1. **METHODOLOGY**
   1. **METHODOLOGY**

After defining the objectives for the robot to design for portability, mobility and versatility, different types of All-Terrain Robots are surveyed and their technical specifications have been noted. Then the comparison factors are sorted out and a suitable method for locomotion is chosen by comparing the factors with objectives.

After that the types of obstacles aimed for the robot to overcome are decided by finding out the most common type of obstacles in an urban terrain. Then the specifications of already available All-Terrain Robots are evaluated and required specifications for the project are determined based on common core urban obstacle dimension like the average height of a step etc. Then a simplified Individually Actuated method is chosen and a 2D sketch is made to evaluate how it could negotiate with the obstacles.

Then a preliminary prototype, termed IAR 1 was designed and built mainly for the purpose of demonstrating the functionality of the IAR. It was also used to check whether the arms and the body are correctly sized and how close it was able to reach the objectives. These results are tabulated and are crucial because they can be evaluated and the adjusted for the next prototype. This prototype had no suspensions or any other extra mechanisms.

From the problems and observations of IAR 1, additional design optimization for weight, portability, packaging, maneuver is made and the revised design is termed IAR 2. It incorporated an additional mechanism termed Weight Shifting Mechanism. Though the design became complicated and paved way for new problems, addition of weight shifting mechanism overcame the problems found in IAR 1. So the comparison values for design and the goals reached of the two robots are tabulated and IAR 3 – which became the final design – is designed.

IAR 3 has overcame many complications found in IAR 2. It is designed to decrease the complexity and increase the easiness to assemble. Then the future scope for the work is assessed and proposed.