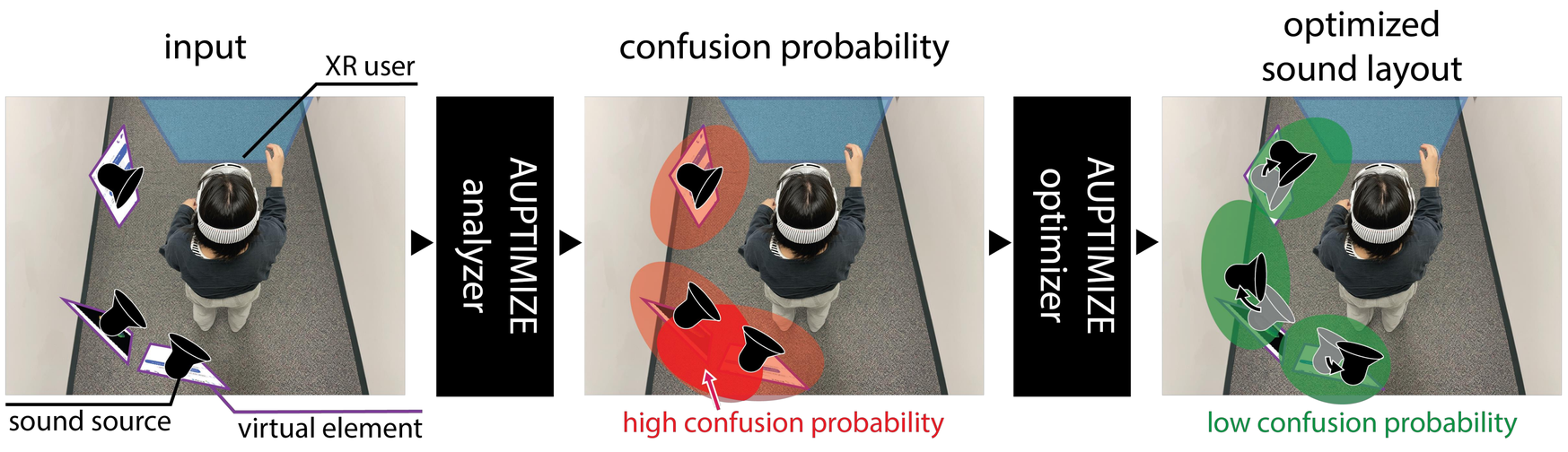

Auptimize: Optimal Placement of Spatial Audio Cues for Extended Reality

Hyunsung Cho, Alexander Wang, Divya Kartik, Emily Xie, Yukang Yan, David Lindlbauer

Contact: hyunsung@cs.cmu.edu

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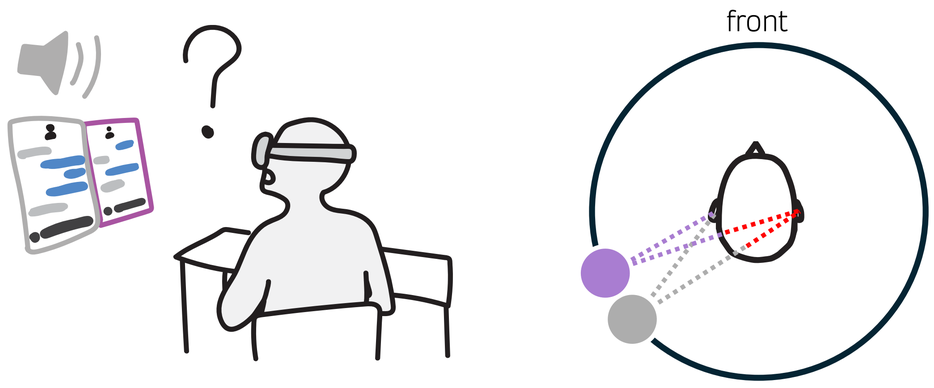
We present a computational approach to enable **accurate spatial audio source identification** in spatial XR interfaces.

