Overall description

- Shopping mall Atlantis

- ~1.2 km walk / ~45 min

- Indoor (95%), outdoor (5%)

- Stairs

- NOVELTY : *quasi RealTime condition !*

- Lifts / Escalator / Travelator

- 3 breaks ~15s

- 4 floors : (R-1) R0 R1 R2

2 teams

Team Name	Country	Organization
Silk-Road Reckoners	China	-School of Electronic and Information Engineering, Beihang University
ICT-BUPT	China	-School of Computer Science, Beijing University of Posts and Telecommunications -Institute of Computing Technology, Chinese Academy Sciences

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frontiers

Overall description

- # Inputs from ULISS :

  - accelerometer / gyrometer / magnetometer from a Xsens Mti-7

  - GNSS rawdata and NMEA (GGA/ZDA) from a Ublox ZED-F9P dual freq. receiver

  - barometer from BMP280 sensor

  - temperature sensor
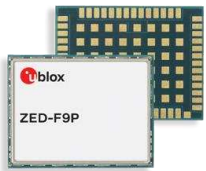
nav4you

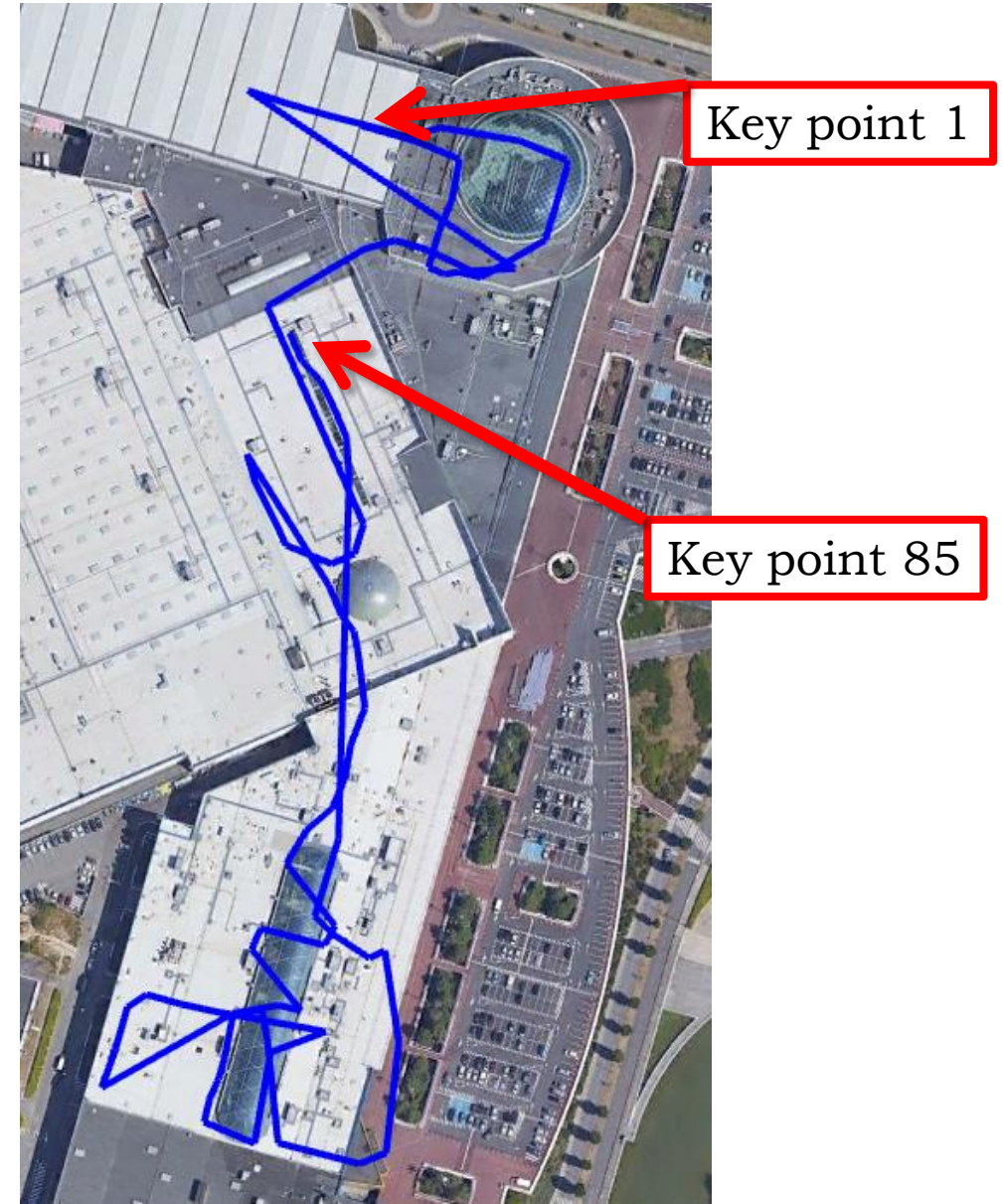Ubiquituous Localization with Inertial Sensors and Satellites
ULISS sensor (by Team GEOLOC)

