Humanoid Interactive Robot

Project Plan

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1. Project Idea

As a group, we will be taking the charge of designing and producing a humanoid interactive robot using 3d designing software, 3D printers, electrical parts, programming languages and AI algorithms. This group consists of engineers and specialists in 5 different fields which are: Industrial Engineering, Electrical Engineering, Mechanical Engineering, Internet of things, and AI. In this project, we will start with dividing the humanoid interactive robot into parts (including the electrical parts) to focus on each part separately, then we will go through the assessment of the design of each and finally we will choose the final design to be produced. This process will be made simultaneously with other fields of IoT and AI to reach the final result of the robot.

Figure 1, An imaginary image of the project. Resource: Made-in-China.com

Figure1: https://www.made-in-china.com/showroom/delongaijia/product-detailqXcmtQaxJNhS/China-Humanoid-Intelligent-Health-Care-Robot-Social-Robot-Companion-Interactive-Telepresence-Robot.html

2. Objective

Designing and producing a humanoid interactive robot that can be used in the final ceremony of Smart Methods' activities of 2021.

3. Stakeholders

- Project owners (Smart Methods)
- Industrial Engineers "Project Managers"
- Mechanical Engineer
- Electrical Engineers
- IoT specialists
- AI specialists

4. Expected Duration

The actual start will be on 2021/7/4 until 2021/8/9.

- 23 working days.
- 37 total days including weekends and Eid-Aladha holiday.

5. Project Scope

5.1 Project Deliverables & Specifications

A humanoid interactive robot with 125cm height, 60cm width, and 40 cm depth (including all parts) where the parts:

- Can interact with humans by emotions and welcoming words.
- Has a fixed head.
- Has a smart screen for displaying emotions and welcoming words.
- Has 2 moveable hands.
- Has a moveable base with 4 tires.

#NOTE: These deliverables, assumptions, and constrains are based on our expectations and approximations, which can be changed after knowing more details about the desired robot's specifications.

5.2 Assumptions

In the initial robot's design, we will assume the following:

- All the required mechanical parts will be produced by 3D printers or CNC machines.
- All the required electrical parts are existed in the workplace.
- The robot's dimensions are approximated and need more details.
- Any needed material for manufacturing the robot is available.
- 3D printers may take time in manufacturing the parts.

5.3 Constrains and Limitations

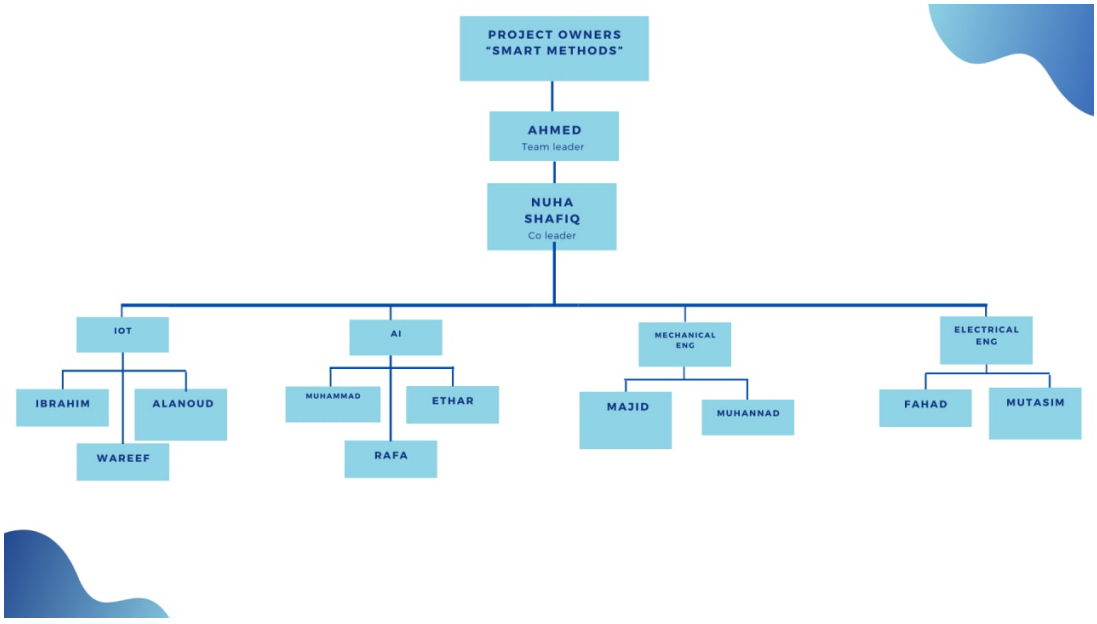
- The robot dimensions should not exceed 125cm height, 60cm width, 40cm depth.
- 3D printers may limit us in manufacturing massive parts.
- The head dimensions not exceeding 30cm height, 30 cm wide, and 20 cm depth.
- The hands' dimensions shouldn't exceed 30cm long, 10cm width, and 10cm depth

6. Project main phases

This project will be divided to 5 main phases to follow up the process of project's completion:

1) Information Gathering
2) Planning and designing
3) Implementation
4) Following and Reviewing
5) Finalizing

7. Group Structure



7. Tasks Dependencies, Dates, & Relationships

#NOTE: These tasks are based on the general idea of the robot. Some tasks may be added later when we have the full information.

