

Midterm Presentation
Frederike Dümbgen
Semester Project LCAV
EPFL
29.10.2015

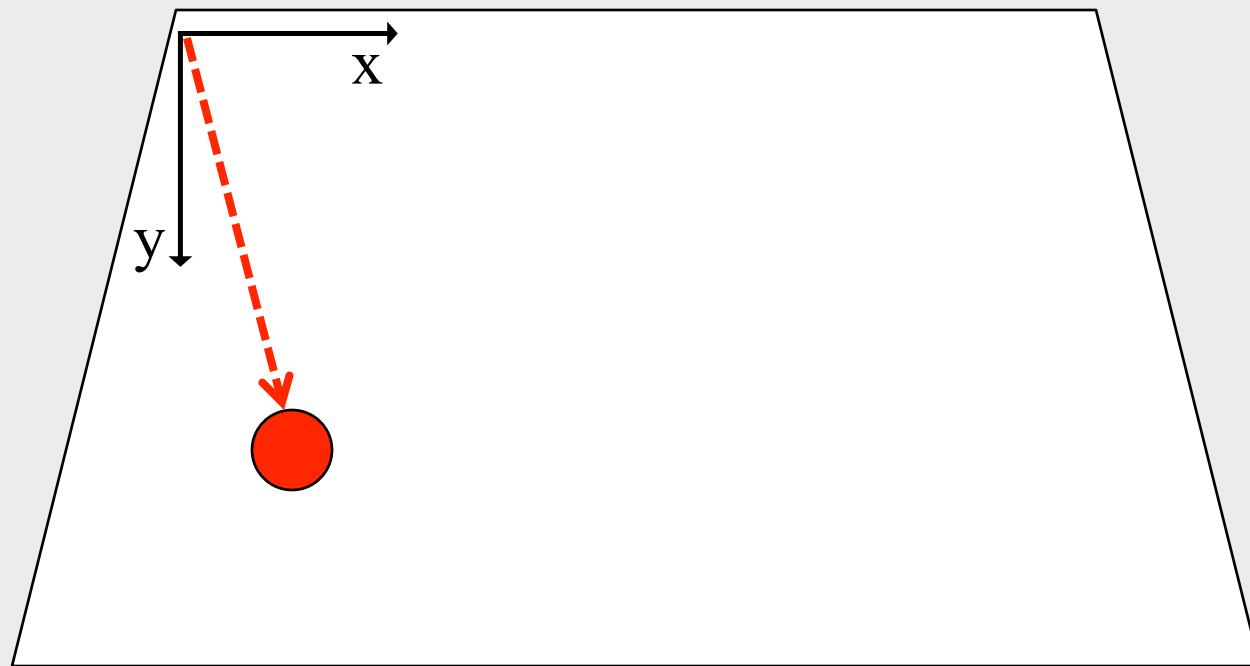
EXPERIMENTAL SETUP OF SOUND EMITTING AND PROCESSING ROBOT FOR ACOUSTIC- BASED SLAM APPLICATIONS

