Honeywell Young Innovator Award 2012

Team of Criti Mahajan and Ritubhan Gautam from IIT Delhi won the Honeywell Young Innovator Challenge for their entry titled “Blue Energy” (reverse electrodialysis) supervised by Prof. S. Basu (Chemical Engineering Department).

From the total of 154 entries from different Universities/Institutes all over the country, 30 were shortlisted for the second round and out of which 15 were called for the final at Honeywell Bangalore campus. On the day of the university relations day celebration by Honeywell, these 15 shortlisted team presented their work through poster presentations and models before the Honeywell employee and jury on April 19, 2013. Results are following:

1. Winner: “Blue Energy”, Criti Mahajan and Ritubhan Gautam, IIT Delhi; Supervisor: Prof. S. Basu. The winning team was awarded the grand sum of Rs 1 Lac along with the internship opportunity at Honeywell.
2. Runner Up: "Obstacle avoidance of ground vehicles using optic flow technique", Abhilash Iyer and Tamal Dutta, IIT Bombay, Supervisor: Prof. Hemendra Arya. Runner-up Prize: Rs 0.5 Lac

Blue Energy or the Salinity-Gradient Energy (concentration cell), is the energy released in the process of mixing of water solutions of different salinity. This form of energy can be effectively harnessed at an estuary, where fresh water river currents and the saline tides of the ocean meet as a concentration gradient is developed. A concentration cell is like a fuel cell but only suffers from the latter two losses e.g., ohmic losses and concentration losses. The bottlenecks in developing this technology are how to overcome the ohmic and concentration losses, the composition of dilute and concentrated compartment, the efficiency of ion exchange membranes, the electrode preparation, spacer thickness etc. In this work three different concentration cells with different flow channels were fabricated and experiments were conducted to compare the efficiency of different flow channels.

Runners-up Abstract
This project addresses the development and implementation of a system to avoid visible obstacles around an autonomous mobile robot. While in motion the robot continuously captures sequence of images of things lying beside its path using a low resolution high speed camera. The Optic flow information is extracted from the image sequence using an image processor and used for obstacle detection and navigation. Onboard system calculates the obstacle distance on the both side of the robot using the optic flow information and controls the left/right turning and speed of the mobile robot to follow a midway path avoiding the obstacle. Also GPS support for tracking and path planning.

2. "Simulation of pressure and flow distribution in fuel cells (clean and green automotive technologies)", Shivangi Tiwary and Vimal K. V., IIT Madras
Fuel cells are emerging as an alternative to the conventional sources of energy as they pave the way towards clean, reliable, efficient, quiet and environment friendly power systems. In this work a two dimensional model of the fuel cell stack, implemented using the fluid flow module in COMSOL Multiphysics. Key parameters like manifold width, number of cells and air feed rate were varied using the parametric sweep feature so as to study the pressure and flow distribution in the manifold. The optimized results were obtained by simulation and validated by comparing them with an analytical model developed using Matlab.