6 Evaluation and Conclusion

6.1 Evaluation

6.1.1 Characterization of Localisation Accuracy

To reliably evaluate the accuracy of the proposed indoor localisation algorithm, a walking model for the robot is designed, as shown in Figure 6.1. It's a series of command of *move* and *rotate*:

Algorithm 1 Commands

```
1: procedure CONTROL
2:     move forward 0.7m
3:     rotate counter-clockwise 30°
4:     move forward 0.5m
5:     rotate counter-clockwise 30°
6:     move forward 0.5m
7:     rotate clockwise 120°
8:     move forward 0.5m
9:     rotate counter-clockwise 90°
10:    move forward 0.5m
11:    rotate clockwise 90°
12:    move forward 2.5m
```

Through remote control, the filter result is as shown in Figure 6.2 and 6.3.

6.1.2 Observation

Compare different experiment result we can know, smoothing filter result heavily depends on the fluent remote control process, which is not always the case.

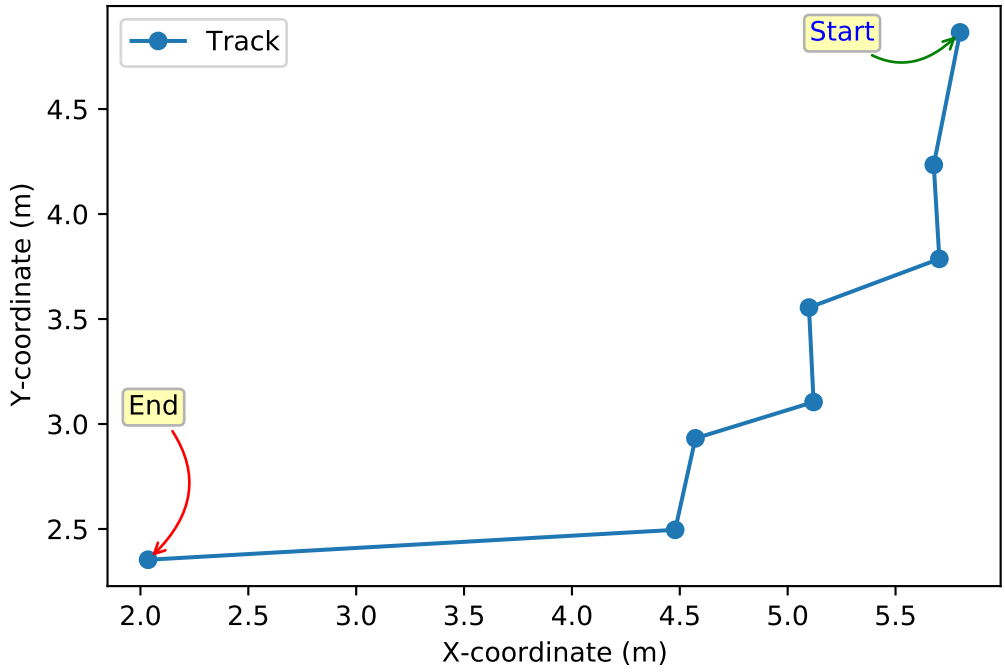
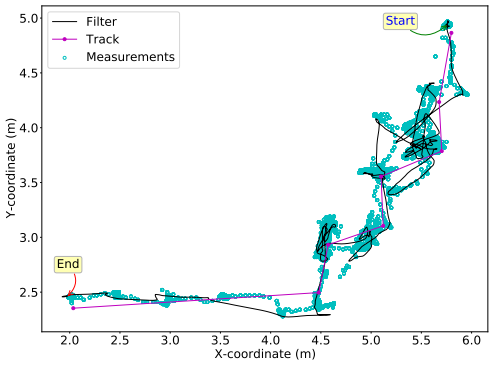
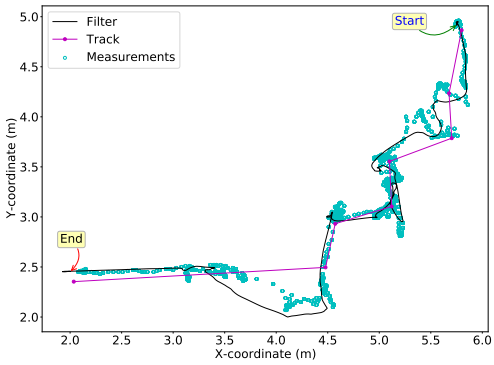