INTRODUCTION

USING ECHOES FOR LOCALIZATION

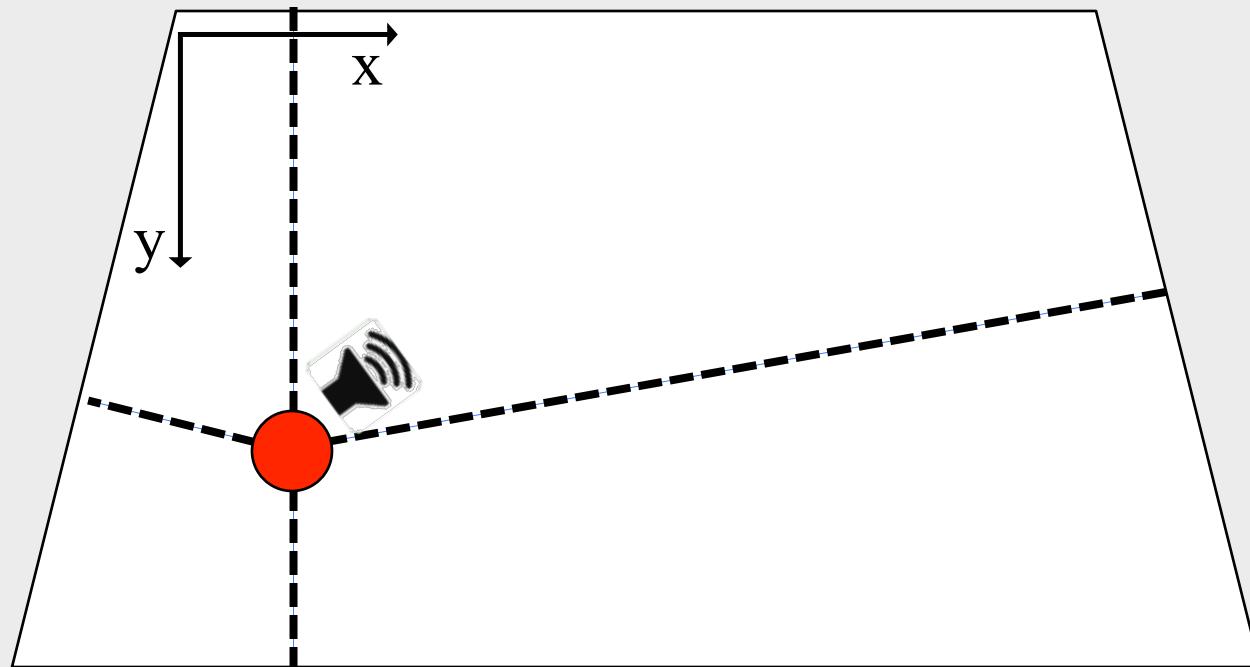
INTRODUCTION

ACOUSTIC-BASED SLAM



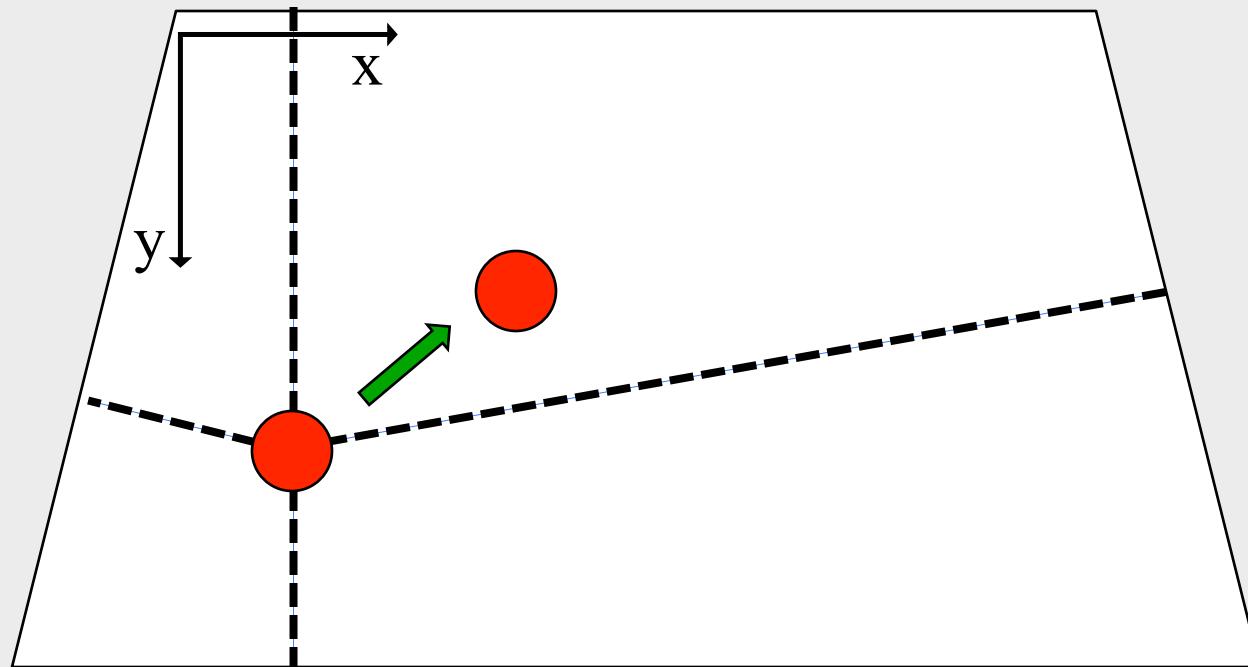
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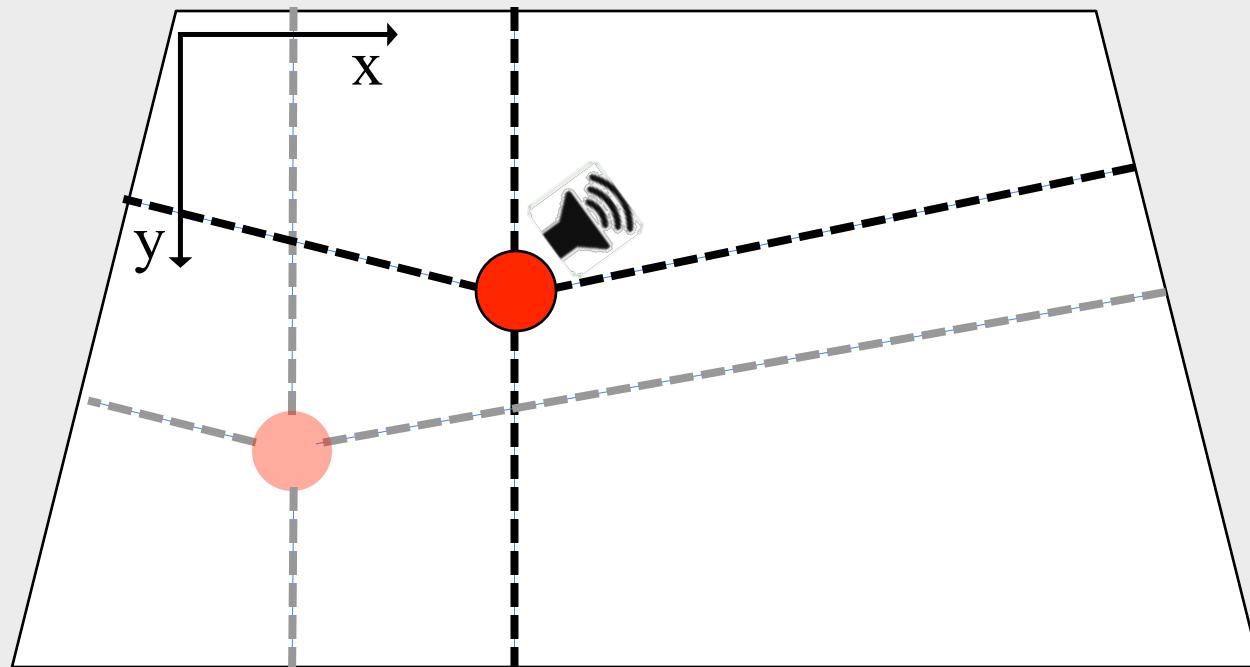
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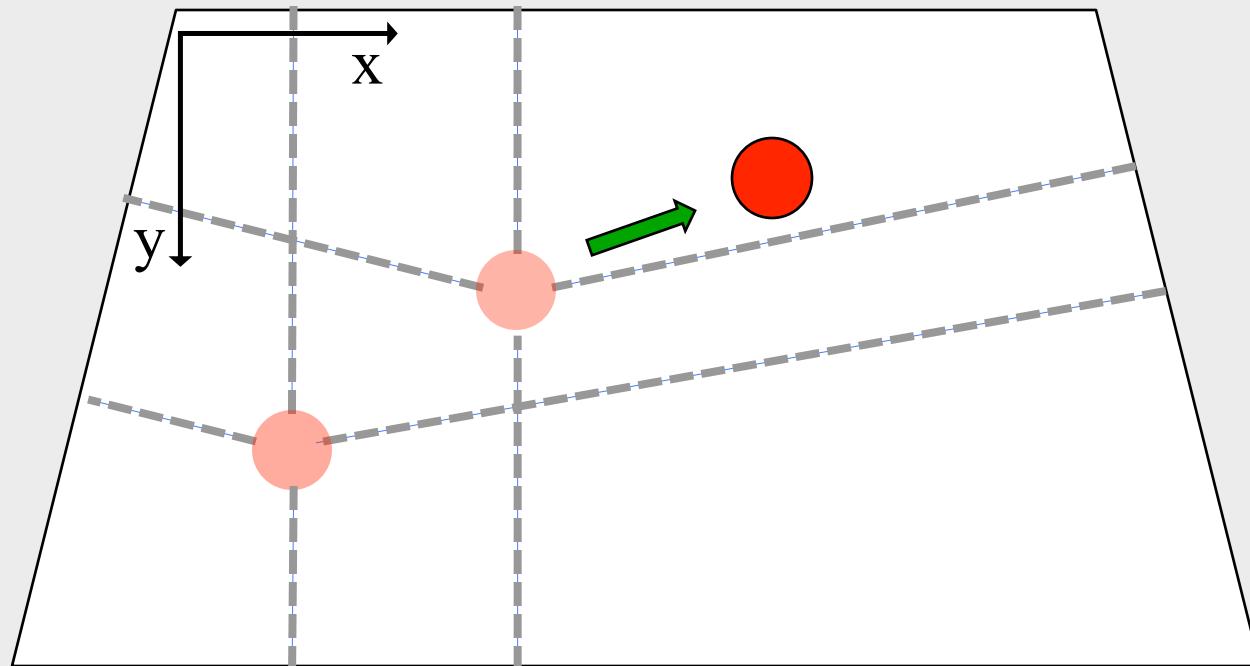
