ANNOUNCEMENT

Seminar Logistics

Seminar Registration

Within 3 weeks from the date of topic assignment

Extra Sessions

We have 8 filled slots; the remaining will be filled up.

Reminder

Read the papers and send the questions by Wednesday 8 AM
rdabral@mpi-inf.mpg.de

Moderator

Will get a mail on Wednesday morning

Classical Concepts of Computer Vision and Computer Graphics in the Neural Age

Seminar – Summer 2024

Talk on Talks

Dr. Rishabh Dabral

MPI for Informatics

About Myself

Rishabh Dabral, PhD (IIT Bombay)

Postdoc

Deptt. for Visual Computing and Artificial Intelligence
Max Planck Institute for Informatics

Research Areas

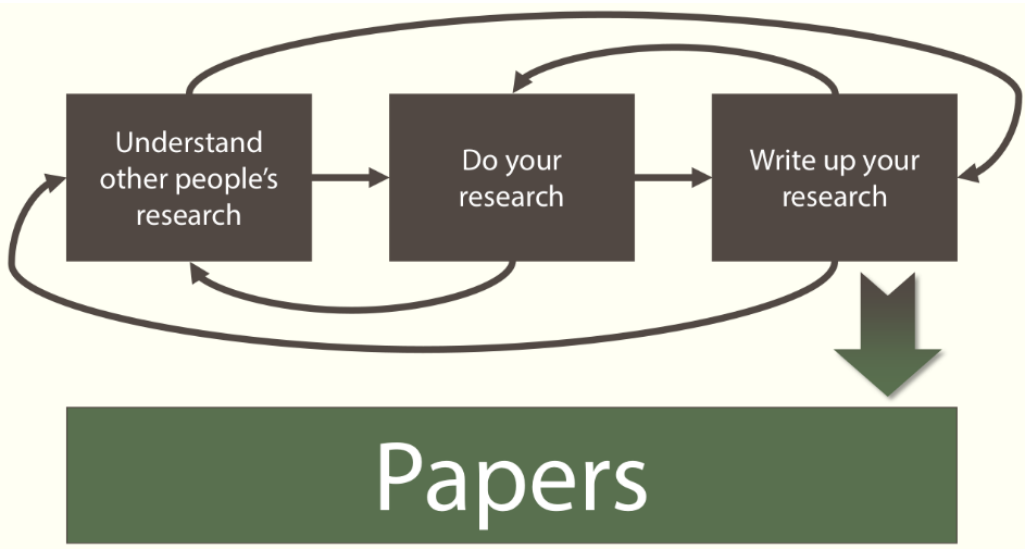
Computer Vision and Graphics
Human motion capture and synthesis
Human-Object Interaction
3D Reconstruction

Webpage:

https://rishabhdabral.github.io/

RECAP

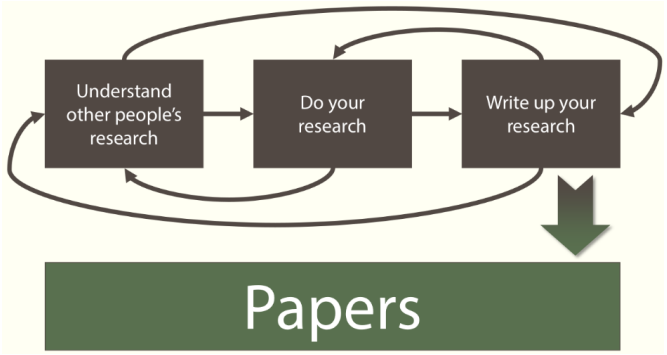
From Last Week …



Iterative Process

RECAP

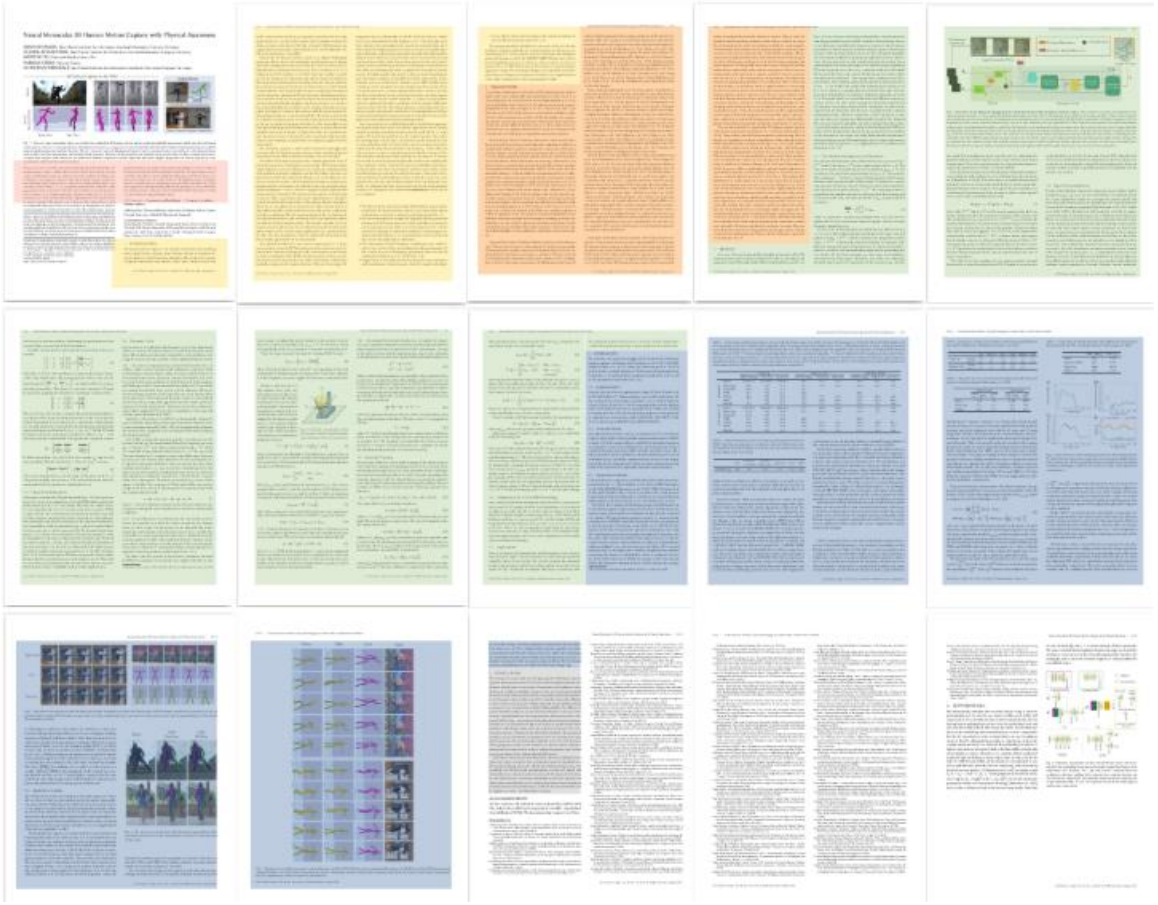
From Last Week …



Iterative Process

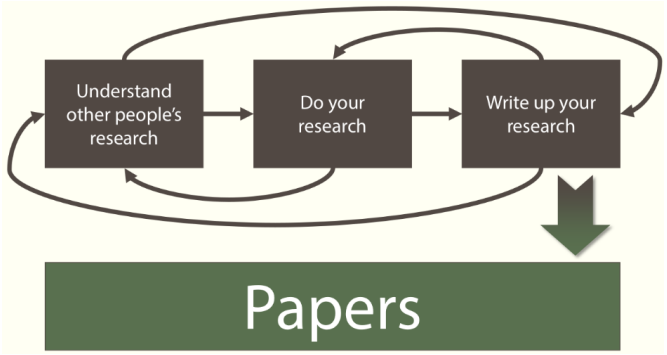
Paper Structure

- Title / Header
- Abstract
- 1. Introduction
- 2. Related Work
- 3. Method
- 4. Experiments
- 5. Conclusions
- Acknowledgements
- References
- Appendix