IPIN 2021
ELEVENTH INTERNATIONAL CONFERENCE ON
**INDOOR POSITIONING
AND INDOOR NAVIGATION**
29 Nov. – 2 Dec. 2021, Lloret de Mar, Spain

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Objective

- **Re-build the trajectory realized in Sept 2021**

- **Starting from a known point**

- **At specific given timestamps**

- **83 key points were evaluated:**


```
304306944, -1.6312051066, 47.2228866914, 0, 1
304318212, -1.6312639579, 47.2230060176, 0, 2
304341237, -1.6311166197, 47.2232588847, 0, 3
304395079, -1.6313360420, 47.2234883288, 1, 4
304399422, -1.6313874860, 47.2235097003, 1, 5
...
305881902, -1.6309329730, 47.2253019451, 0, 65
305925620, -1.6308880959, 47.2253704618, 0, 66
305963826, -1.6308375003, 47.2255163809, 0, 67
306012968, -1.6302977366, 47.2254982935, 0, 68
...
```

Key point 1

Key point 85

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Objective

From: IMU (Acc,Gyro), MAG, GNSS, BARO sensors

Compute:

```
ROTA,310061.998129000,4.12264,-0.11782,1.95676
ACCE,310061.998358000,-5.08618,-8.94552,7.51071
ROTA,310062.003132000,3.99029,-0.171031,2.0577
ACCE,310062.003346000,-4.81856,-8.90485,7.69366
MAGN,310062.006216000,0.834387,0.496714,-0.539119
GOBS,310062.007000000,G07  24984599.602 9
GOBS,310062.007000000,R23  22411544.490 9
GOBS,310062.007000000,G02  24973888.141 9
ROTA,310062.008136000,3.82733,-0.196311,2.14405
ACCE,310062.008333000,-4.42163,-8.88965,8.09426
ROTA,310062.013140000,3.65192,-0.187157,2.20612
ACCE,310062.013321000,-3.98475,-9.17112,8.48837
```

-Latitude
-Longitude
-Floor level

At specific timestamps

In quasi Realtime condition through the Evaal web API

Track4 Call For Competition

https://evaal.aaloa.org/images/2021/IPIN2021_Track4_CallForCompetition_v2.1.pdf

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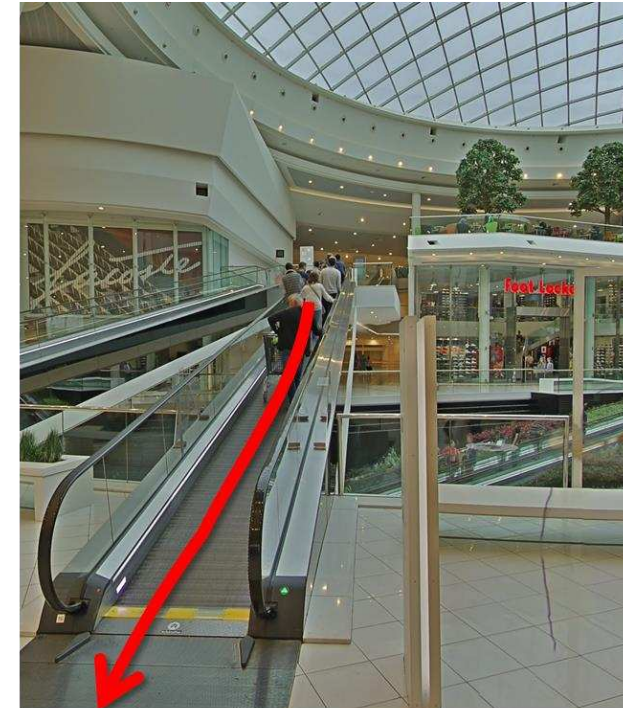Miguel Ortiz, Ni Zhu

frontiers

Track description

Starting point R-1
(indoor - static)

Lift (R-1) →(R2)