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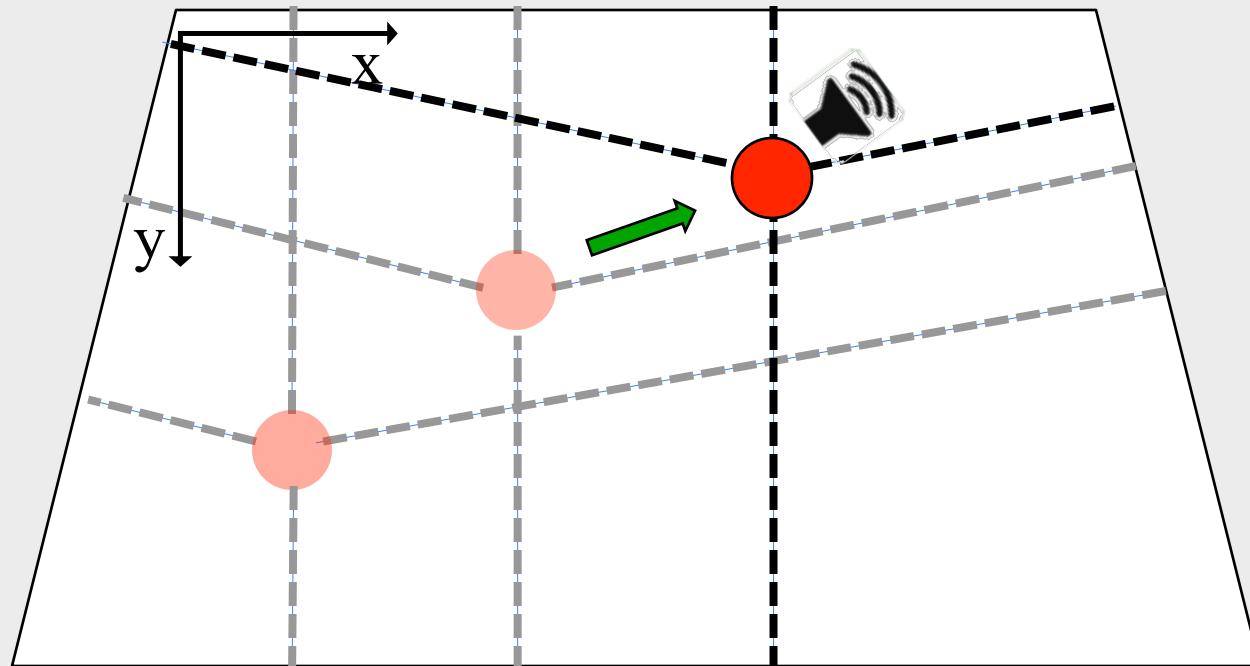
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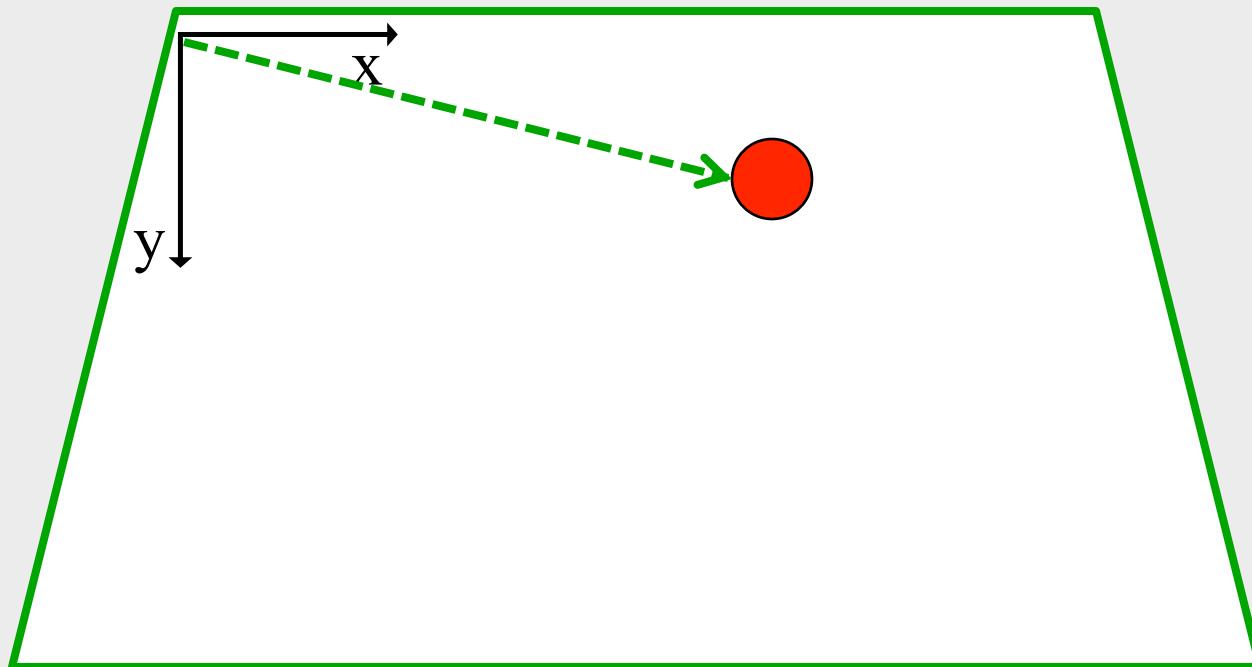
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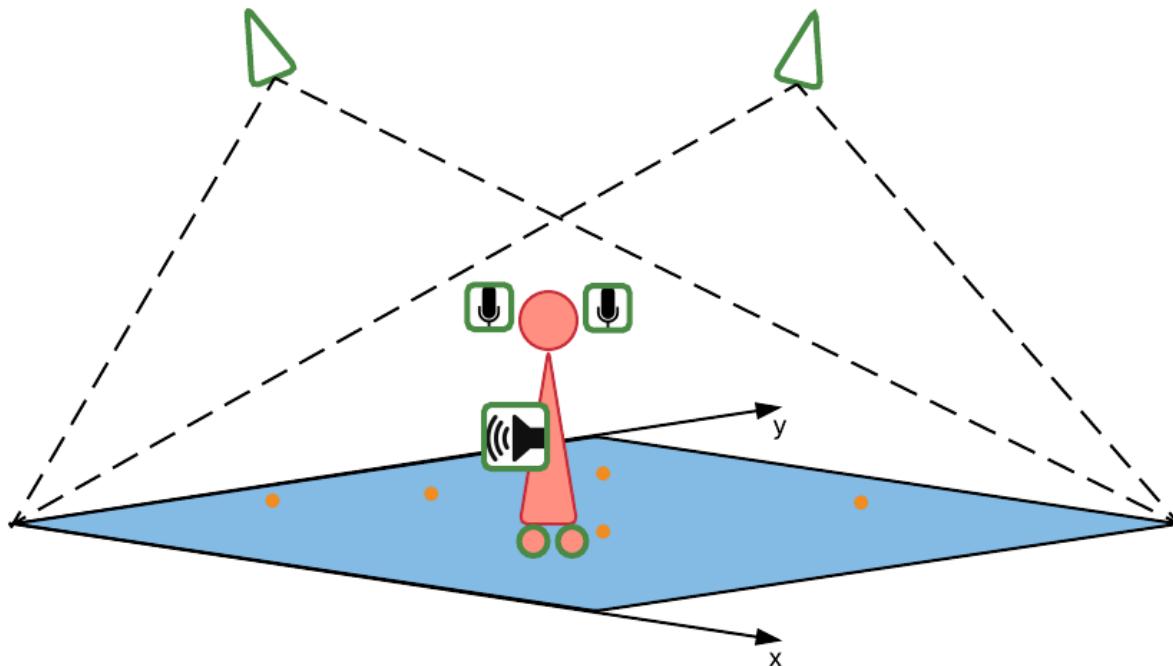
INTRODUCTION

