

Explore the next sense



Yunhorn, presence detection

June 1, 2020

Introduction

- Presence detection on toilet, detect person who is sitting still
- Area to cover: 1 m x 2 m
- Sensor mounted in the ceiling, height 2.5 m ~ 3.5 m

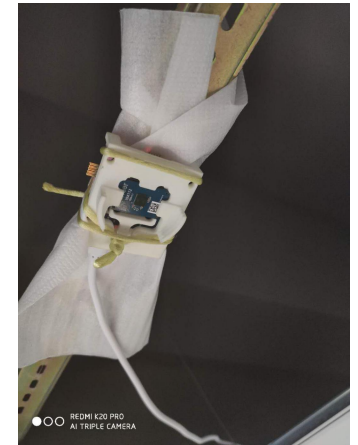
Tests conducted of Yunhorn

- Tests with/without lens
- Tests with person sitting still and with no person present
- Sensor placed in ceiling ~ 2.5 m
- Result
 - No detection of person sitting still without lens
 - With lens, detection only within 1 m x 0.7 m

With lens

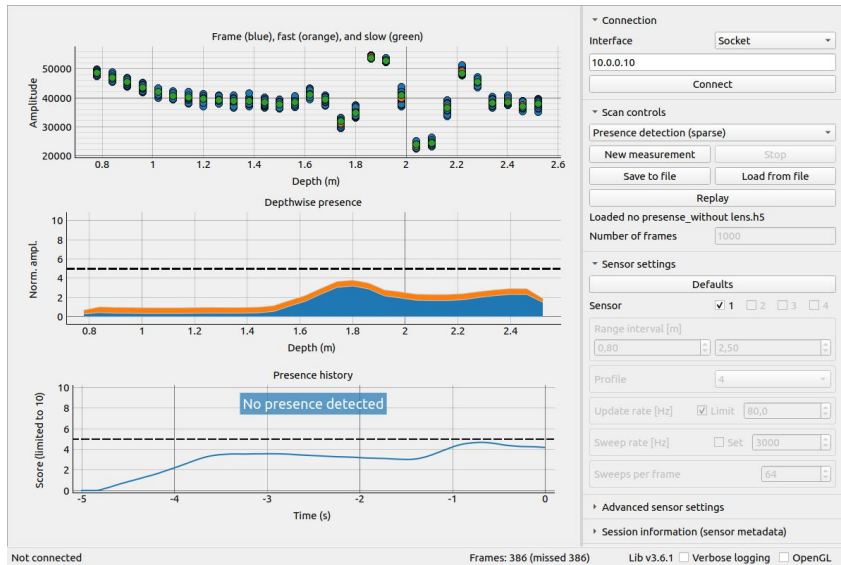


Without lens

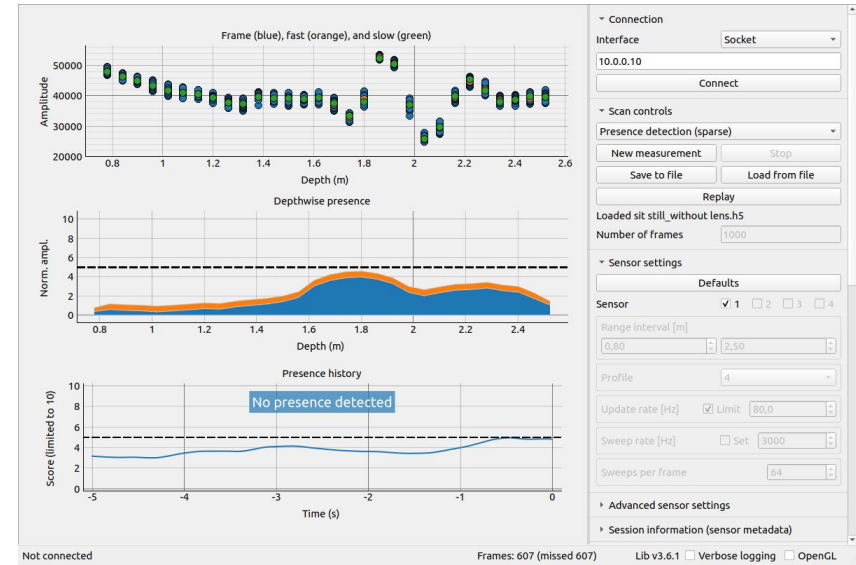


Snapshot of data

