

# Investigating Augmented Reality Spatial Perception via Handheld Mobile Devices in a Distributed Experimental Setup

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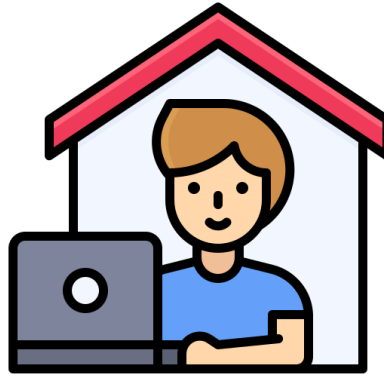
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# Extended Reality (XR) Remote Research



Unsupervised/semi-supervised  
experiment



In participants' locale



Remote data retrieval

# Extended Reality (XR) Remote Research



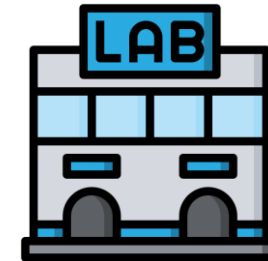
## Position & survey paper

[Steed et al. 2020, Ratcliffe et al. 2021, Kelly et al. 2021]

## Remote Setting



## Lab Setting



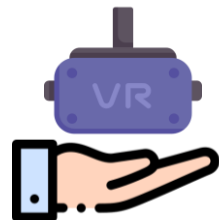
## Replication

of lab-based research findings

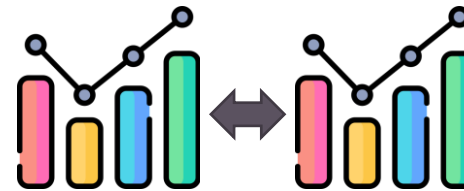
[Steed et al. 2016, Ma et al. 2018, Saffo et al. 2021, Zhao et al. 2021, Kelly et al. 2022]