ACOUSTIC-BASED SLAM



PROJECT DESCRIPTION OVERVIEW

Physical setup



Algorithms

Visual localization
ground truth

Odometry
position guess

Sound processing
new algorithm

PROJECT DESCRIPTION

PHYSICAL SETUP

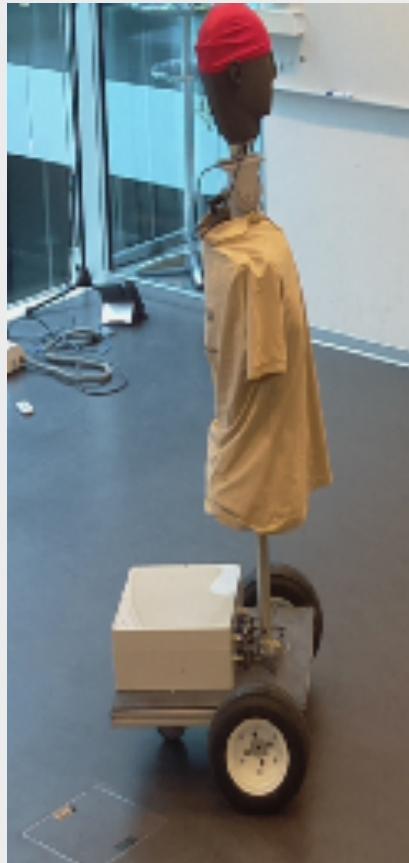
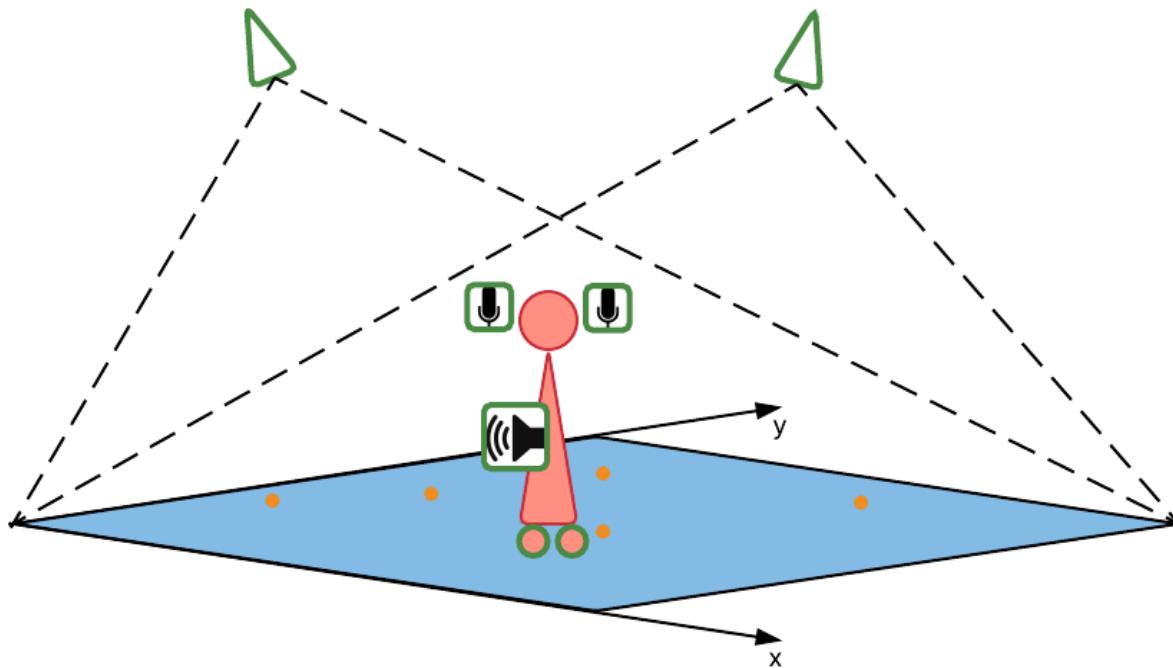


