Progress Presentation-I

e-Yantra Summer Intership-2016
Modular Robots

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Overview of Project

Give following details:

- **Project Name**: Modular Robots
- **Objective**
  1. To build a Self-reconfigurable autonomous robot which can deliberately change shape by reorganizing connectivity between the modules.
  2. To add sensors to the robot and make it smart.
     (To sense and take action according to the environment)
- **Deliverables**
  1. A stable modular robot which is able to change its shape upon the need of the environment
  2. Code and Documentation of each Task (1-6)

Overview of Task

- **List Of Key Tasks with Deadlines**

Task No.	Task	Deadline
1	Getting Familiar with existing models of Modular Robots	2 days
2	Interfacing Arduino IDE with Servo, Bluetooth and Sensor	3 days
3	Testing and selecting appropriate sensors to be added in the module	2 days
4	Make design changes in the modules for accommodating sensors.	4 days

Overview of Task

Task No.	**Task**	**Deadline**
5	Assembling all the selected parts. Four robotic modules need to be produced	4 days
6	Applying algorithm to check different types of motion (Wheel, Snake, Ladder)	7 days
7	Autonomous Obstacle Avoidance using sensor detection and self-reconfiguration	6 days
8	Code & Documentation	6 days

Task Accomplised

- **Task-1:** Got Familiar with existing models, selected the most suitable model based on efficiency, expandability and time constraints.
- **Task-2:** Interfaced Arduino Nano with Servo Motors, Bluetooth and Sensor
- **Task-3:** Testing and selecting appropriate sensors to add in the module. Two Sensors were successfully interfaced and calibrated:
  1) Sharp Sensor
  2) Laser TOF Sensor (selected based on size, range and accuracy)

Task Accomplised

- **Task-4:** Studied the design and made design changes to module to change the hole size as to fit the available screw dimension.
- **Task-5:** Simulated the movements of the designed modular robot.
  - Interfaced Laser TOF sensor in simulation environment and took feedback for reorganization.
  - Also scripted it in LUA to overcome obstacles. (Attached video) After successful simulation of the design the parts are given for printing.

Challenges Faced

- Appropriate screw (2mm x 4mm Flathead) not available, so had to change the 3D CAD design
- Selection of Sensors which would fit the free space available in the design, and also serve the purpose of successful obstacle detection.
- Coding on V-REP using LUA. The V-REP script flow is time dependent. (Add flow diagram)

Future Plans

- All printed parts assembled. Four Robotic modules to be assembled
- Applying algorithm to check different type of motion (Wheel, Snake)
- Begin with Autonomous obstacle avoidance using sensor detection.

Thank You

THANK YOU !!!