No lens, empty toilet

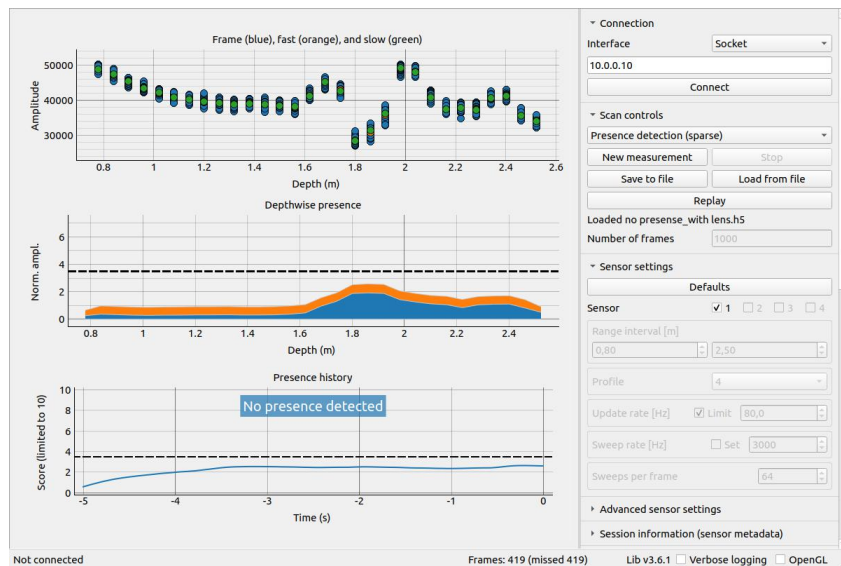


No lens, sitting on toilet

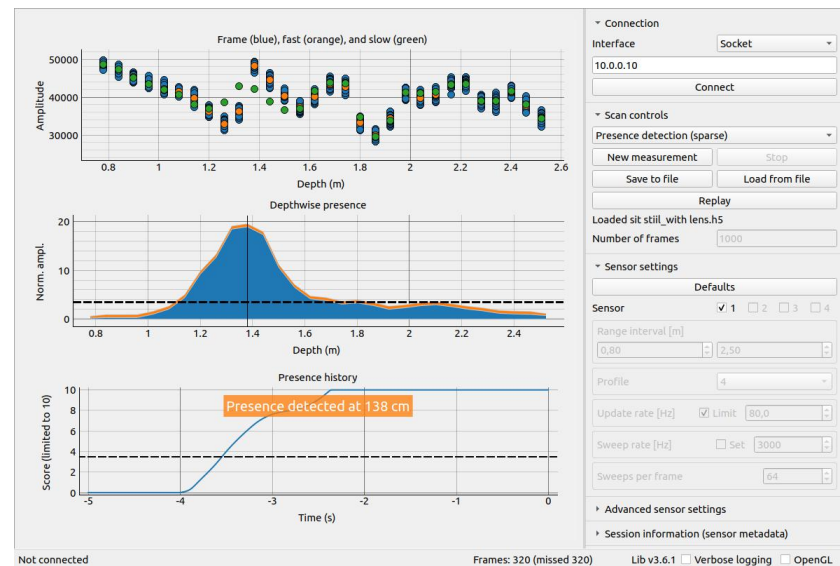


Snapshot of data

With lens, empty toilet



With lens, sitting on toilet



Settings used

SENSOR CONFIG

=====

```

mode .....
SPARSE
sensor .....
[1]
range_interval ..... [0.8,
2.5]

profile .....
PROFILE_4
update_rate .....
80.0
sweep_rate .....
None
sweeps_per_frame ..... 64
sampling_mode ..... B
repetition_mode .....
HOST_DRIVEN
downsampling_factor ..... 1
hw_accelerated_average_samples .... 63

gain .....
0.9
maximize_signal_attenuation ..... False
tx_disable .....
False
power_save_mode ..... ACTIVE