Travelator R2 → R0
(walker static)

Track description

Long straight walk

Wide area

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Track description

Travelator R0 → R-1
(walking)

Wide area
(running)

Travelator (R-1) → R0
(walker static)

Track description

$$R0 \rightarrow (R\text{-}1) \rightarrow R0$$
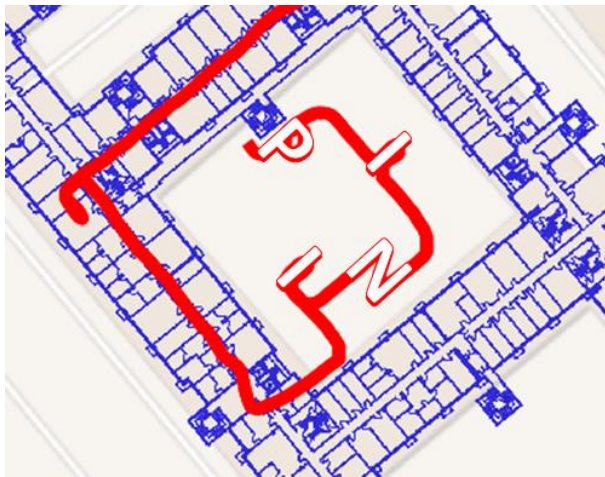(outdoor)

Stairs
$$R0 \rightarrow (R\text{+}1)$$

$$\text{Escalator } (R\text{+}1) \rightarrow R0$$
(walking)

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Track description

surprise IPIN2021:
some new activities
(side walking / running)

IPIN2019

IPIN2020

IPIN2021

IPIN2021 news

- AWINDA system used in // (ZUPT ref)

- Availability of the data under discussion

MVN Awinda starter
Standard performance

Range	~20m
Update rate	60hz
Battery life	6h
Comms	Radio protocol (Awinda)
Receiver	Awinda dongle
Hardware	17 wireless sensors T-shirt + straps
Charging	USB cable

MVN Awinda
Intermediate performance

Range	~50m
Update rate	60hz
Battery life	6h
Comms	Radio protocol (Awinda)
Receiver	Awinda station
Hardware	17(+1) wireless sensors T-shirt + straps
Charging	Charging station