RECAP

From Last Week …



Iterative Process

3-Pass Approach

Scan → Read → Understand

RECAP

From Last Week …

Paper Structure

- Title / Header
- Abstract
- 1. Introduction
- 2. Related Work
- 3. Method
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- Acknowledgements
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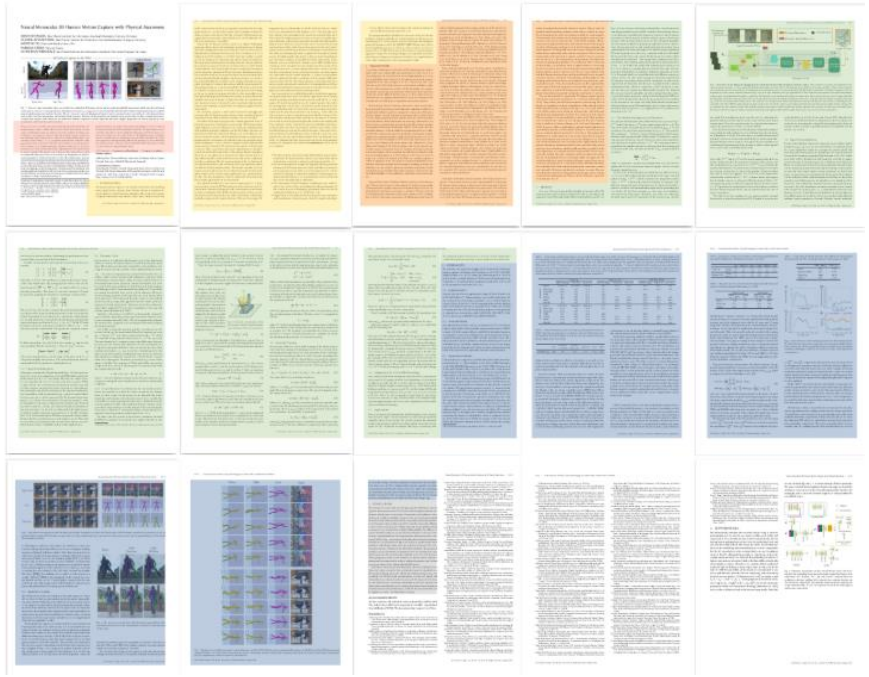
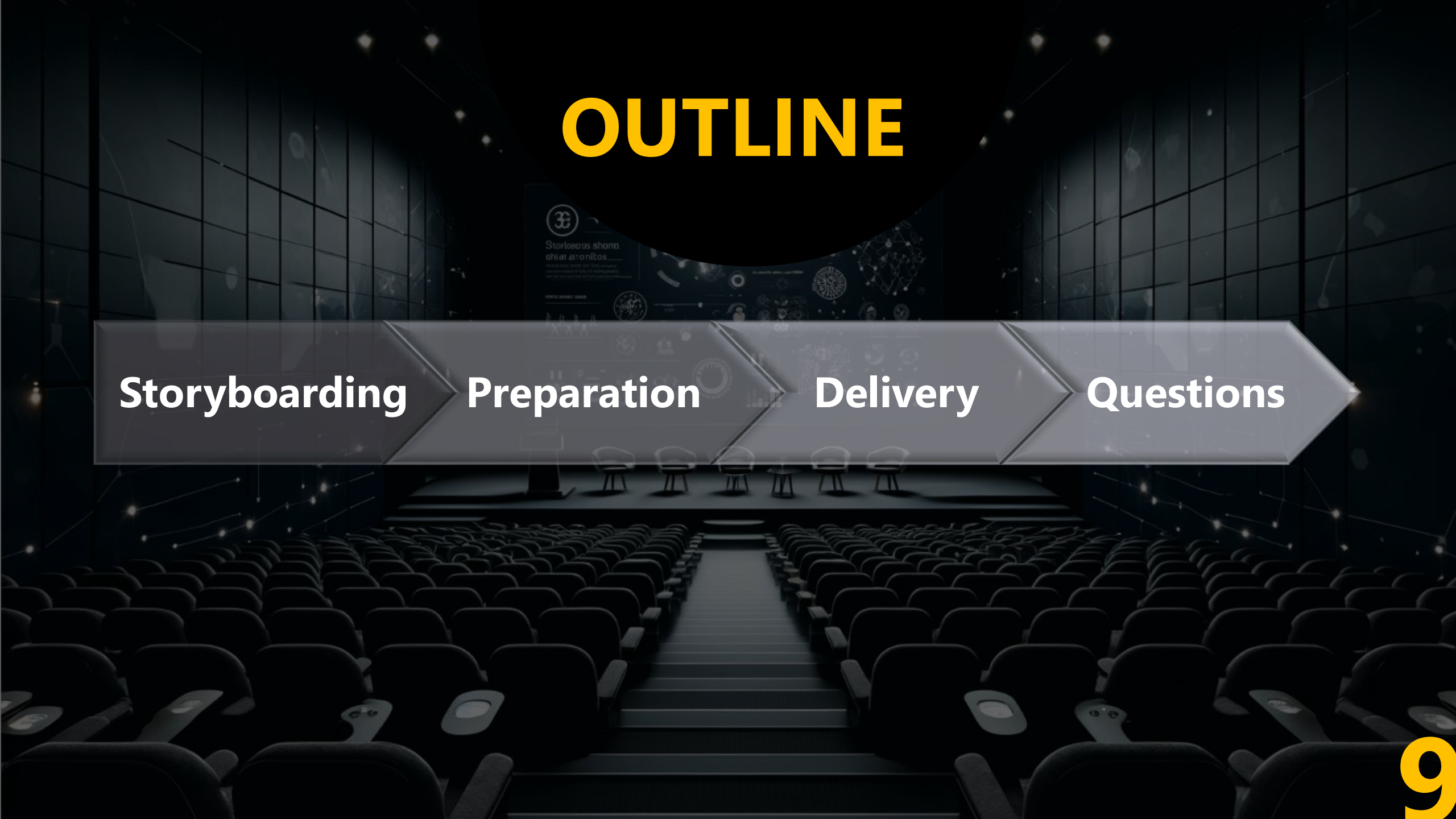
- Appendix