```

PROCESSING CONFIG

=====

```

detection_threshold ..... 5.0
inter_frame_fast_cutoff ..... 20.0
inter_frame_slow_cutoff ..... 0.2
inter_frame_deviation_time_const .. 0.5
intra_frame_time_const ..... 0.15
intra_frame_weight ..... 0.6
output_time_const ..... 0.5

```

ADDITIONAL INFO

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```

range_start_m ..... 0.781
range_length_m ..... 1.742
data_length ..... 1920
sweep_rate .....
2274.583
step_length_m .....
0.060055

```

Proposed settings

```

mode .....
SPARSE
  sensor .....
[1]
  range_interval .....
[0.8, 2.5]

profile .....
PROFILE_4
  update_rate .....
80.0->65.0
  sweep_rate .....
None
  sweeps_per_frame ..... 64
  sampling_mode ..... B
  repetition_mode .....
HOST_DRIVEN
  downsampling_factor ..... 1->2
  hw_accelerated_average_samples .... 63

gain .....
0.9->0.4
  maximize_signal_attenuation ..... False
  tx_disable .....
False
  power_save_mode ..... ACTIVE
  
```

PROCESSING CONFIG

=====

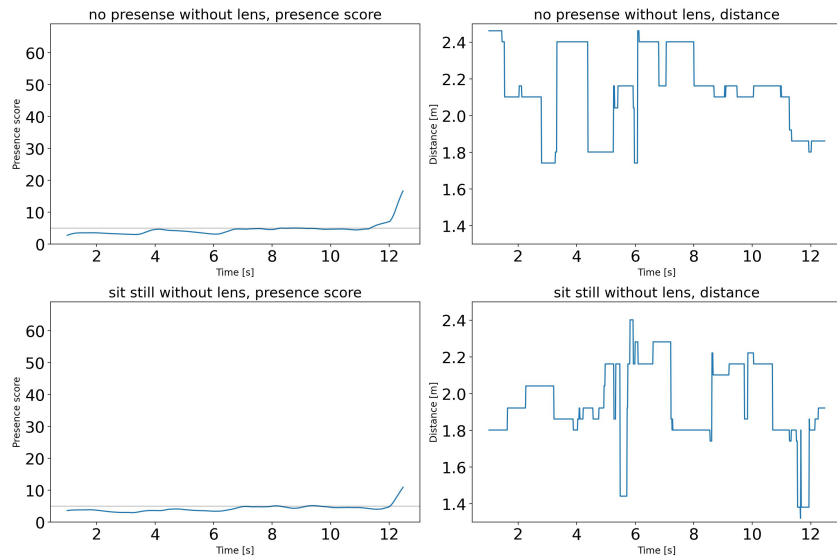
```

