To develop an autonomous navigation system for a 4-wheeled omnidirectional robot that adapts and continuously improves its navigation capability by choosing the path with fewer obstacles in a controlled environment.

1. Initial Supervised Learning: In this initial stage, a dataset called "Initial Training Dataset" containing labeled information about sensors and control actions will be used. This dataset will be obtained as the project progresses by researching and collecting data from different sources, including:

- **Online Resource Exploration:** extensive research will be conducted in online resources, such as Kaggle, the UCI Machine Learning Repository, and other relevant sources to search for public datasets related to robotics and autonomous navigation.
- **Progressive Collection:** As suitable datasets are identified, we will proceed with progressive collection of the datasets. This may include downloading publicly available datasets or collecting additional data through testing and experiments in the controlled environment of the project.
- **Creation of a Custom Dataset**: In addition, as the project progresses, it is planned to create a custom dataset collected by the project team. This will involve conducting controlled navigation sessions with the robot, recording sensor data and control actions, and properly labeling the data.
- **Labeling and Preparation:** All data, whether from public sources or from the custom dataset, will be properly labeled and prepared for use in the training process of the supervised learning model. This may require the identification of correct and incorrect actions in the data, as well as the creation of appropriate annotations.

2. Unsupervised Learning: In this stage, unsupervised learning is employed to further improve the autonomous navigation of the robot. The focus here is on obstacle classification and the definition of specific actions.

- **Obstacle Classification:** During navigation sessions, the robot collects additional sensory information in real time. This information is used to perform unsupervised learning techniques, such as object segmentation or clustering, to identify and classify different types of obstacles in its environment. This can include distinguishing between moving and static obstacles, as well as categorizing obstacles according to their size or shape.
- **Defined Actions:** Once the obstacles have been effectively classified, specific actions are defined to deal with each type of obstacle. For example, the robot could learn to slow down when it detects moving obstacles, to change direction when encountering static obstacles.

3. Reinforcement Learning: In this stage, we will use a point system to guide the robot in its process of improving autonomous navigation. Initially, we assign the robot a total score of 1000 points to complete the entire course successfully. The goal is for the robot to learn to make decisions that maximize its total score.

- **Correct Decisions:** Each time the robot makes a correct decision, such as choosing a route without obstacles, it is awarded additional points. For example, it could earn 10 points for choosing the most efficient and obstacle-free route.
- **Wrong Decisions:** On the other hand, each time the robot makes a decision that is not optimal, such as hitting an obstacle or choosing a complicated route, it is deducted points. For example, it could lose 20 points for a bad choice.

The robot learns from these rewards and penalties. As it accumulates experience in its navigation, it develops a decision-making model that always seeks to maximize its total score. This means that, on future attempts, the robot will tend to avoid actions that previously resulted in the loss of points and will seek routes that lead to a higher score.