Photo cameras



PROJECT DESCRIPTION OVERVIEW

Physical setup



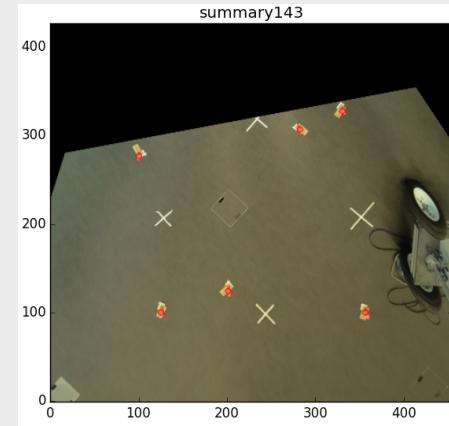
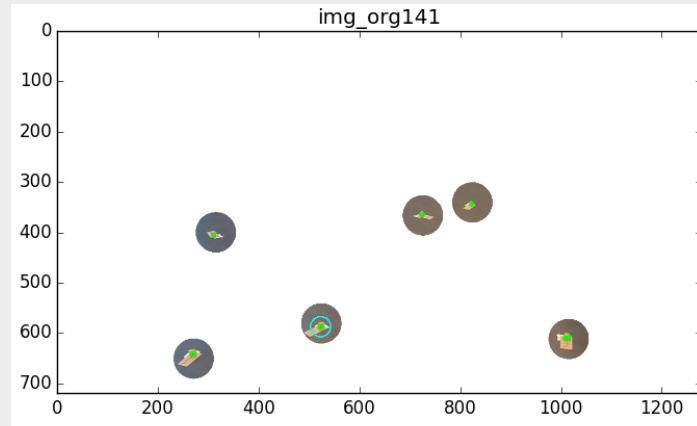
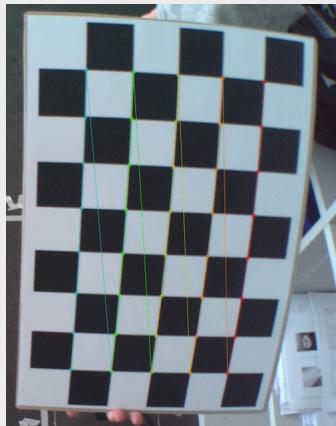
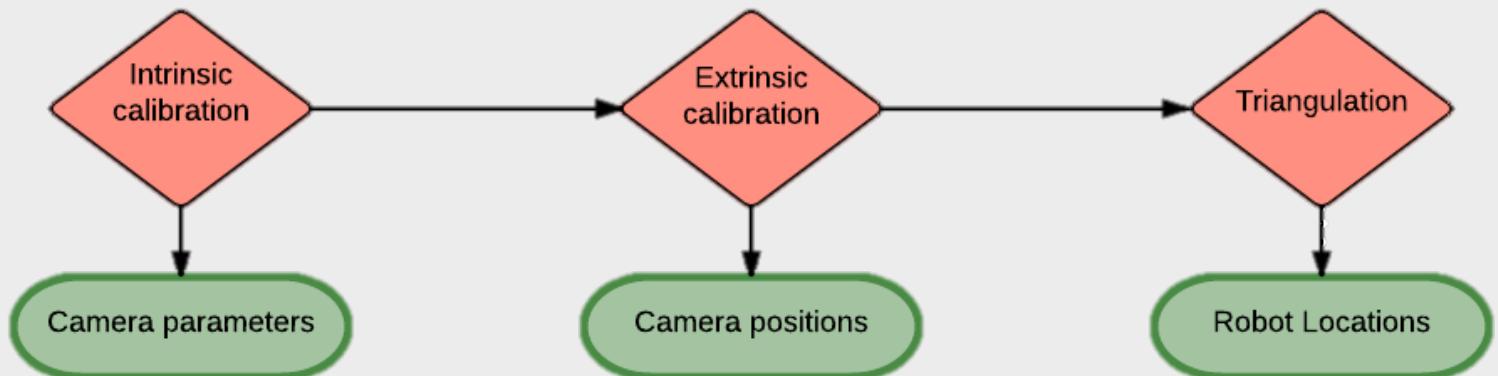
Algorithms

