Progress Presentation-I

e-Yantra Summer Intership-2016
Distributed Robotics - Multi Swarm Robots

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Overview of Project

- **Project Name**
  - Distributed Robotics - Multi Swarm Robots
- **Objective**
  - **Bulid minibots** which have capabilities to sense its surrounding and communicate with its neighbouring robots
  - **Shape formation** using the minibots
- **Deliverables**
  - **Five Minibots** that can portray swarm behaviours
  - Implement/Develop an **algorithm** to form shapes using the robots

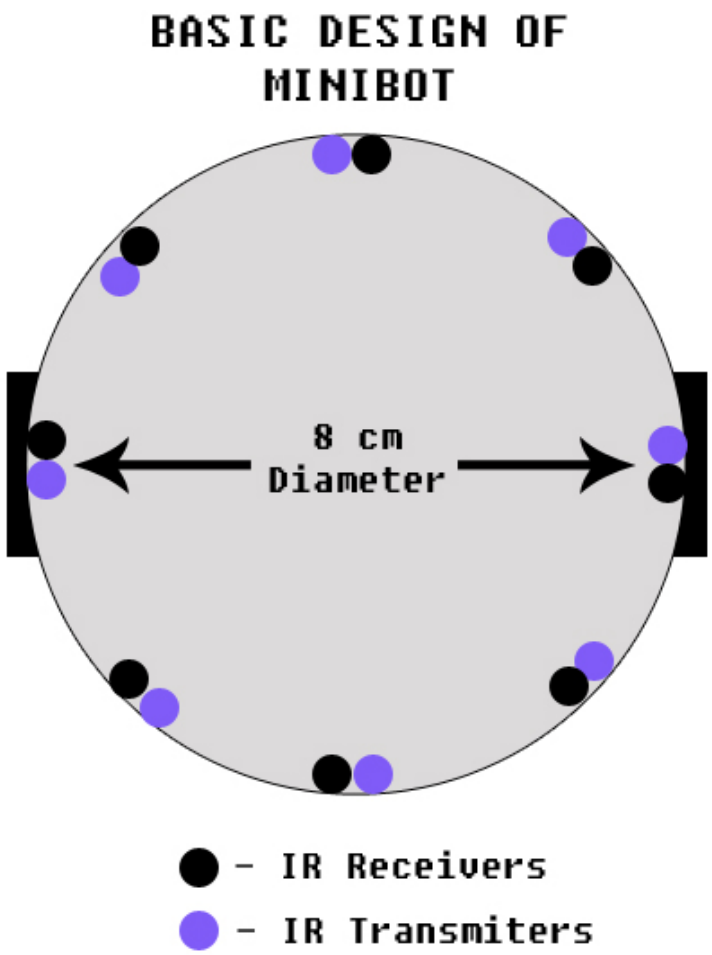
Overview of Task

TASK	**DAYS**
Study the concepts of swarm robotics and get familiar with different robots available	3
Make the Minibots:	
Study the kinematics of differential drive configuration	3
Select appropriate sensors to be added:	3
Design the pcbs	3
Assemble all the components	4
Test the robots	3
Solve rendezvous problem using homogenous controller gain	2
Solve rendezvous problem using heterogenous controller gain	2
Shape formation	4
Documentation	5

