**Project No.: TARA-1**

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| Project Title | Physical Distancing Alarm Cap (Covicap) |
| Faculty Mentor | Shreyas Deshmukh (194070026@iitb.ac.in), Maheshwar and Joseph John |
| Application | Physical Distancing Alarm Cap for use during Covid times |
| Brief Description | The purpose of the project is to have a useful cap to ensure physical distancing. It should raise an alarm if anyone comes closer than 1.5 m. It should have at least two ultrasonic sensors, one in the front and once one in the rear. |
| Work expected | Use an ultrasonic sensor (and associated signal conditioning and interface circuits) for generating alarm if anyone comes closer than 1.5m. Not allowed to use ready made Ultrasonic modules with all circuits provided. Instead you should design the required interfacing and signal conditioning given the basic discrete Tx and Rx modules. |
| Reference, if any | See JJ-3 sub folder in the following link for some general info https://drive.google.com/drive/folders/1vLQYrszWGdBRkJXafNnBKJWzq4XWAVLb?usp=sharing |
| Remarks/other comments | Open only to physical students. |

**Project No.: TARA-2**

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| Project Title | Automatic Water Dispenser at Public Places |
| Faculty Mentor | Shreyas Deshmukh (194070026@iitb.ac.in), Maheshwar and Joseph John |
| Application | Dispensing a fixed volume of water into a bottle/glass tumbler, without any physical contact with the dispenser |
| Brief Description | The purpose of the project is to dispense a fixed volume (say 200 ml) of drinking water each time a person puts his/her hand under the tap (as commonly available in public places). |
| Work expected | The project involves the use of the following: proximity sensor, flow sensor, and a solenoid valve. All these sensors are easily available. There should be a user interface to modify the dispensing volume. The project should use only one battery. |
| Reference | |
| Remarks, other comments | Open only to physical students. |

**Project No.: TARA-3**

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| ***Project Title*** | Solar Charge Controller with MPPT |
| ***Application*** | Backup power system, Energy harvesting |
| ***RA Mentor and Faculty Mentor*** | Md. Ali. Kamran (kamran@iitb.ac.in),<br>Maheshwar G. Mangat, Joseph John |
| ***Brief Description*** | Solar cells produce maximum power when operated at a specific point on the I-V curve, called the Maximum Power Point (MPP). The I-V Characteristic of solar cell is dependent on solar irradiation and temperature also. So, MPP keeps fluctuating with environmental conditions. Typically, when a load is connected directly to the panel it does not operate near MPP.<br>Maximum Power Point Trackers continuously monitor MPP and force solar panel to operate at MPP. This increases system efficiency and reduces the system cost, as less number of panels will be required compared to a system without MPPT. |
| ***Work expected*** | Design includes DC-DC converter design, interfacing sensors, MOSFET driver, Microcontroller based control. The system must have mechanism for battery safety. You need to rigorously test your system and report if the efficiency gain is worth the additional power drawn and the cost of MPPT.<br>Battery: 12 V Lead-acid, Solar Panels – 10W Panels available in the WEL Lab.<br><br>Compare fixed voltage MPPT efficiency with direct MPPT method used. Estimate cost and power drawn by fixed voltage MPPT and report which one should be preferred in your system.<br><br>Find a product in market that is closest to your prototype and report why your prototype is not competitive, if it is not. |
| ***Reference*** | Standard text books and papers |
| ***Remarks*** | Offline (physically present) students only |