# RealSound Interaction

A Novel Interaction Method Using Sound Events in Real World

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## Introduction

- **Mixed Reality (MR)**
  MR merges real and virtual worlds in real time

- **RealSound Interaction**
  - Sound events in the real world is used as interaction or input devices with an MR space
  - Easy to keep proper mental model using familiar sound sources
  - Detecting the direction and location of a variety of sound events by microphone arrays
  - Using them for more general interactive operations

## Interaction methods using sound event

- **Using direction of sound event**
  - **Menu selection**
    - The user can select the menu item by generating a sound toward it
  - **Direction indication**
    - Sound source (mobile phone)
    - Virtual object superimposed at the direction of sound source

- **Using location of sound event**
  - **Menu selection**
    - Pointing operation
  - **Sound source**
    - Microphone array
  - **Direction of sound source**
    - Clap!
    - Selected!

## Application

- **Watch the Birdie! ♦♦♦**
  - MR attraction using the sound of birdcall
  - Mother duck (a real toy with a speaker) squawks and virtual ducklings run toward her

- **Come & play! ♥♥♥**
  - Using 3D sound localization, the users can gather virtual fish swimming in the 3D space by handclap

- **AcousticInk ♥♥**
  - A new drawing tool in MR

## Mixed Reality (MR)

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## RealSound Interaction

- **Sound events in the real world is used as** interaction or input devices with an MR space
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## Future work...

- **Multipoint recognition using different sounds**

## Demos

- **High Canvas**
  - Traditional
  - Proposal
  - Wearable type microphone array
  - Capture sound constantly in front direction and near the sound source
- **Low Canvas**
  - Traditional
  - Proposal
  - Fixed type microphone array
  - Work well only in a limited range of the front direction

## Canvas

- **Shape palette**
- **Color palette**
- **Draw with a sound**