Auptimize mitigates confusion caused by human **perceptual limitations** in audio localization:

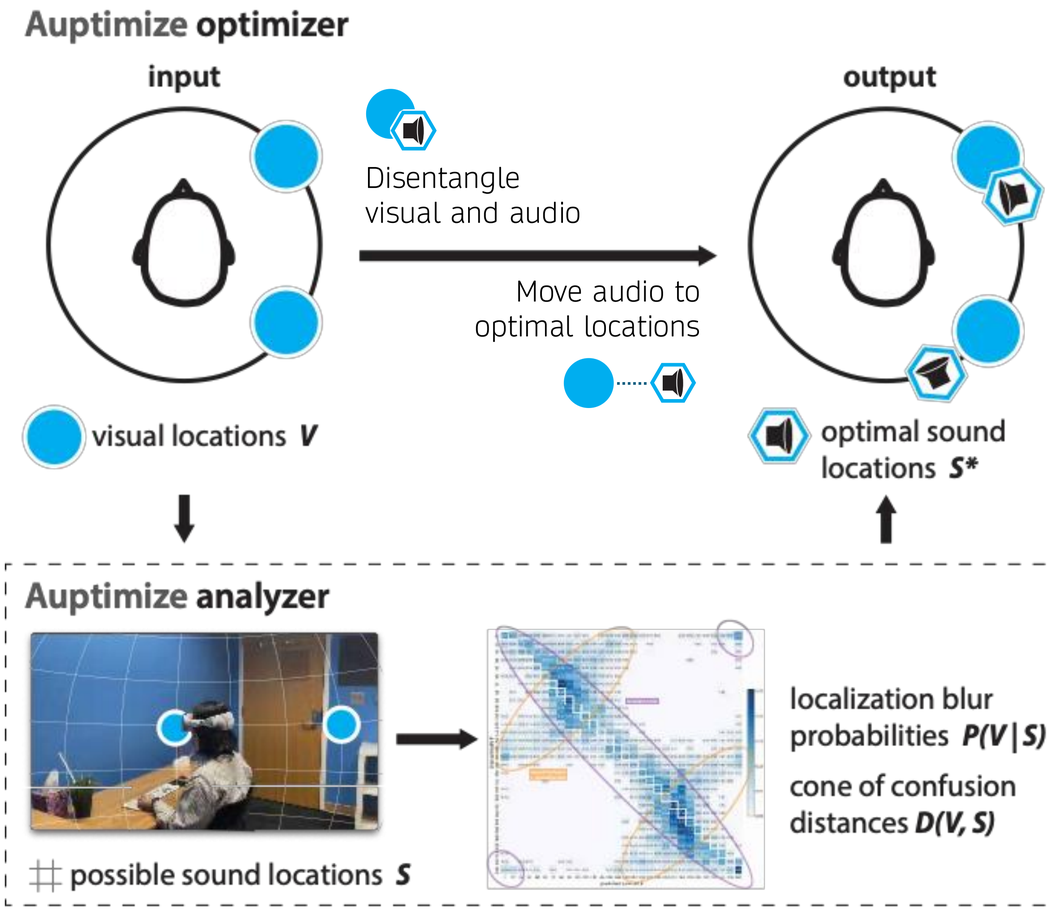
1. **Localization Blur**: confusion when **too close**



2. **Cone of Confusion**: confusion when **same distance to both ears**, e.g., front and back

Through **data collection**, we quantify audio localization errors and confusion patterns when audio is played at various angles.

Auptimize **disentangles visual and audio** source locations of XR elements and **moves** audio sources to **optimal locations**, minimizing confusion among the elements.



Analyzer models the **predicted** localization blur and cone of confusion given a layout of virtual elements.

Optimizer uses **integer programming** to find the optimal placement:

$$\max \sum_{v \in V} \sum_{s \in S_{all}} (w_{blur} \cdot P(v|s) + w_{cone} \cdot D(v,s)) \cdot x_{v,s}$$

APPLICATIONS

Multi-window Messaging | Stock Trading | Cooking | Item Search - Workshop | Item Search - Supermarket | Interactive Guidance