
1	Just tolerable
2	Adequate
3	Good
4	Vary good

	Concept 1	Concept 2	Concept 3	Concept 4	IMPORTANCE
Minimize computational power needed	+1	+2	+4	+3	2
Minimize number of sensors	+4	+1	+4	+3	2
Structure's weight	+4	+1	+4	+3	1
Power needed	+2	+1	+3	+3	1
Avoid objects' disturbances	+2	+4	+1	+4	3
Detecting accurancy & comfort	+3	+4	+1	+4	2
Resistance to vibrations	+3	+2	+3	+3	3
Simplicity	+2	+2	+3	+3	2
Cost	+1	+2	+3	+3	4
TOTAL	+45	+46	+55	+65	

Figure 9: Selection of most promising variant.