ARComposer: Authoring Augmented Reality Experiences through Text

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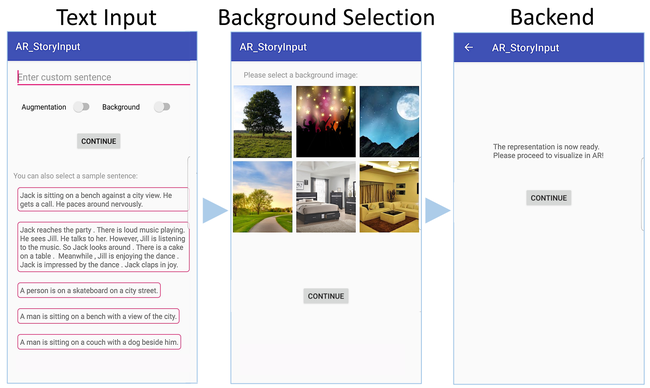
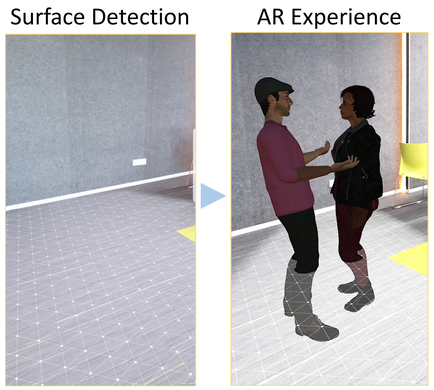
Motivation

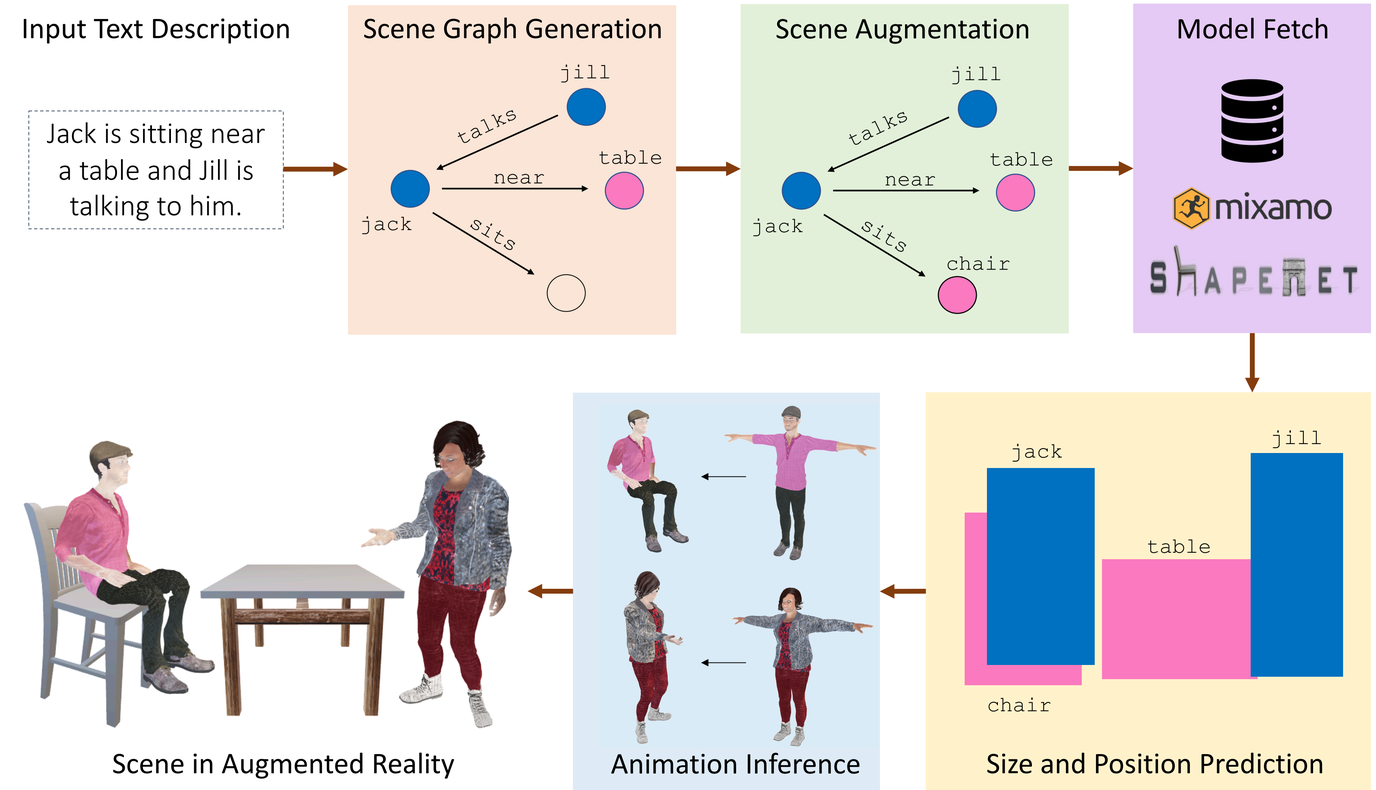
- Augmented Reality (AR) blends the lines between digital and physical worlds and offers an interactive way of engaging with the surroundings.
- Existing tools for developing AR content:
  - By creative professionals [2,3]
  - Marker technology for pre-fixed augmentations [4]
  - Schema based approaches [1,5]
- These technologies are restrictive as they are either based on templates or require expert knowledge.
- ARComposer is an easy-to-use interface that allows novice users to compose AR experiences in real time through free-form text descriptions.





