

VITCC ROBOTICS CLUB  
VIT University, Chennai Campus

*“Make-A-Thon on Sensors in robotics”*

PROBLEM STATEMENTS





**MAKE-A-THON**

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**8 PROBLEM STATEMENT  
ON SENSORS (ROBOTICS)**  
**24 HOUR EVENT**  
  
TEAM OF 3



**8 INTERNSHIPS FROM 3 DIFFERENT COMPANIES  
&  
6 WINNERS WITH  
EXCITING CASH PRIZES !**  
8 REAL WORLD PROBLEM NEED SOLVING !  
QUESTIONS WILL BE OUT 2 DAYS PRIOR  
48 HOURS TO COME PREPARED



**Prag Robotics®**  
Research • Innovation • Development



**L&T Technology Services**



**EPRLABS**

**14 DECEMBER '18  
6:00 pm ONWARDS**

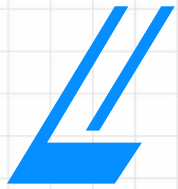
**ADMIN BLOCK  
6TH FLOOR**

**REGISTRATION FEE  
RS.1000 / Team**

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# Integrated Manufacturing and Supply Chain



Industrial Problems : Sensors in  
Robotics



*L&T Technology Services*



**Background:** Thanks to industrial revolutions in last couple of decades, robots are becoming integral part of almost all industries. With increased technological advancements, with more and more sophisticated robots in the market, their applications are not limited to high volume industries. Robots are being widely used in Automotive, FMCG, Aerospace, Heavy Engineering, Medical, Defense industries for various applications.

With so many advanced robotics inventions, there are few challenges and opportunities which can be explored further. Few of them are listed as below:

**1. Collaborative Robots:**

Collaborative Robot technology is not new now. Almost all major industrial Robot OEM's have developed *Cobots* and they are in implementation for industrial use. However, the technology is still not fully developed. Collaborative Robots are safe to work alongside operators as long as their speed is within 30-50% of maximum speed. Their response time to stop it, is long enough to run it at maximum speed. Can additional/upgraded sensors make *Cobot* safe to be able to run with maximum speed and still be safe with operator working alongside with them without fencing?

**2. Machine Learning:**

Machine learning is an application of artificial intelligence (AI) that provides systems the ability to automatically learn and improve from experience without being explicitly programmed. Machine learning focuses on the development of computer programs that can access data and use it learn for themselves. Can machine-to-machine learning reduce the online and offline teaching time for industrial robots?

**3. Human Safe:**

Normally, Industrial robots are having high load carrying capacities, high ranges, precision and robustness. There are newer safety technologies developed by many Robot OEM such as ABB SafeMove, Kuka Safe Operation, Fanuc DCS etc. However, current industrial robot installed in plants may not have these safety features built-in. Since the potential risk for humans in the event of a collision is naturally greater than when robots are smaller, can we make existing industrial robots safer for operators in line to newer safety technologies?

#### 4. Singularity Error:

A **singularity** is a situation that often happens when robot to go to a given point, but since the robot's configuration is not compatible with this point, the robot stops and shows the error: Joint Limit Violation. This happens when there is infinite joint configuration to reach to a certain point.

Can we prevent this error from happening?

**Eligibility: 2<sup>nd</sup> Year/3<sup>rd</sup> Year B.Tech Students**



Mission Statement: A team of scientists are in a mission to explore Pandora. Their objective is to understand the environment which might be prone to varying conditions such as

- Atmospheric pressure
- Magnetic Field
- Terrain conditions
- Vibrations
- Temperature
- Humidity
- Obstacles
- Fire
- Water
- Terrain Inclinations

Your mission is to develop a sensor fusion system that will be mounted on a robot (robot is not part of the mission statement). To sense the environment, use can you multiple sensors connected to an Arduino. The scientists team is expected to maintain a log of their mission and in case of emergency they should record their navigational data. This data has to be stored in a Raspberry pi.

Your primary objectives of the mission will be as follows:

1. Sensor fusion system with Arduino
2. Gather sensor data
3. Store/Log data in Raspberry pi

The students who show a working model of the sensor fusion system with clear understanding of the system will be given an internship for a period of 30 days at **Prag Robotics** Private Limited.

**Eligibility: 2<sup>nd</sup> Year/3<sup>rd</sup> Year B.Tech Students**



**PROBLEM STATEMENT FOR INTERNSHIP (Eligibility: 1<sup>st</sup> Year/2<sup>nd</sup> Year/3<sup>rd</sup> Year B.Tech Students)**

1. Vehicle Number Plate Extraction of Speed Violators and  
transferring the data through IOT
2. Character Recognition and Training Machines for  
Artificial Intelligence
3. Surveillance Robot with Real Time Images  
using IOT
4. To Image Compression without loss in data clarity
5. Real Time Image Processing
6. Voice Alert System In Automobiles
7. Machine Training for Image Processing
8. Automated Car Parking System
9. IOT Controlled Appliances with Image Applications
10. Effective Traffic Management System using Vehicle Detection and Density