After you've **understood** the paper …

You will have to **present** them!

OUTLINE



OUTLINE

STORYBOARD

Basic Structure

Introduction

Say what you **will** say

Scientific Details

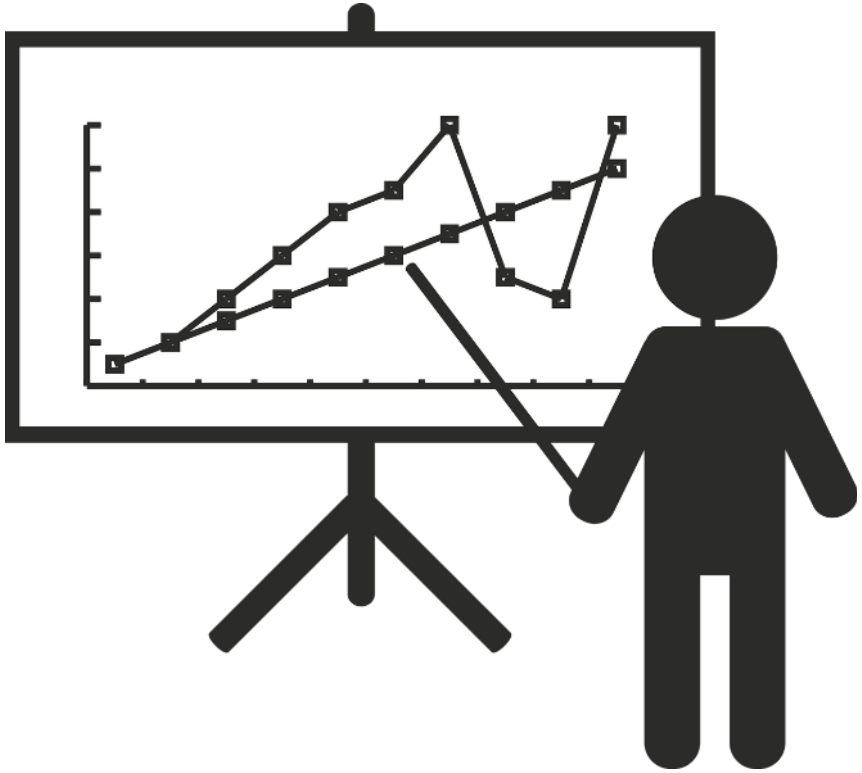
Say it

Conclusion

Summarise what you said

STORYBOARD

Logic over Suspense



VS

http://blogs.nature.com/naturejobs/2017/01/11/scientific-presentations-a-cheat-sheet/