[1] https://www.gurivr.com/
[2] https://www.alivestudiosco.com/
[3] https://www.carltonbooks.co.uk/
[4] Lytridis, Chris, Avgoustos Tsinakos, and Ioannis Kazanidis. "ARTutor—An Augmented Reality Platform for Interactive Distance Learning." *Education Sciences*, 2018.
[5] Seichter, Hartmut, Julian Looser, and Mark Billinghurst. "ComposAR: An intuitive tool for authoring AR applications." *International symposium on mixed and augmented reality*, 2008.

Technology



In-Person Evaluation

- Participants freely created scenes using ARComposer followed by a semi-structured questionnaire.
- Perceived flow [6] & usability [7] to evaluate the interface.

Control	3.4 ± 1.3
Attention Focus	4.0 ± 1.1
Curiosity	4.2 ± 0.9
Intrinsic Interest	4.2 ± 0.9
Usability	3.8 ± 0.7

"One can easily turn their visualization into reality."

"The relative positioning of the objects is good and that made the scene coherent and realistic."

"I liked that the size of the objects was relatively more realistic in the scene. It was easy to visualize and control."

[6] Webster, Jane, Linda Klebe Trevino, and Lisa Ryan. "The dimensionality and correlates of flow in human-computer interactions." *Computers in human behavior* 1993.
[7] Brooke, John. "SUS-A quick and dirty usability scale." *Usability evaluation in industry* 1996.

Crowd-Sourced Evaluation

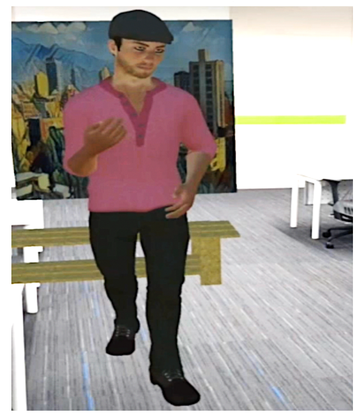
- Comprehensive survey on Amazon Mechanical Turk.
- Captions from MS COCO [8] as scene descriptions.
- Users rated different aspects of the generated scenes on a 5-point Likert scale.

Aspect	In Person (N = 20)	Mturk (N = 278)
Position	3.7 ± 1.1	3.4 ± 1.3
Size	3.8 ± 1.3	3.3 ± 1.3
Augmentation	3.8 ± 0.9	3.3 ± 1.2
Background	3.6 ± 1.1	3.2 ± 1.3
Human Actions	4.1 ± 1.1	3.5 ± 1.1
Overall Coherence	3.6 ± 1.2	3.2 ± 1.2

[8] Lin, Tsung-Yi, et al. "Microsoft coco: Common objects in context." *European conference on computer vision*. Springer, 2014.

A child sits on a bench at a playground

Bob is walking near a bench with a city view.



Dave and Rose are talking at a party with a cake on the table.