Opportunities &  
Drawback



VR headsets  
owners



Replication of lab results  
cannot be assumed



Demographic  
difference

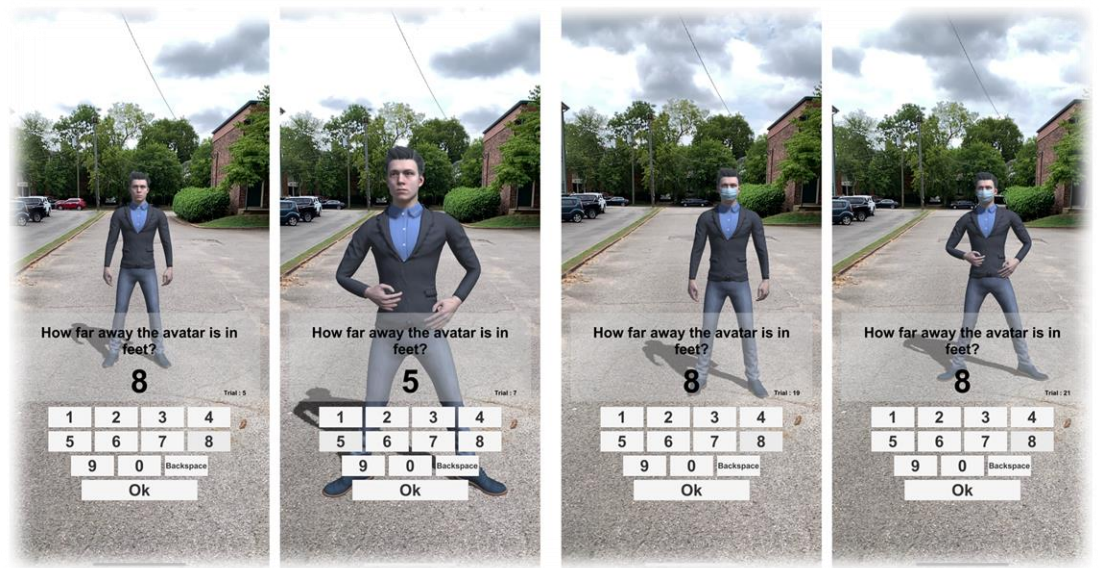
# AR Spatial Cognition Experiments



Passing Through

Stepping Over

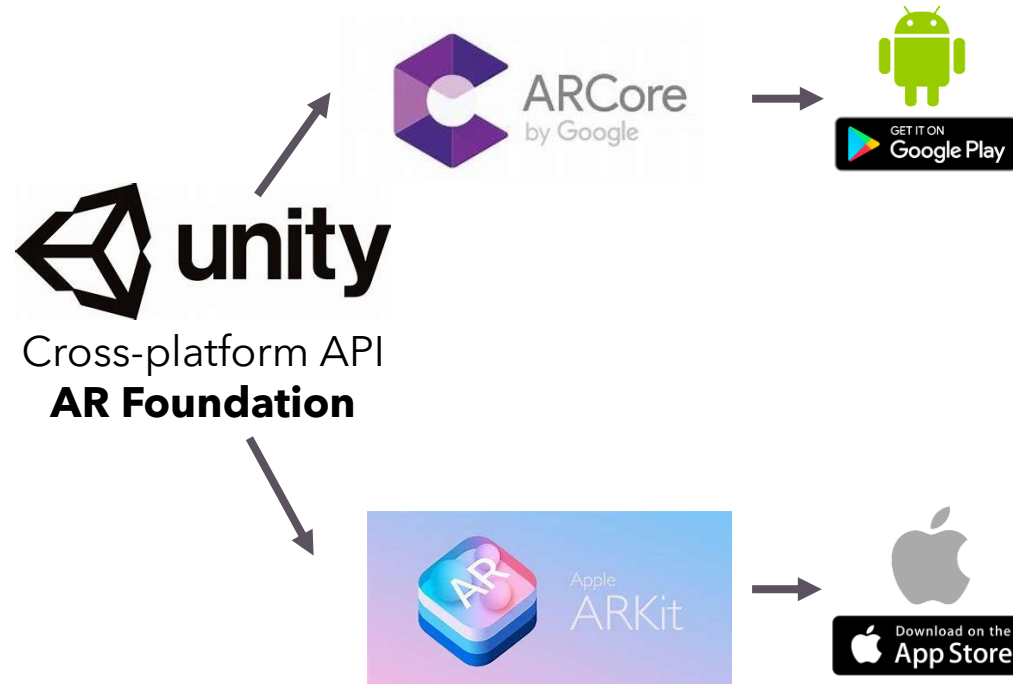
## Affordance Judgement Experiment



Non-Masked Non-Coughing, Non-Masked Coughing, Masked Non-Coughing and Masked Coughing Avatars