MVN System 1
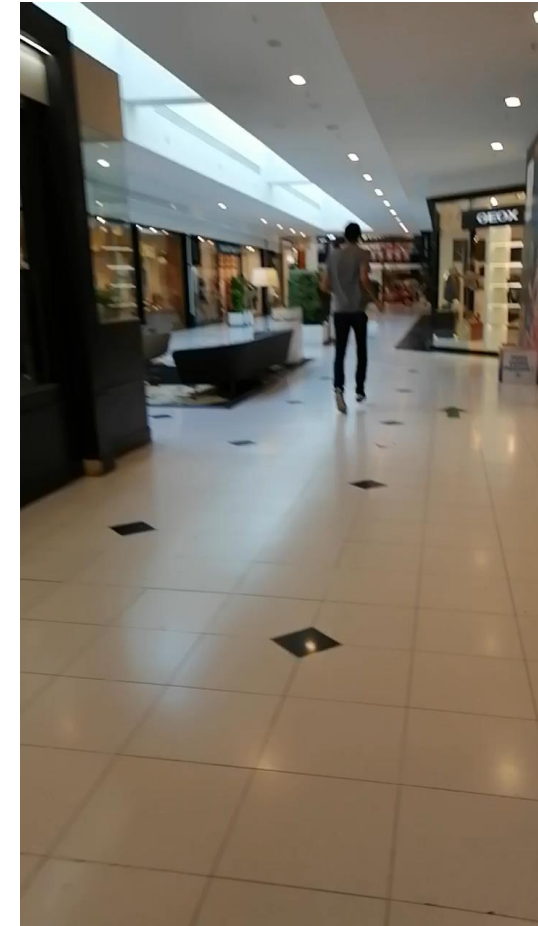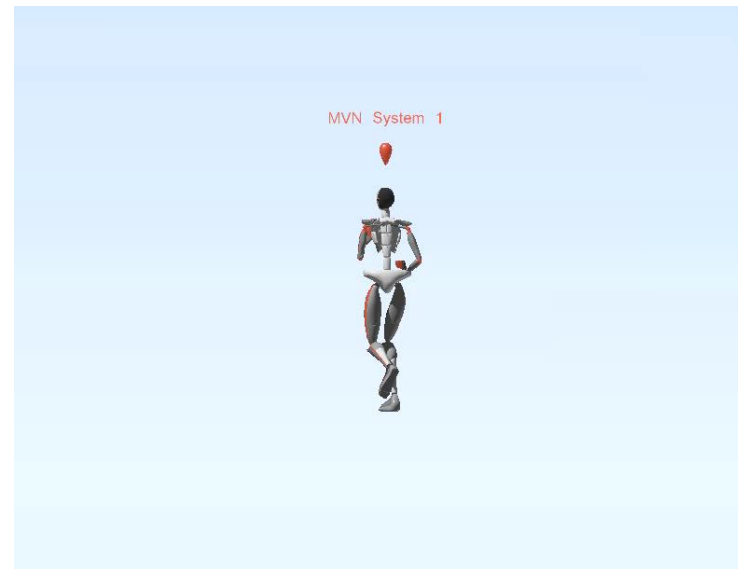
Evaluation
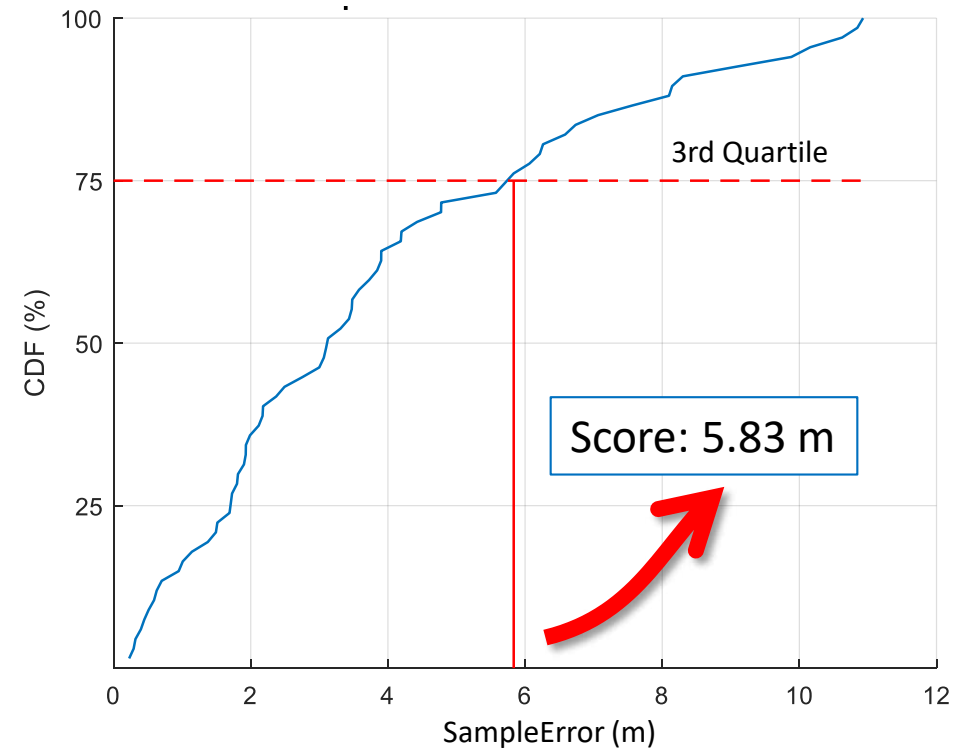

3D geo-referenced points cloud (Lat/Long/Height)

Accuracy Score $= 3\text{rdQuartile}\{\text{SampleError}(R_i, E_i)\}$

Where :

