Overview:
With the rapid development of population and city size, traffic congestion has been more and more serious, especially in those super cities. Lots of people are seeking a revolutionary means transportation, which is expected to fulfill several requirements. Firstly, it has to be small enough such that users can easily carry it around. Secondly, it has to be powerful enough to keep running for 10 kilometers or more. Last but not least, it has to be safe and easy to use.

Objectives:
The focus of mechanical subsystem design in this project is to devise a mechanism to carry out bi-directional self-balancing function of the unicycle, which has the following features:
1. It has to be safe, simple and portable, such that we can easily learn how to use it and bring it around with us.
2. It has to be powerful enough to keep running for 10 kilometers or more and be robust enough to work in the harsh environment.
3. It should be smart and be able to interact with its own owner.

Methodology:

Result:
1. Figure 1 shows the mechanical design of our prototype.
2. Figure 2 shows the actual prototype we built.
3. Figure 3 shows the final UI design of our user recognition App.
4. Based on the test result, the successful rate when the user is owner is 92%, while the successful rate when the user is not the owner is 100%.

Conclusion:
The objective of this final year project is trying to develop a kind of unicycle, which is safe, simple and portable. These three targets have been in our minds since the first day. Up to this point, the primary goal of this final year project has been reached. With the Auxiliary Wheel Design, the unicycle is equipped with Lateral Self-balancing capability as well as user recognition capability.