detection_threshold ..... 15
inter_frame_fast_cutoff ..... 10
inter_frame_slow_cutoff ..... 0.01
inter_frame_deviation_time_const .. 0.5
intra_frame_time_const ***..... 0
intra_frame_weight ..... 0
output_time_const ..... 0.5
  
```

Without lens

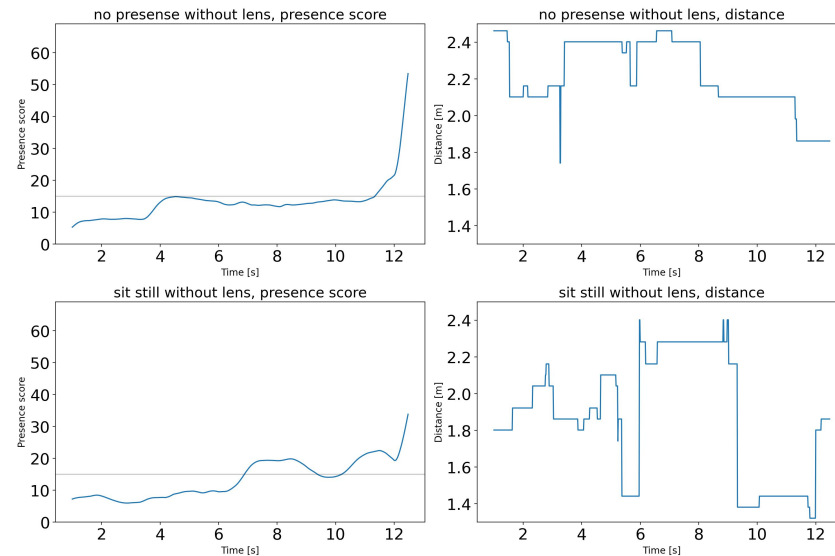
Old settings

Presence detection



Proposed settings

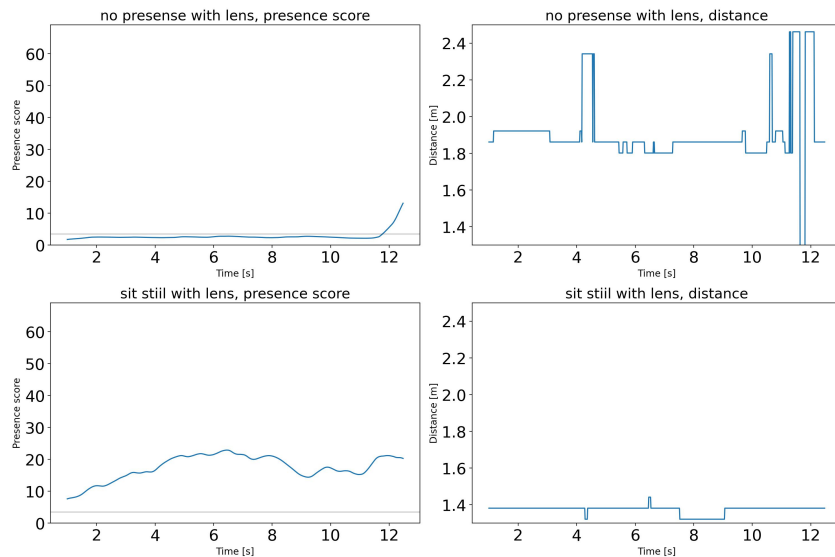
Presence detection



With lens

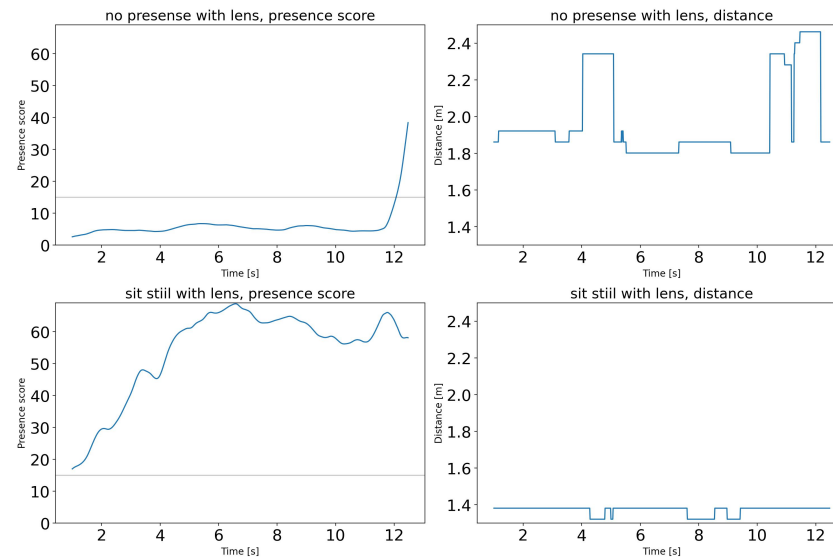
Old settings

Presence detection



Proposed settings

Presence detection



Conclusion

- Strong reflections at distance 1.8–2.5 m
- New tests with proposed settings

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