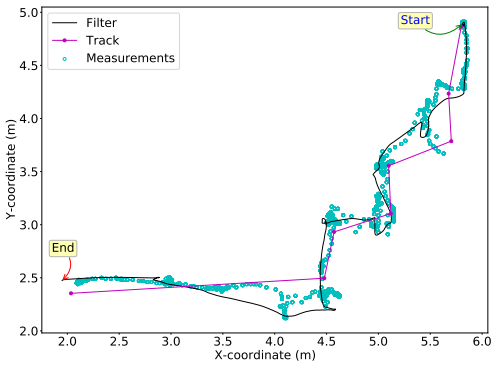
Figure 6.1: Ground truth



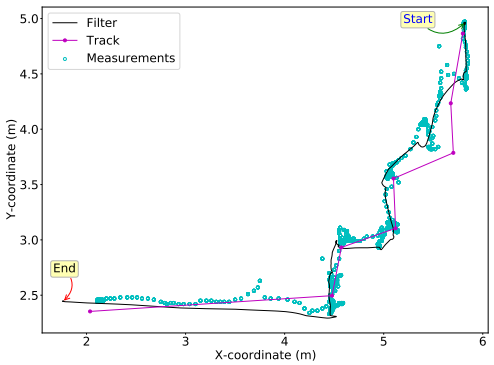
(a) Experiment 1



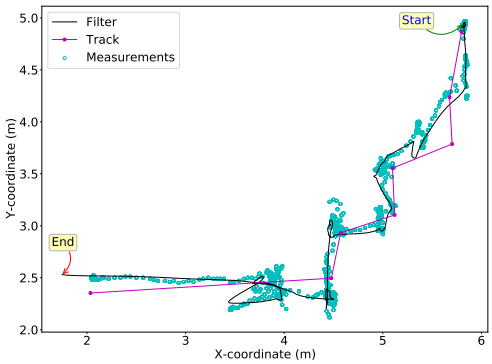
(b) Experiment 2



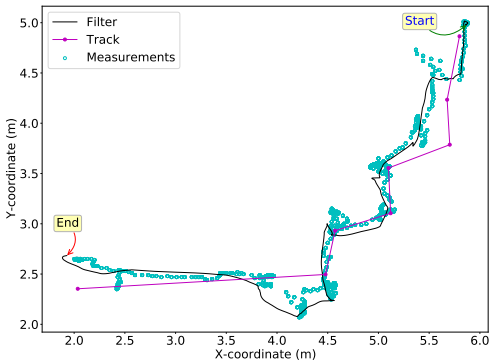
(c) Experiment 3



(d) Experiment 4

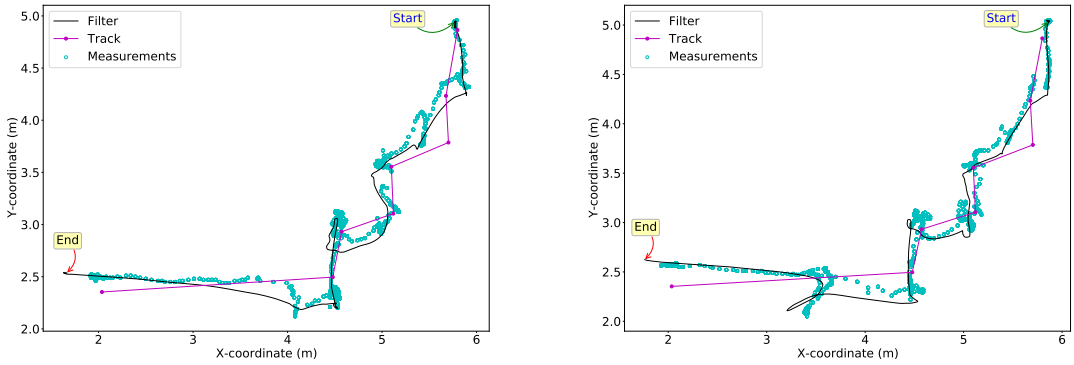


(e) Experiment 5



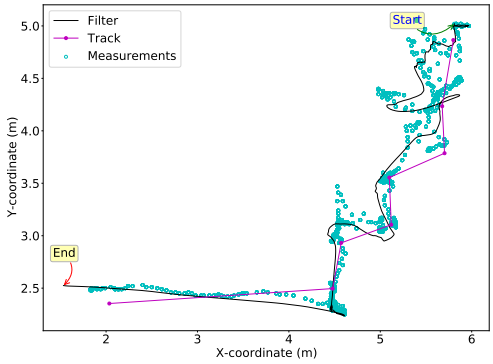
(f) Experiment 6

Figure 6.2: Plots of six times repetitive experiment result

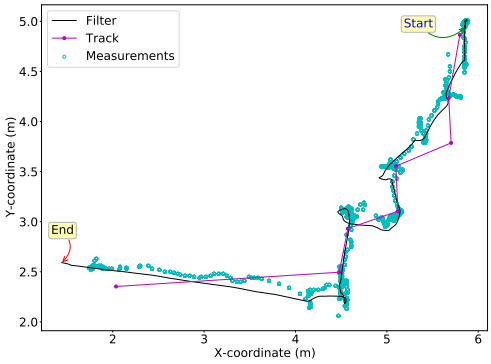


(a) Experiment 7

(b) Experiment 8



(c) Experiment 9



(d) Experiment 10

Figure 6.3: Plots of another four times repetitive experiment result

6.2 Conclusion

The model of sensors and of the system can never be perfect, what we can do is just localising the mobile robot as accurate as possible. No doubt, robotics programming is a process which often involves a great deal of plain old trial-and-error. Sometimes in order to tune a single parameter it takes a few hours or even days.