# Requirements Analysis :

## the humanoid robot with coffee serving feature

This is requirements analysis for adding a new feature (coffee serving) to our humanoid robot. It includes all the departments that work on the robot: Mechanical Engineering Department, Electronics and Power Department, Robotics and AI Department and IOT and software development. The goal of this requirements analysis is to distinguish between functional requirements and non-functional requirements in each department.

### *The Requirements For Mechanical Engineering Department:*

| functional requirements: | Non-functional requirements: |
|---|---|
| 1- Balanced humanoid robot.<br><br>2- Floyd dynamic force analysis for a small amount of liquid in humanoid robot to make it able to serve coffee.<br><br>3- Designing structures of the robot arms and making them suitable for serving coffee. | 1- Designing white covers for the arms + hand structures. |

### *The Requirements For Electronics and Power Department:*

| functional requirement: | Non-functional requirements: |
|---|---|
| 1- Power circuit design and implementation.<br><br>2- Motor drive design and implementation for the robot arms. The motor rotates "the dalah" to carry out the pouring process of the coffee.<br><br>3- Control circuit design.<br><br>4- Power tolerance examination and improvement process. | 1- The rotation angle that the motor causes should be more than 50 degrees with considering the wights for a cultural purpose of how to pour the Saudi coffee.<br><br>2- Control circuit design "using ARM controller". |

*The Requirements for Robotics and AI Department:*

| functional requirement: | Non-functional requirements: |
|---|---|
| 1- Robot Navigation, the ability to determine its own position in its frame of reference and then to plan a path towards some goal location.<br><br>2- Robot operating system installation and configuration. | 1- face recognition feature to help in serving the coffee.<br><br>2- Robot motion system for "ten" degrees of freedom. |

*The Requirements For IOT and software development:*

| functional requirement: | Non-functional requirements: |
|---|---|
| 1. stop button on an application for the humanoid robot.<br><br>2. Text to speech design and testing for robotic communication system.<br><br>3. Database analysis and design for robotic control system on cloud-based computing.<br><br>4. User experience testing and improvement for robot control system. | 1- Arabic & Chinese natural languages recognition design and testing for robotic communication system. |