## Egocentric Distance Estimation Experiment

# Software Development and Deployment



## Recommendations:

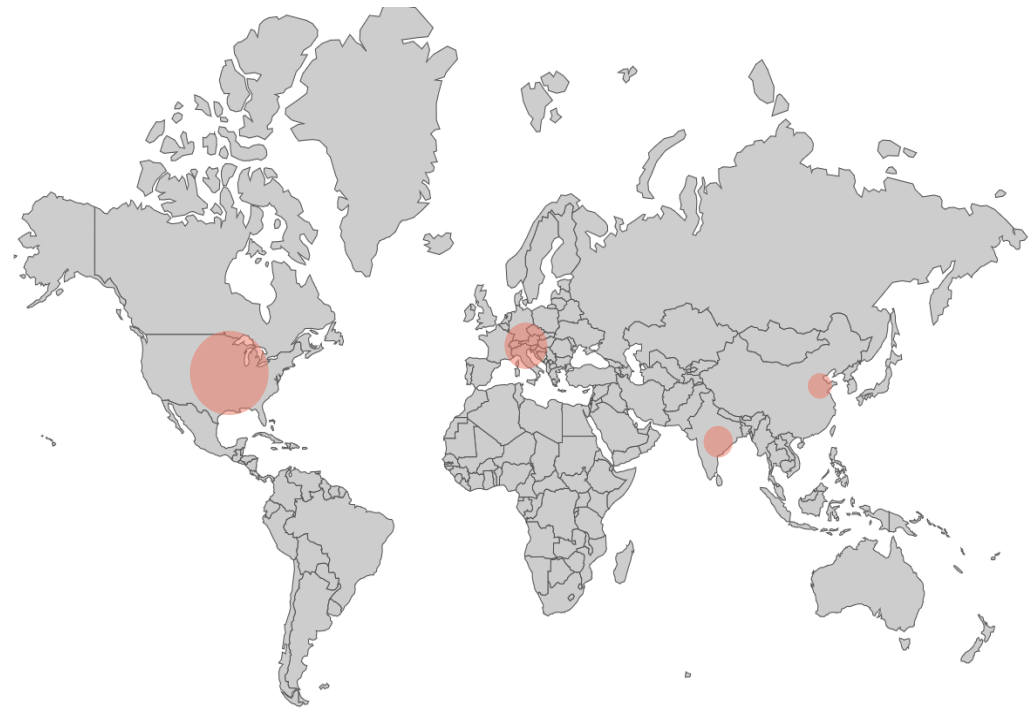
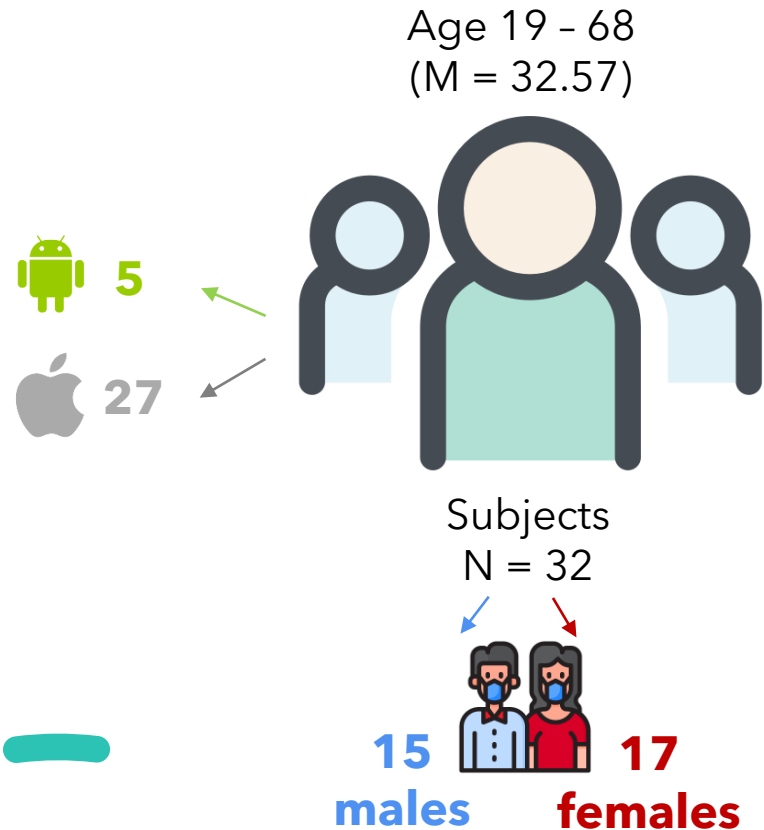
Consider the compatibility of the applications on different devices