STORYBOARD

Example Structure

Appropriate title

Affiliations

Relevant Graphics

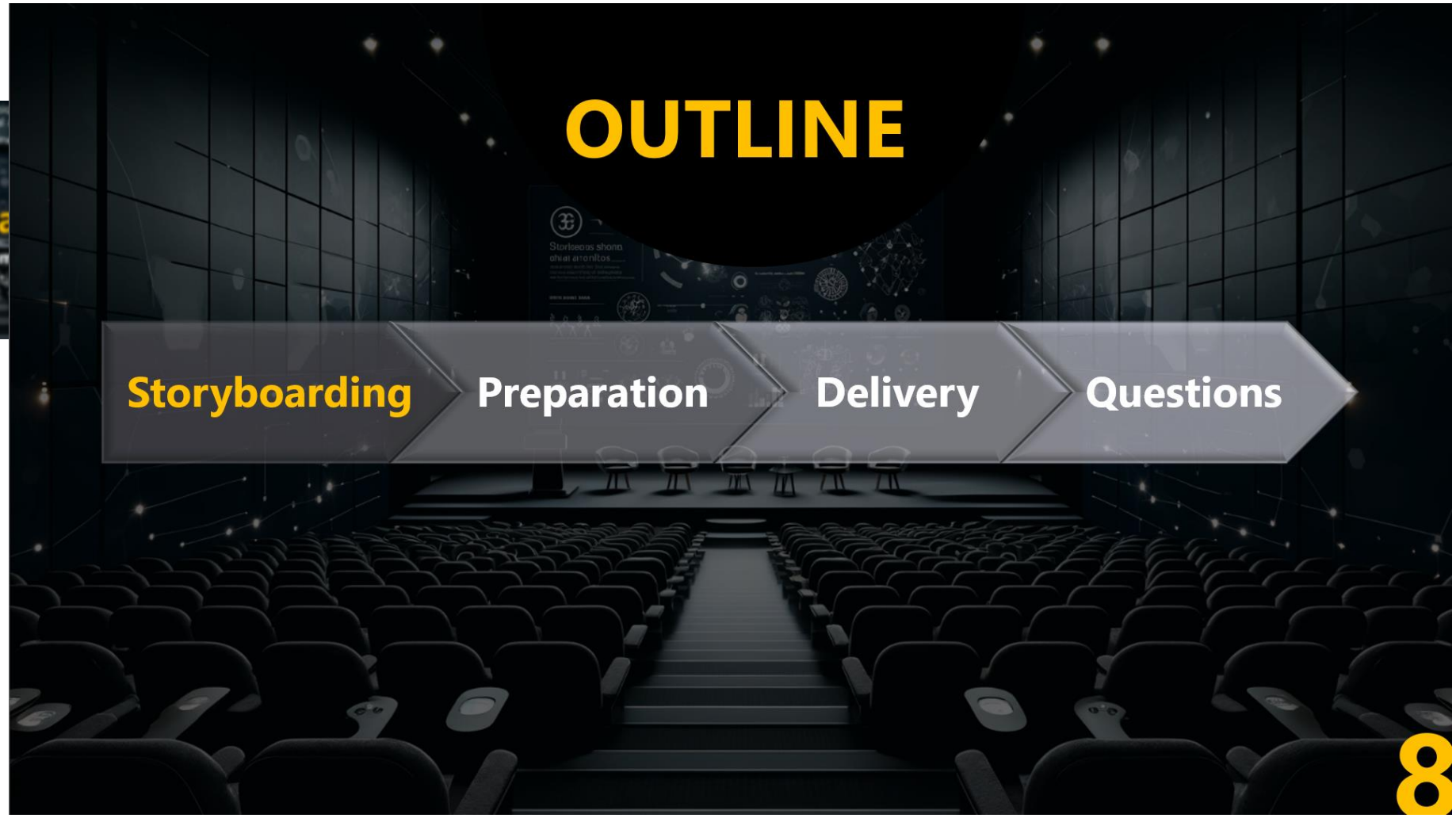
Relevant Graphics

STORYBOARD

Example Structure