Visual localization
ground truth

Odometry
position guess

Sound processing
new algorithm

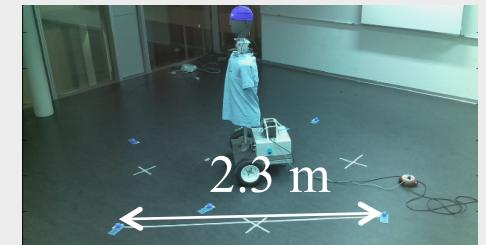
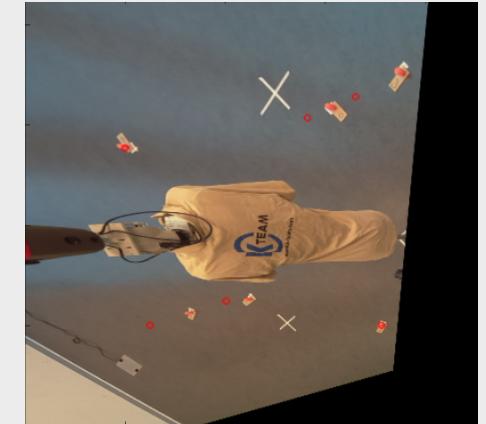
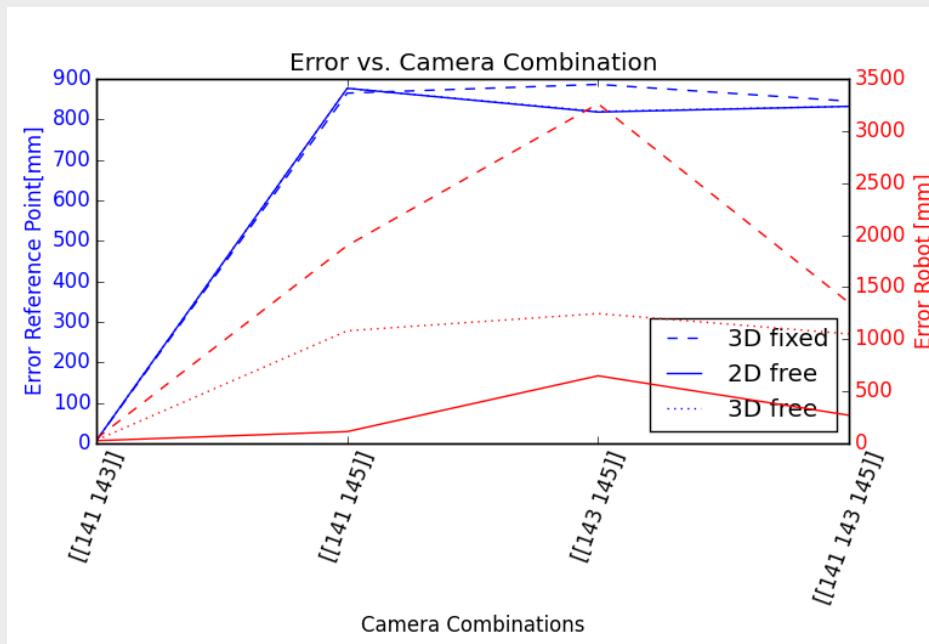
VISUAL LOCALIZATION IMPLEMENTATION



EXPERIMENTAL RESULTS

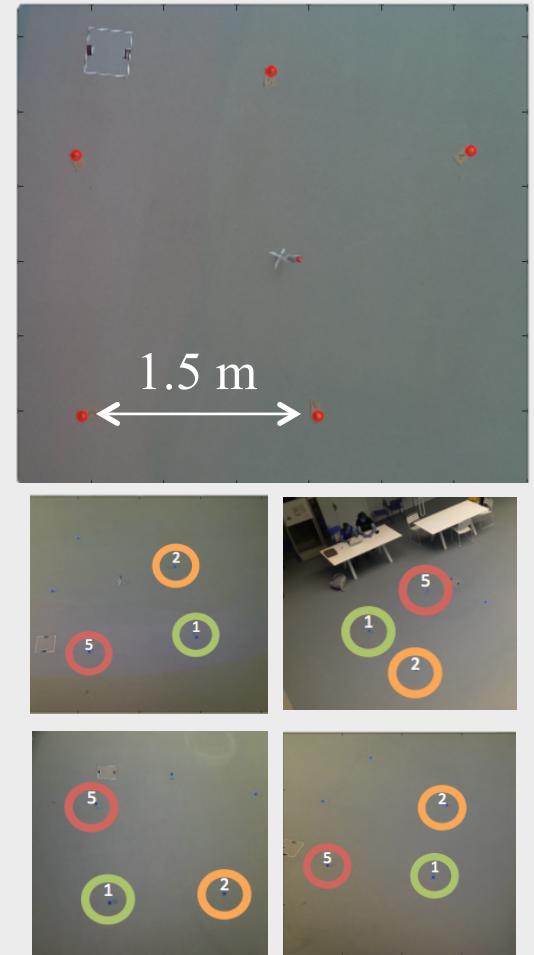
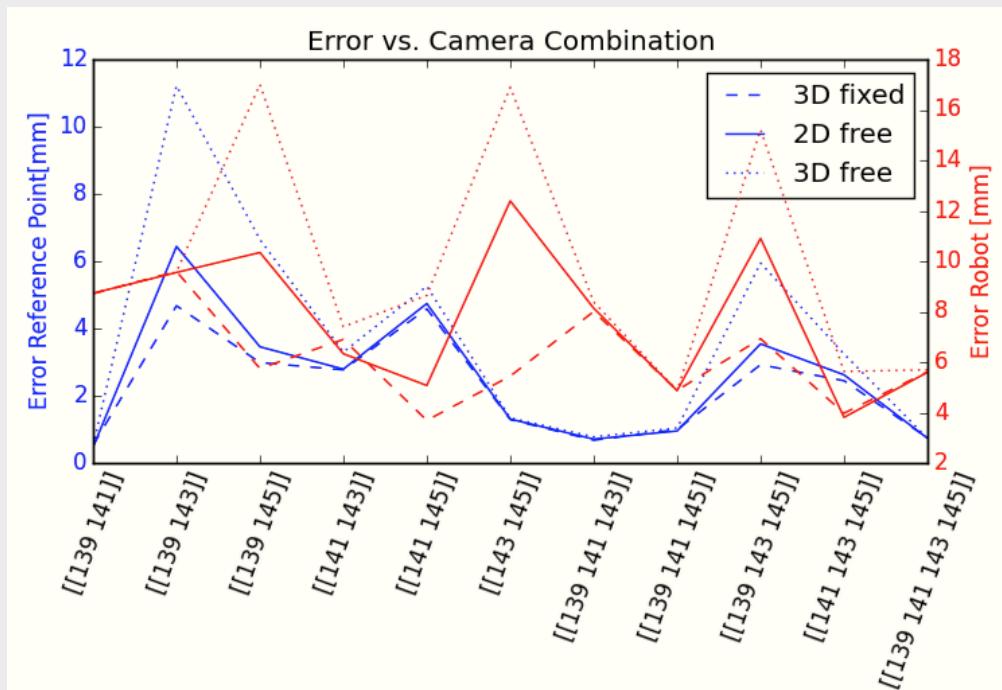
VISUAL LOCALIZATION