A published version requires additional review by the app store

Prepare more time for developing and deploying the software

# Participant Recruitment

## Heterogenous Population

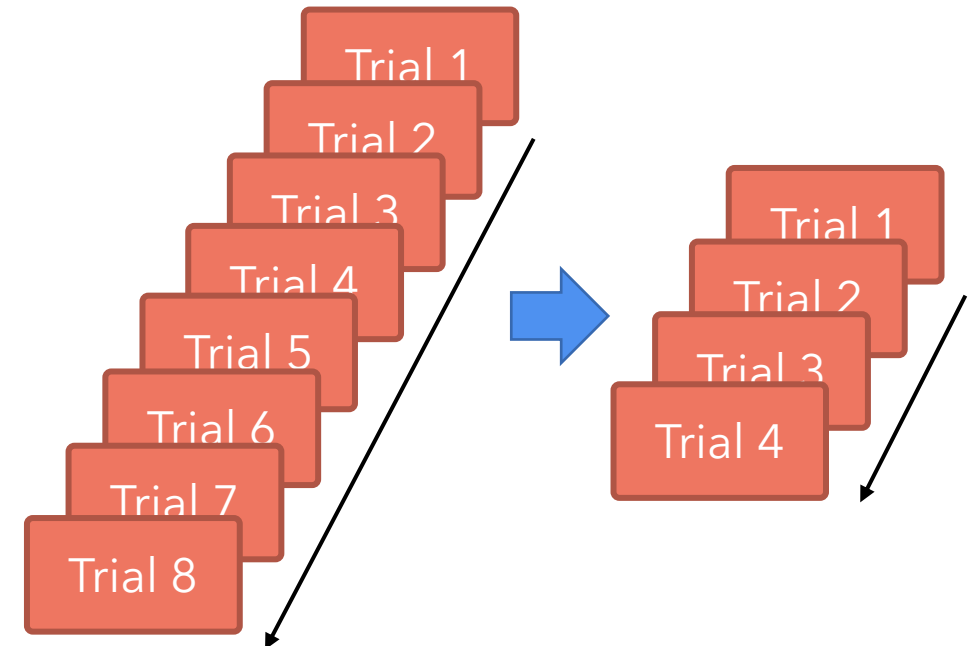
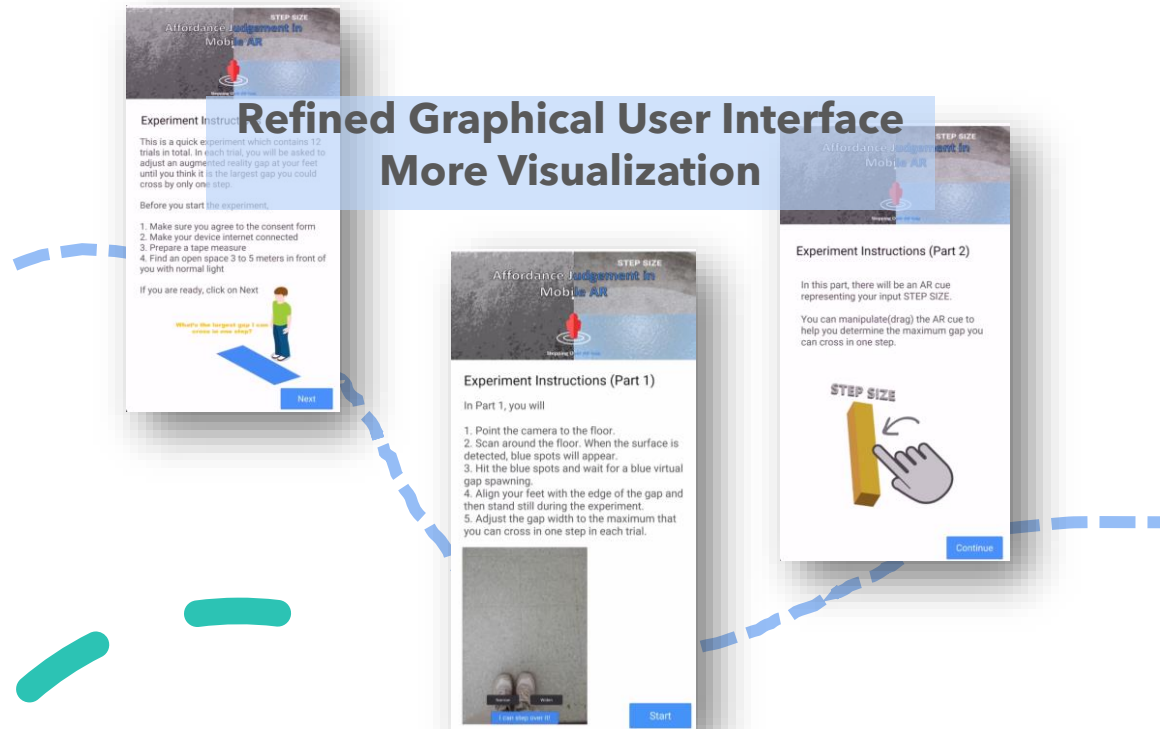