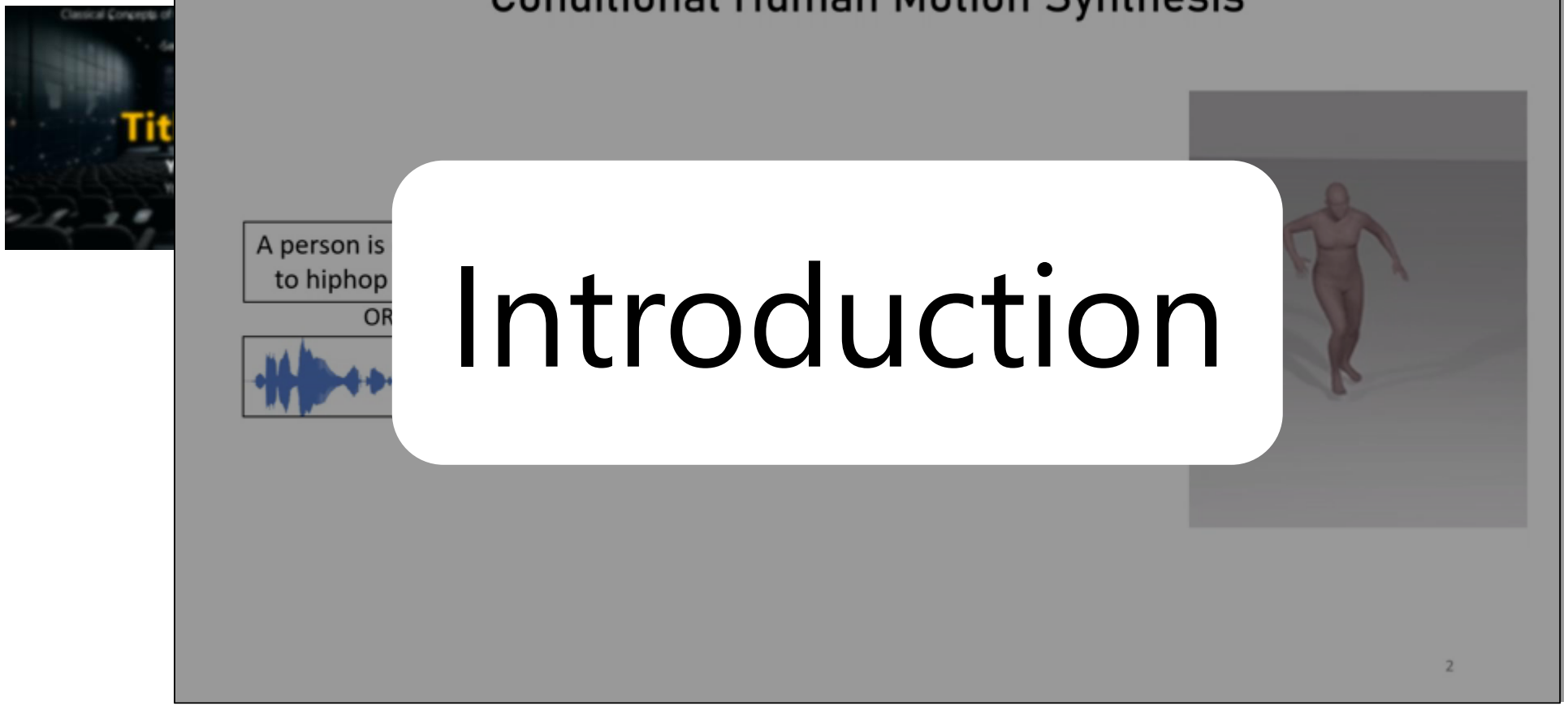
STORYBOARD

Example Structure



STORYBOARD

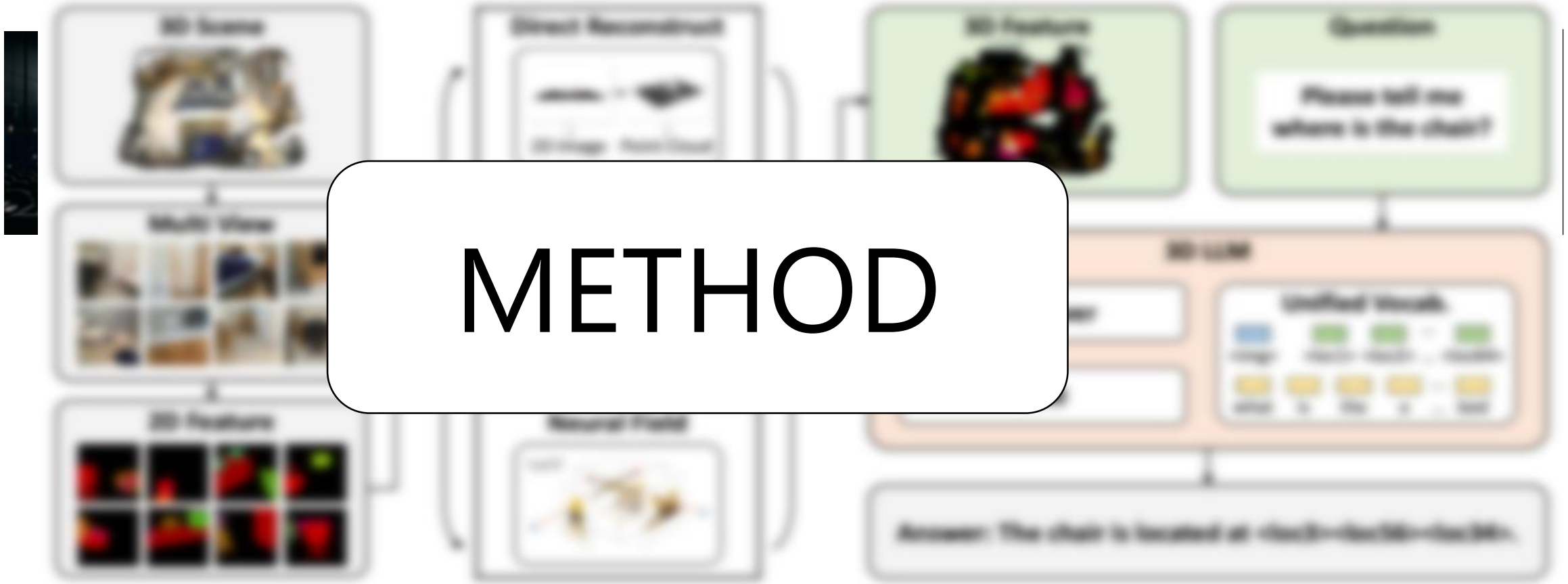
Example Structure



- Introduction
- Task Definition
- Motivation