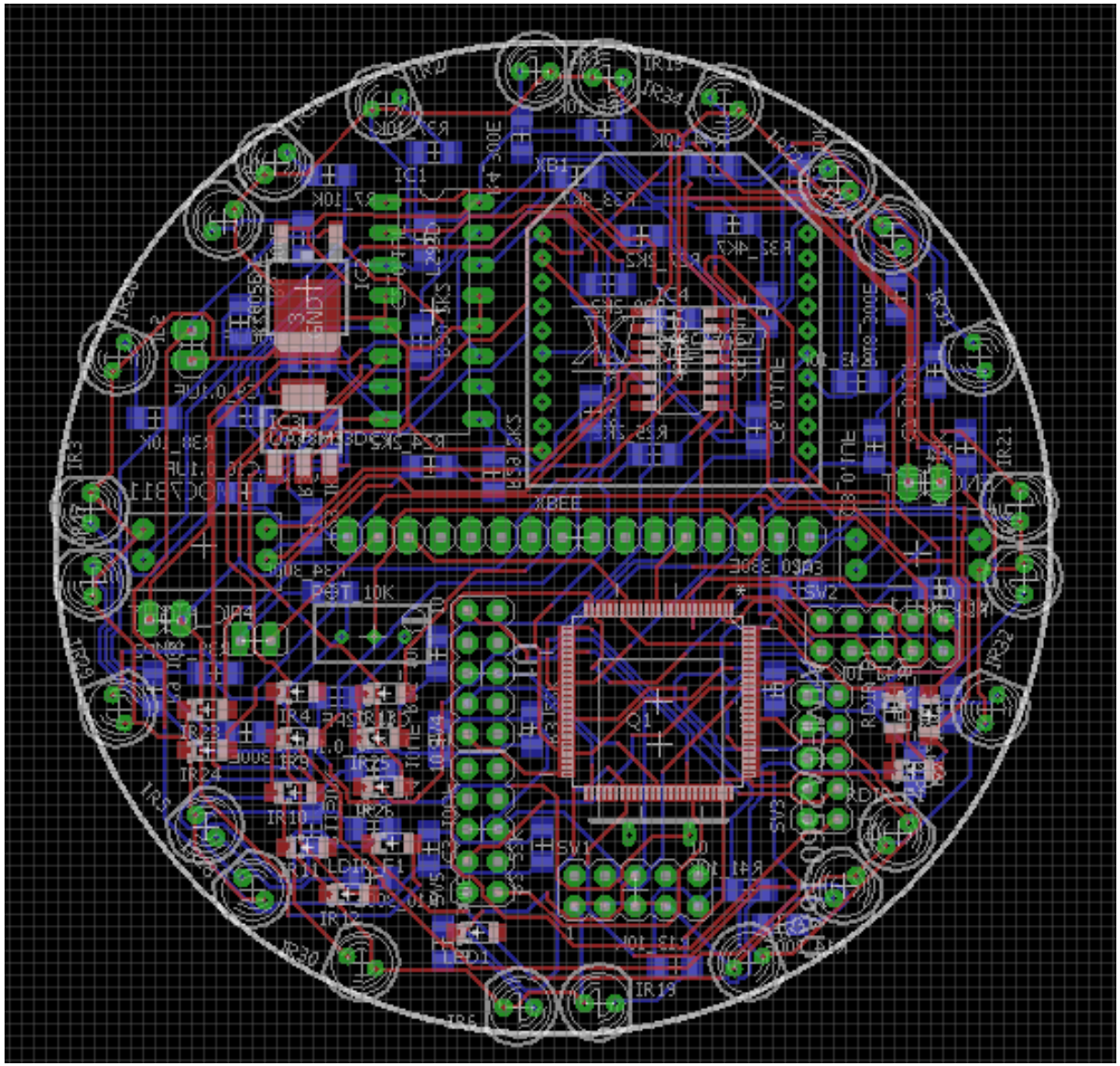
Task Accomplised

- Understanding the fundamentals of swarm robotics
- Learning motion kinematics and inverse kinematics for mapping distance and angle to the position
- Designing PCB:
  - Components and shape (8cm dia) finalization
  - Understanding eagle software
  - Designing schematics
  - Placing parts in PCB layout
  - Routing the PCB, generating Bill of materials and gerber files
  - Finalizing PCB design
- Solved rendezvous problem using Firebird V robots
- Developed an algorithm for line formation by swarm robots

Basic Desgin of Minibot



PCB Design and Schematic



Challenges Faced

- Miniaturizing the design of minirobot
- Designing of PCB with the constraints in size
- Routing double layered PCB
- Mapping IR reading to actual distances
- Designing line formation algorithm with respect to relative positions of robots

Future Plans

- Desinging and building chassis for the minibots
- Printing of PCB and soldering parts
- Reading on already existing shape forming algorithms in swarm robots
- Developing an algorithm for forming regular shapes
- Further implementing the same for alphabets

Thank You

THANK YOU !!!