# Experimental Design

## Unsupervised Experiments

### Clear Instructions

### Reduced Trial Number

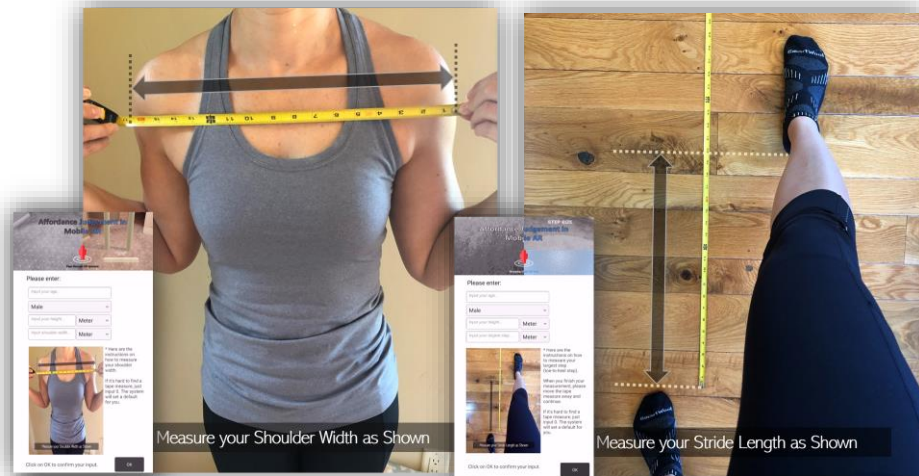




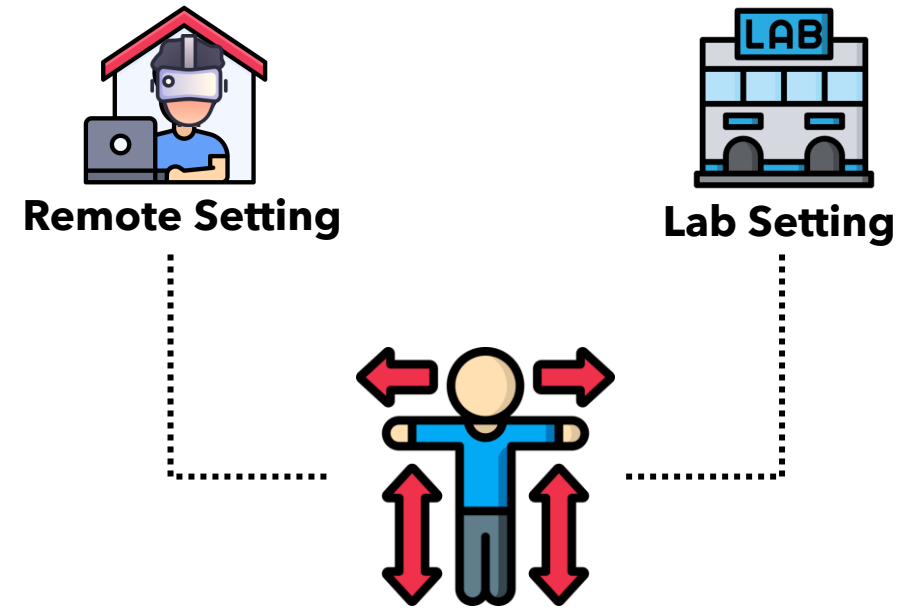
# Experimental Design

## Reliability of Data (self measurement)

### Use Photograph to Illustrate



### Compare with Lab Setting Results



Log Useful Data for validation



# Data Collection



## **Email Service is a reliable choice**

- Data file size is not greater than 25 MB [1]
- There is no sensitive information

**Automatically sending data is recommended**



**Different countries have different data privacy laws**

**Consider data privacy issue in your research protocol**

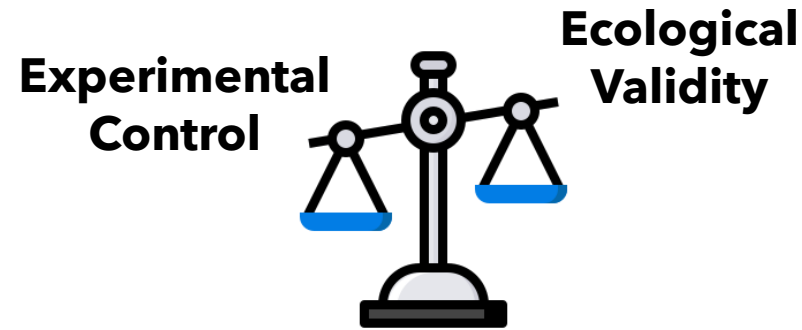
[1] <https://support.google.com/mail/answer/6584?co=GENIE.Platform%3DDesktop&hl=en>



Lab Setting



Remote Setting



## Advantages and Disadvantages of remote XR experiments

# Thanks!

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