- ◆ Good precision in 2D (<3 cm) and height (<2 cm) for **some** camera combinations
- ◆ Very big variance between and within cameras **needs more investigation**

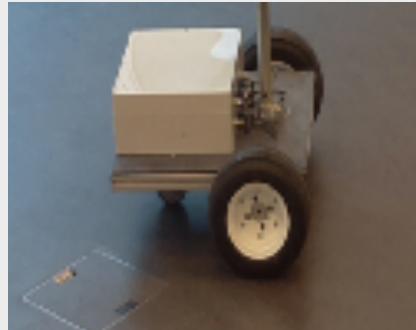


VISUAL LOCALIZATION COMPARISON ATRIUM

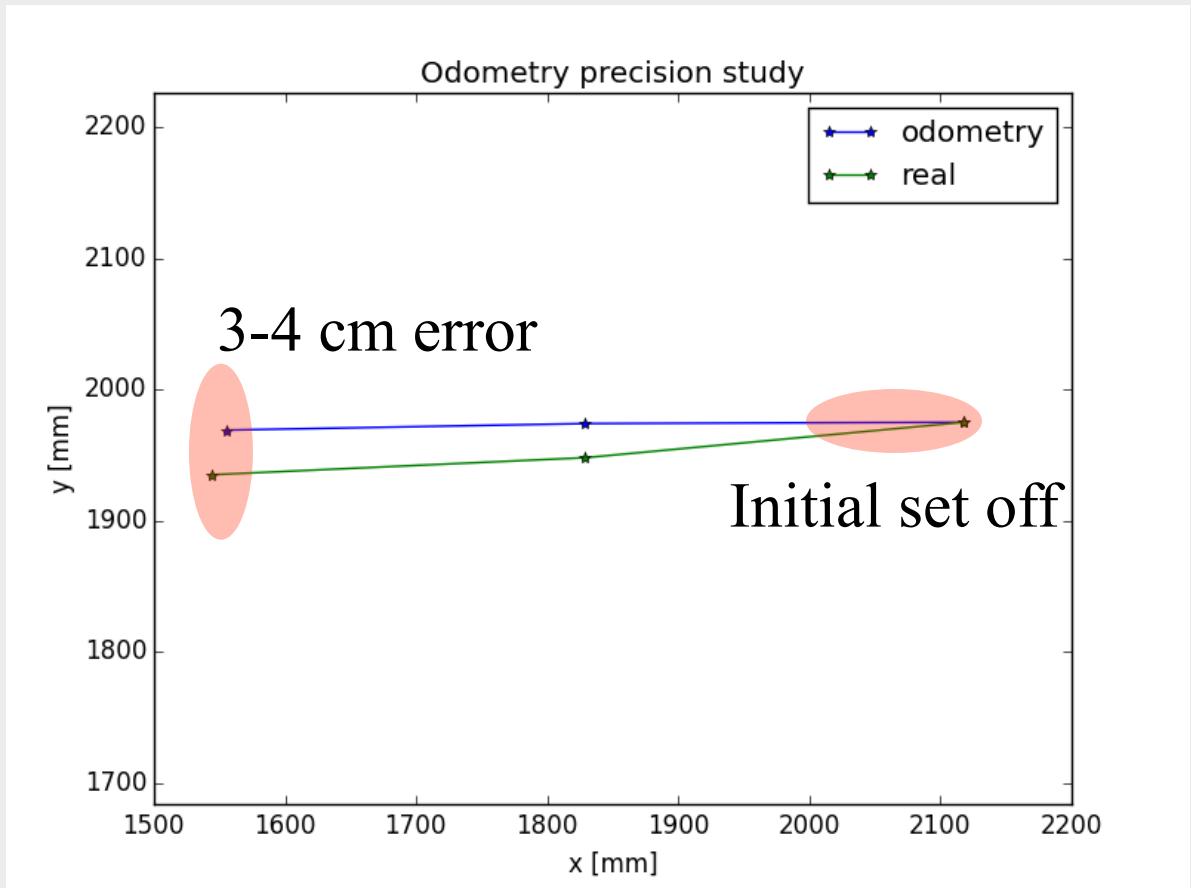
- ◆ Very good precision in 2D (<1 cm) and height (<5mm) for **all** camera combinations
- ◆ Optimal camera combination hard to find



