Notes from the last meeting

1: Quantitative metrics / assessment on:
1.1 Crowd moving on curved corridor/ straight, constant speed everybody:
- test 3 different speeds, 0.8, 1.2, 1.6
- two different models using ORCA/rds for every pedestrian and ORCA/RDS for the robot
- holonomic vs non-holonomic robot

1.2 with tracked human crowd used for cocktail party simulation with static pedestrians (5 cases)
- path deviation quantification

2; Qualitative assessment
highlight qualitative differences in the methods
- cornering
- pushing

Results

1.1 Crowd in a curve

- **equal desired speed for robot and crowd**
  - robot uses RDS to respond to crowd motion from ORCA [RDS-ORCA]: https://drive.google.com/open?id=1WCNfYnHVBgWEzX9Fy-oKHxPMrWY9ZZYM
  - robot uses ORCA to determine its velocity like every pedestrian [ORCA-ORCA]: https://drive.google.com/open?id=1qWi3N4bJRjDkGci_20AletI0uPrxhSJm
- **higher robot desired speed (1.3 times crowd speed)**
  - RDS-ORCA: https://drive.google.com/open?id=1BSGuMOuj5-efT4D0wv40XUBCywRzNYb6
  - ORCA-ORCA: https://drive.google.com/open?id=1G93brt4IXoNP044lvyTH_YG0xjfmjx41
- **lower robot desired speed (0.7 times crowd speed)**
  - RDS-ORCA: https://drive.google.com/open?id=1ZpALGXRThnNB0a4YjTm2fBjESLyT5sSm
  - ORCA-ORCA: https://drive.google.com/open?id=1wcPyqmxITeCZnM7OTq8L2krQRLvb3jAl

1.2 Crowd following real-world motion recordings

The robot replaces one pedestrian and follows its trajectory, either using RDS or ORCA. The quantitative evaluation generates 100 different cases by replacing in each case a different pedestrian by

the robot. For each case, the robot's original path deviation is computed as the temporal average of the distance between the robot's target and actual location and this number's average over all cases is reported for both control modes RDS-ORCA and ORCA-ORCA. It follows below this result and videos of three selected cases.

Robot original path deviation (average over 100 cases)

- RDS-ORCA: 0.97 m
- ORCA-ORCA: 1.45 m

Example cases

The red path traces the original pedestrian location, and the white path traces the robot. The straight white lines connect for each agent its target and actual location.

- **A)**
  - RDS-ORCA: https://drive.google.com/open?id=1jS_68-Vk5f7zJpf2zyfb-HxY1taij67Z
  - ORCA-ORCA: https://drive.google.com/open?id=1Y_d65Y7D-aNZ9nVboEJTIZBxDyNXUxrK
- **B)**
  - RDS-ORCA: https://drive.google.com/open?id=14Z2j9PtfXdvQogoTs-tU3pcDIinjS9KO
  - ORCA-ORCA: https://drive.google.com/open?id=1mupKW8weZBMcPvMNa8N4DITs6LInSrux
- **C)**
  - RDS-ORCA: https://drive.google.com/open?id=1k1UECiRnWwCAY4YIgKlSX4KQ_0MMRnbt
  - ORCA-ORCA: https://drive.google.com/open?id=1MJbNMZteRC7M4llduVucoZf84ux7rfQw