- Prior Works

STORYBOARD

Example Structure

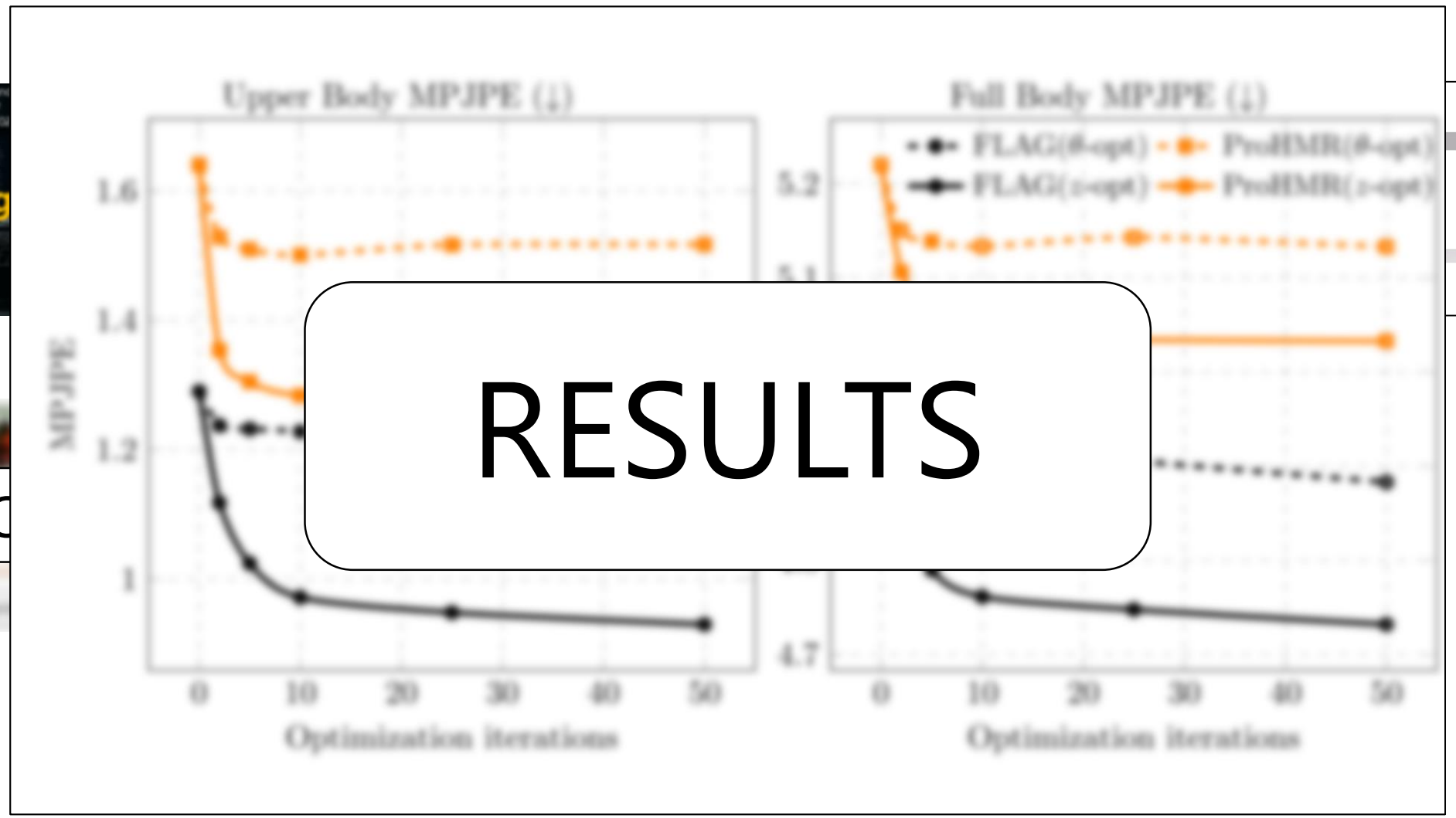


METHOD

STORYBOARD

Example Structure

METHO



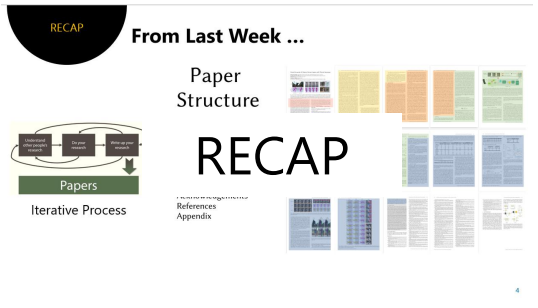
RESULTS