ODOMETRY

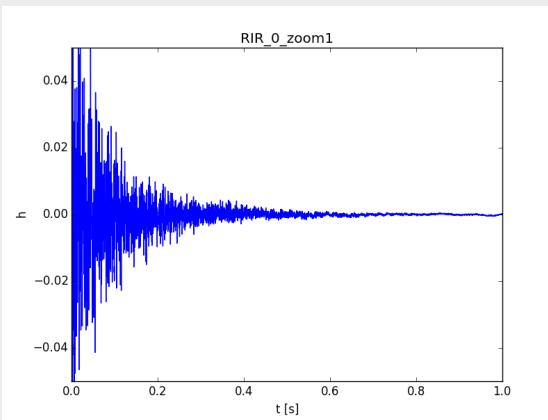


R=15cm
D=71cm
N=512*47

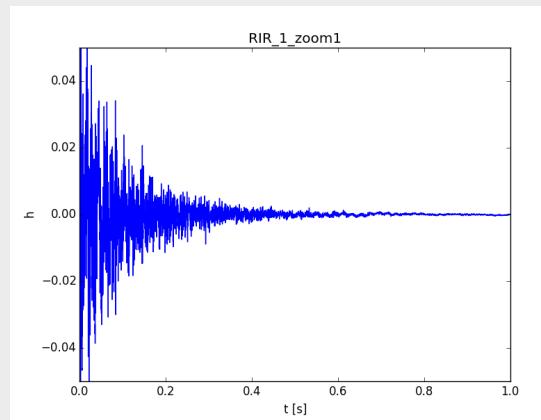


ACOUSTICS

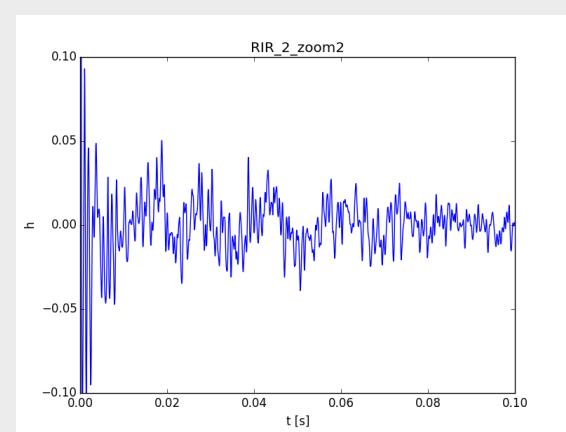
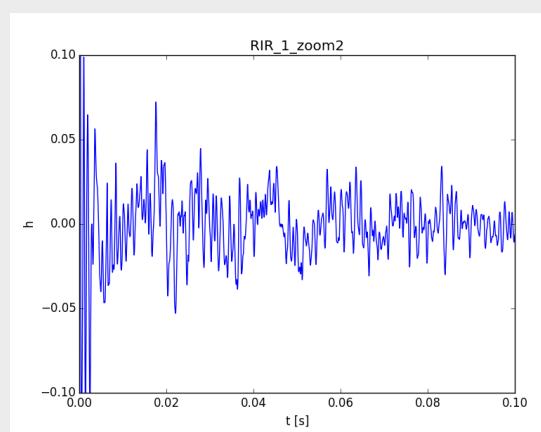
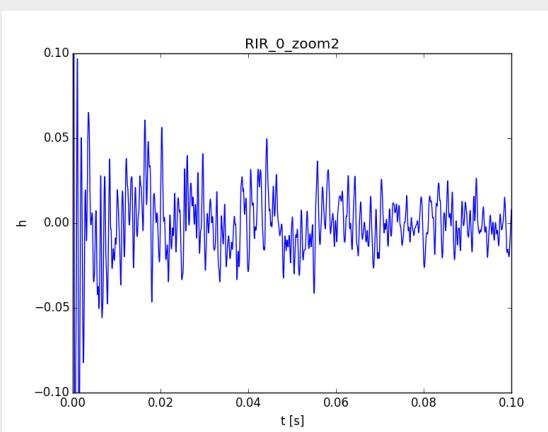
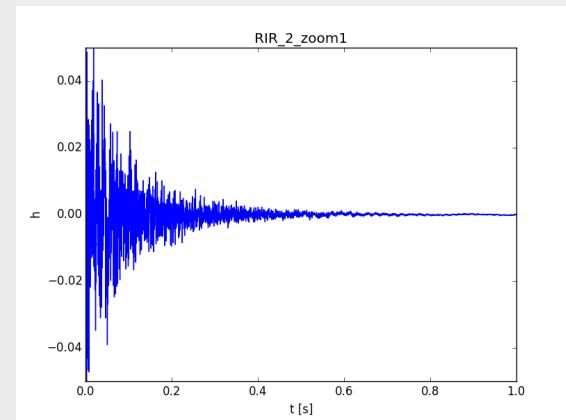
Position 1



Position 2

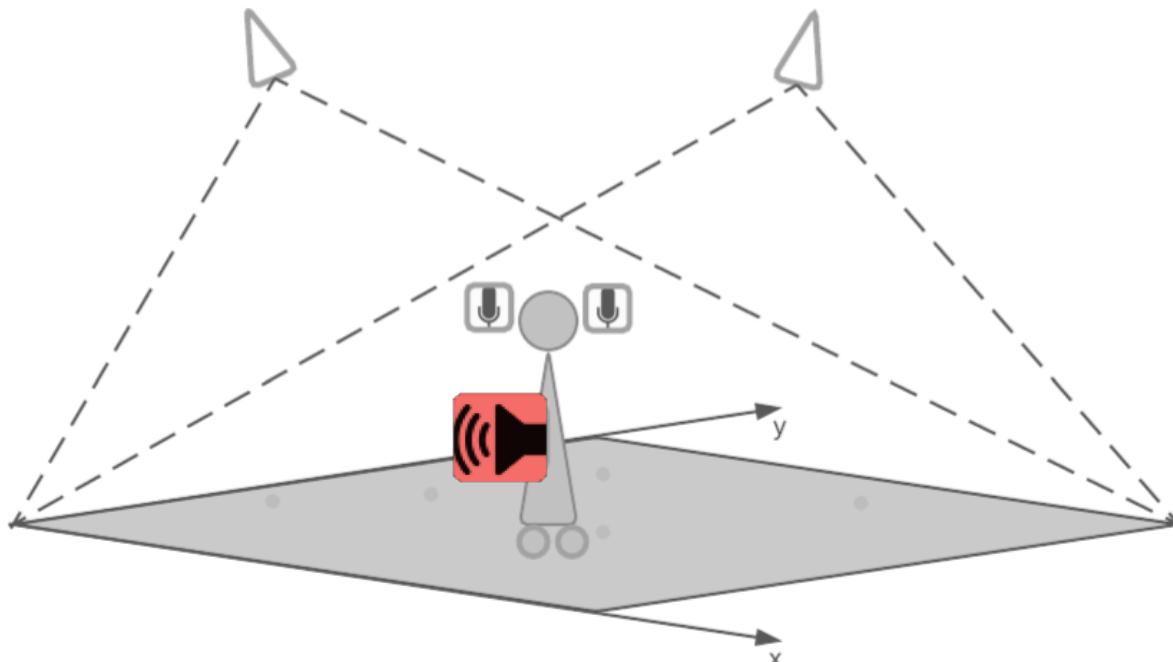


Position 3



SUMMARY AND OUTLOOK

Physical setup



Algorithms

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ground truth

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+ Finalization Instructions online



THANK YOU