1. **Project Information**

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| **Project title** | Smart Home Handler |
| **Project Track** | Embedded |
| **University** | Institute of aviation engineering and technology |
| **Department/Faculty** | Communications Department |
| **Industrial partner**  **(if any)** |  |

1. **Supervisor Information**

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| **SupervisorName** | Tawfik Ismail Tawfik |
| **Title** |  |
| **Work Address** |  |
| **Mobile** | 01009181536 |
| **E-mail** | tismail@niles.cu.edu.eg |
| **Brief summary of expertise** |  |

1. **Project Members Information**

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| **#** | **Name** | **Department** | **2nd year grade** | **3rd year grade** | **Strengths (special skills and capabilities)** | **Mobile number** | **Email** |
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\* Please note that the first name will be referred to as the main **contact person** for the whole group.

1. **Project Description**

Applicants shall provide a brief description of their project. This description should include the following:

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| 1. **Overview** |
| (i) Problem definition, (ii) approach and tools/techniques, and (iii) overview of system modules. |
| **People need robots for dangerous, repetitive and high-precision work.** They used to perform tasks that are impossible for humans, while also carrying out repetitious tasks with speed and accuracy, but as for now they could perform almost every daily task. In this project we are showing the role that emerging robotic technologies could play in daily life of disabled people as well as normal ones. When we talk about disability, we mean any temporary or permanent limitation due to a chronic disease and deficit, as well as, socially disadvantaged conditions, which imply functional and emotional restrictions experienced at any age. All these limitations can be characterized by a specific mental and physical impairment.  A Smart Home Handler (SHH) is a project that aims in designing a Robot that can be operated using Android mobile phone.The robot has two operational modes which are the normal mode and the special needs mode. Both modes can perform tasks like obstacle avoidance, home electrical system control, face recognition for home’s owner, warning alarm and setting up a waking alarm. The controlling of the Robot is done wirelessly through Android application. Here in the project the Android smart phone is used as remote control for operating the Robot. The controlling device of the whole system is the Arduino microcontroller interfaced with Wi-Fi module, DC motors, a camera and object detector sensors.  **C:\Users\Karim Mira\Desktop\15151236_1320238771361122_1373022500_n.jpg**  The above Block diagram represents an overview of the system modules such that the data received by the Wi-Fi module, Ultrasonic sensor and the camera is fed as an input to the controller. The controller acts accordingly on the DC motors of the Robot, speaker and output screen.  In achieving the task the controller is loaded with a program written using Embedded ‘C’ language.  The proposed system shows how a robot can be used for helping purpose. The operating system of smartphone is Android, and it can develop effective remote control program and by using Wi-Fi wireless network, the communication between smartphone and robot can be realized, which makes it simple and convenient to control robot. |

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| 1. **Impact** |
| Why do you consider this project? What is its impact on community/market/end user/…? |
| Robots are designed to be a helping hand or a high-tech tool. They help people with tasks that would be difficult, unsafe, boring, or repetitive for a human to perform. As for our project (SHH) we thought about merging both luxury and scarcity by building a system that can do regular tasks and special ones needed by disabled people, the system should be user friendly and provided by a safe and secure modes of operations.  Most of the impact robots have on society is positive, as they help improve human health and improve the efficiency of industrial and manufacturing processes. They work without breaks or the need to sleep or eat, allowing manufactures to streamline processes and improve output. Robots also provide a level of precision that is unmatched by the human hand, and one which is repeatable over indefinite time frames. These characteristics make them ideal for interacting with community.  **Through the multiple kinds of modes/ users in the mobile application and the system overall ,**  **Administrator** : will have privilege of controlling each part of the system with almost zero forbidden commands  **Regular user** : will be able to control some of the tasks such as home lightning control and setting alarms , he won’t be able to access some tasks mainly the tasks related to security and configuration of system itself.  **Disabled user**: this mode will be run through accessibility mode in smart phone , it will allow disabled people (blind/diff) to accomplish some daily tasks with ease. |

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| 1. **Novelty and Features** |
| Explain (i) novelty (ii) features, and (iii) related products, if any. |
| As for our future approach and visionary theme we plan to provide our robot with some features and techniques such as :-   1. Self-charging technique  the robot will be able to measure the battery level by using “Uh-Oh Battery Level Indicator Kit”. This can be done by utilizing the threshold resistor in the circuit to take a feedback from it to the Microcontroller such that you have to adjust it first to certain level of low battery. The robot then will have to find the charging station, which could be done either by using the IMUsuch that there is a start point where the charger is placed then the robot move from its location towards the charging station.   OR using line following insuch a way that the robot go to the start of the white line by using IMU and follow that line to the charging station. The last step is the charging mode that could be done by using two contact points; First one is the antenna-like touch sensor that’s used as one of the charging lead and also as touch sensor at the same time, the other charging contact is a metal caster at the bottom of the robot. The robot itself can switch on and off the charging operation, and when the battery is recharged enough it disengages itself from the charging station and begins to move around again.   1. Audible mail notification feature  the robot should be able to receive mails and read it out loud   **3- Internet connection**  **The system will have the ability to connect directly through the internet reaching its own servers**  **, searching engines and having its database which will help adding many features such as**  **comparing captured photos with the database** |
| 1. **Deliverables** |
| What is the project final outcome (HW device, SW package, simulation ...)? Do you foresee any potential marketing or customers? |
| The expected outcome is an interactive Robot controlled by Android application that can perform some tasks like: -   1. Obstacle avoidance technique and moving according a predetermined map to guide blind users. 2. Motion detection feature that detect any movement and notify user by turning a device from off to on or vice versa. 3. Notify the user by sending a message through Android application or making a call. 4. Turning a warning alarm if any suspicious action or movement detected. 5. Waking up alarm with definite ringing tone. 6. Controlling the home lighting system. 7. Taking photos and performing face and object recognition.   We target organizations and communities that have interest in robotics for both luxury and scarcity such as...  - Companies that are interested in robotics, control systems and programming.  - People who want to add more prosperity and comfort to their lives.  - Hospitals and disabled people's residence.  - Scientific research foundations. |

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| 1. **Role of the Industrial Partner (if any)** |
| What is the type of support to be provided by the industrial partner (technical, financial, access…)? |
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| 1. **Estimated Expenses** | | | | | | | |
| An estimate of the itemized costs: Equipment &tools;printing (up to 500 LE) | | | | | | | |
| **Item** | **Type (Hardware/ Software/ Other)** | **Specifications (brief description)** | **Justification (why is this item needed?)** | **Vendor/Source** | **Unit Cost** | **No. of Items** | **Total Cost of Items** |
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| **Total Cost of project** | | | | | | |  |