Task Name	Duration	Start	Finish	Predecessors	Responsible
1. Information Gathering Phase	**4 days**	**Sun 7/4/21**	**Wed 7/7/21**		
1.1 Studying the initial design	2 days	Sun 7/4/21	Mon 7/5/21		All
1.2 Revising and arranging the gathered information for the 4 fields	2 days	Mon 7/5/21	Wed 7/7/21	4	IE
1.3 Information about the needed mechanical parts	2 days	Mon 7/5/21	Wed 7/7/21	2	ME
1.4 Information about the needed electrical system	2 days	Mon 7/5/21	Wed 7/7/21	4SS	EE
1.5 Information about the needed programming language and user interface	2 days	Mon 7/5/21	Wed 7/7/21	4SS	IoT
1.6 Information about the needed AI algorithms	2 days	Mon 7/5/21	Wed 7/7/21	4SS	AI
2. Planning and designing Phase	**9 days?**	**Wed 7/7/21**	**Wed 7/28/21**	**1**	
2.1 Design the initial design using 3d software	3 days	Wed 7/7/21	Mon 7/12/21	3	ME, IE
2.2 Determine the manufacturing processes for each part	1 day	Mon 7/12/21	Tue 7/13/21	9	ME, IE
2.3 Design the electrical circuits for the robot using a software	3 days	Wed 7/7/21	Mon 7/12/21	3	EE
2.4 Determine the needed electrical parts for the robot	1 day?	Mon 7/12/21	Tue 7/13/21	11	EE
2.5 Write a code for controlling the smart screen on the robot	3 days	Wed 7/7/21	Mon 7/12/21	3	IoT
2.6 Write a code for controlling the movement of the arms	3 days	Mon 7/12/21	Thu 7/15/21	13	IoT
2.7 Write a code for controlling the movement of the robot	3 days	Thu 7/15/21	Wed 7/28/21	14	IoT
2.8 Determine the needed algorithms to be linked with robots' parts	7 days	Wed 7/7/21	Mon 7/26/21	3	AI
Revising the completed tasks from project owners	0 days	Tue 7/13/21	Tue 7/13/21	12	Project Owners
3. Implementation Phase	**4 days**	**Mon 7/26/21**	**Sun 8/1/21**		
3.1 Produce the designed robot's parts using the determined manufacturing processes	3 days	Mon 7/26/21	Thu 7/29/21	16	ME
3.2 Implement the designed electrical circuits at headquarters	3 days	Mon 7/26/21	Thu 7/29/21	16	EE
3.3 Check the suitability of the written codes for the final produced mechanical parts	3 days	Mon 7/26/21	Thu 7/29/21	16	IoT

3.4 Apply the AI algorithms on the final produced robot	4 days	Mon 7/26/21	Sun 8/1/21	16	AI
4. Following and Reviewing Phase	**4 days?**	**Sun 8/1/21**	**Thu 8/5/21**		
4.1 Revise and test the produced mechanical parts	1 day?	Sun 8/1/21	Mon 8/2/21	22	ME, IE
4.2 Put the electrical parts on their designed places with the robot	1 day	Mon 8/2/21	Tue 8/3/21	24	EE
4.3 Revise the linked electrical system with the mechanical parts	1 day	Tue 8/3/21	Wed 8/4/21	25	EE, ME
4.4 Link the robot with internet	1 day	Wed 8/4/21	Thu 8/5/21	26	IoT
4.5 Check the applied AI algorithms on the robot.	4 days	Sun 8/1/21	Thu 8/5/21	22	AI
Revise the project progress	0 days	Tue 8/3/21	Tue 8/3/21	25	Project Owners
5. Finalizing Phase	**2 days**	**Thu 8/5/21**	**Mon 8/9/21**		
5.1 Review the final robot design	1 day	Thu 8/5/21	Sun 8/8/21	28	Project Owners, ME, EE, IE
5.2 Test the robot	1 day	Thu 8/5/21	Sun 8/8/21	28	Project Owners, IE
5.3 Determine the possible problems	1 day	Sun 8/8/21	Mon 8/9/21	32	All
5.4 Check the safety specifications	1 day	Sun 8/8/21	Mon 8/9/21	32	EE, ME, IE