$\text{SampleError}(R_i, E_i) = \text{Distance}(R_i, E_i) + (\text{penalty} \times \text{floorfail})$
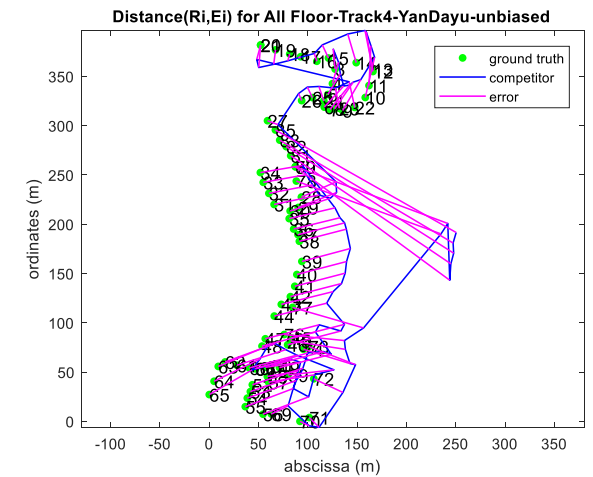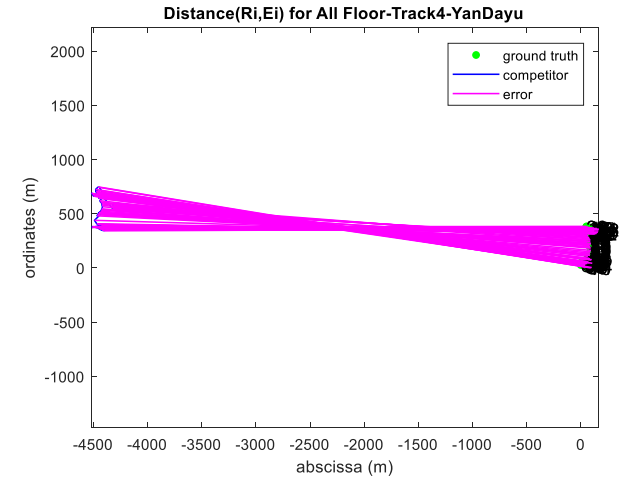

3rd Quartile

Score: 5.83 m

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Results

SampleError	Team

Results

SampleError	Team
4562 m 54.1 m* unbiased	Silk-Road Reckoners

biased
(official result)

Distance(Ri,Ei) for All Floor-Track4-YanDayu

un-biased
(by track chair)

Distance(Ri,Ei) for All Floor-Track4-YanDayu-unbiased

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Results

SampleError	Team
61.9 m	ICT-BUPT
4562 m 54.1 m* unbiased	Silk-Road Reckoners

SampleError distribution-Track4-BokunNing
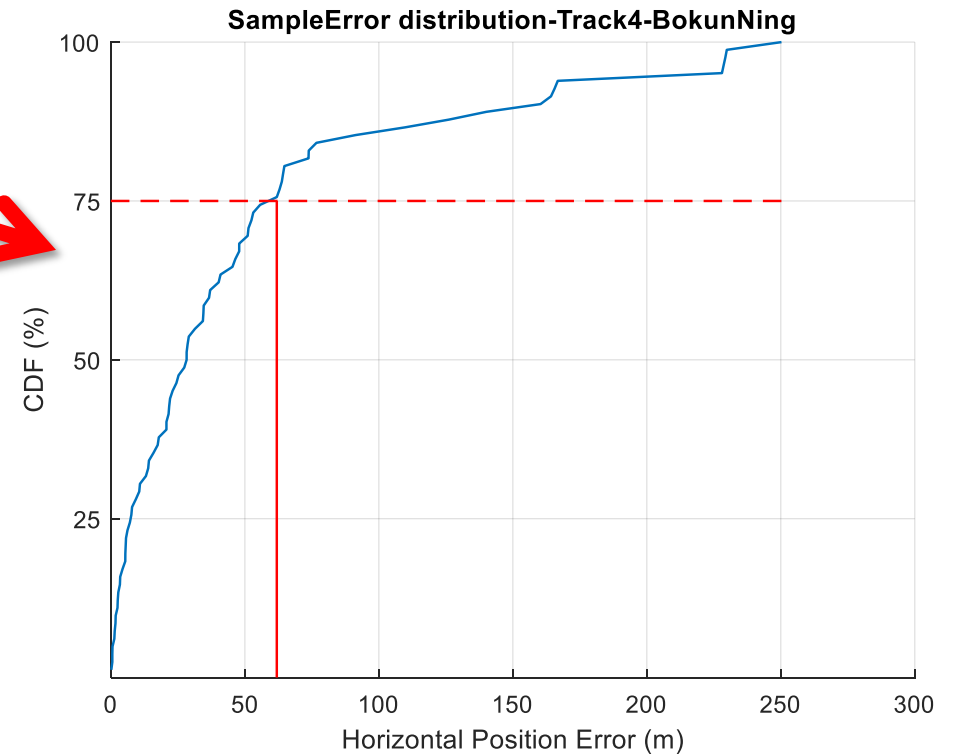
Results

CONGRATULATIONS

ICT-BUPT

Bokun Ning, Bao Linfeng

Results

Evolution of best score of Track4 over last 4 years

1 session : re-loadable

1 Trial re-loadable (for setup)
2 sessions : loadable only once

https://evaal.aaloa.org/evaalapi/

Post processing with completed CSV file

Quasi RealTime processing
(without completed CSV file)