As we know, ~~Right now,~~ our world has been undergoing a major technological revolution. Many new types of mobile robots have been developed to work in places factories, hospitals, or other public area. While these robots help reduce tedious task or take on dangerous works such as resceuting after an earth quake, they have to ensure that they will not hit any people, cars, or other obstacles on their missions. Unfortunately, many of today’s navigation systems still struggle with dynamic environments, highlighting their limitations in handling moving obstacles. This is a critical area where further improvements are needed. I think a powerful navigation system is essential for the robot to work safely in complex environments. Therefore, my research focuses on expanding an obstacle-avoidance algorithm for a specific type of mobile robot called the General Bicycle Model or GBM. “if no question, next, I want to elaborate the GBM”

(“anybody have a question?)”

~~If a powerful navigation system could be developed for a kind of agile robot, we can use them safely in more complex environments, such as in train station or busy streets, without crushing into anything. Therefore, my research focuses on expanding an obstacle-avoidance algorithm for a specific type of mobile robot called the General Bicycle Model or GBM.~~

(“raise your hand if you have a question.”)

The GBM has a unique design. Unlike regular bicycles that steer by turning the front wheel, the GBM has two wheels that can rotate independently. This design allows it to move in any direction without changing its orientation—similar to how a crab moves. This flexibility makes GBM highly maneuverable.

You may want to know, how can we make the GBM avoid obstacles on its own in dynamic environments and reach its goal safely? It relies on an obstacle avoidance algorithm. This system can help the robot develop a kind of "special awareness."

* First, the GBM must observe obstacles around it.
* Next, predict those obstacles’ future position and evaluate the risk of collisions.
* Then, adjust its future path to minimize those risks.

By continuously repeating these three steps in real time, the algorithm can let GBM find the safest route to its destination.

(“up here, any questions?”)

If we can combine this improved navigation system with the GBM, we will be one step closer to fully autonomous robots. With a better strategy for avoiding obstacles, these robots could operate safely and efficiently, even in complex environments. In the future, they could serve as platforms for other autonomous systems, providing support wherever it’s needed.

Right now, our world is in the middle of a major technological revolution. Many new types of mobile robots are being developed to work in places like factories, hospitals, and other public areas. These robots help by reducing tedious tasks and handling dangerous jobs. But, to be effective, they must avoid collisions with people, cars, and other obstacles around them. Unfortunately, many of today’s navigation systems struggle in dynamic environments, showing clear limitations in handling moving obstacles. This is a critical area where improvements are needed.

If we can create a stronger navigation system for more agile robots, we could use them safely in complex places like train stations or busy streets. My research focuses on developing an obstacle-avoidance algorithm for a specific type of mobile robot called the General Bicycle Model, or GBM.

The GBM has a unique design. Unlike regular bicycles that steer by turning the front wheel, the GBM has two wheels that can rotate independently. This design allows it to move in any direction without changing its orientation. Its movement is similar to a crab’s and gives the GBM impressive flexibility and maneuverability.

But how can we help the GBM avoid obstacles and reach its goal on its own? The answer is to give the robot "special awareness." First, the GBM observes obstacles around it. Next, it predicts each obstacle’s future position and evaluates the risk of a collision. Finally, it adjusts its path to avoid these risks. By continuously repeating these three steps in real time, the GBM can find the safest route to its destination.

If we can combine this improved navigation system with the GBM, we will be one step closer to fully autonomous robots. With a better strategy for avoiding obstacles, these robots could operate safely and efficiently, even in complex environments. In the future, they could serve as platforms for other autonomous systems, providing support wherever it’s needed.