Path planning is essential for guiding a robot to its destination while avoiding obstacles. In practical scenarios, the robot is often required to remain within predefined safe areas during navigation. This allows the robot to divert from its main path during emergencies and follow alternative routes to a safety center.

This paper introduces a novel method to incorporate safety zones into path planning. Each zone is defined by a central point and a radius. Our approach efficiently plans paths to the goal, ensuring that the robot can reach a safety center without having to travel more than the radius of the safety zone. Using sampling, our approach constructs a roadmap with navigation routes and identifies safe locations that satisfy the distance requirements for reaching a safety center. The safe portion of the roadmap is then searched to find a path to the goal.

We demonstrate the effectiveness of our approach through simulated experiments in obstacle-rich 2D and 3D environments, utilizing car and blimp robot models.