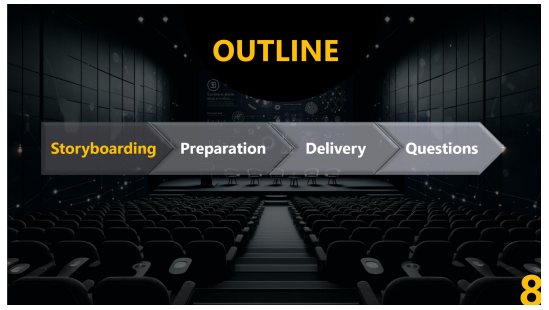
STORYBOARD

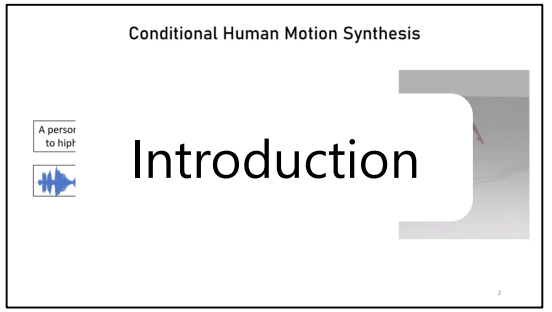
Example Structure

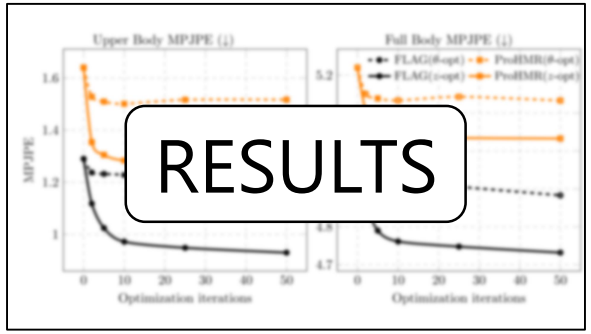
STORYBOARD

Example Structure





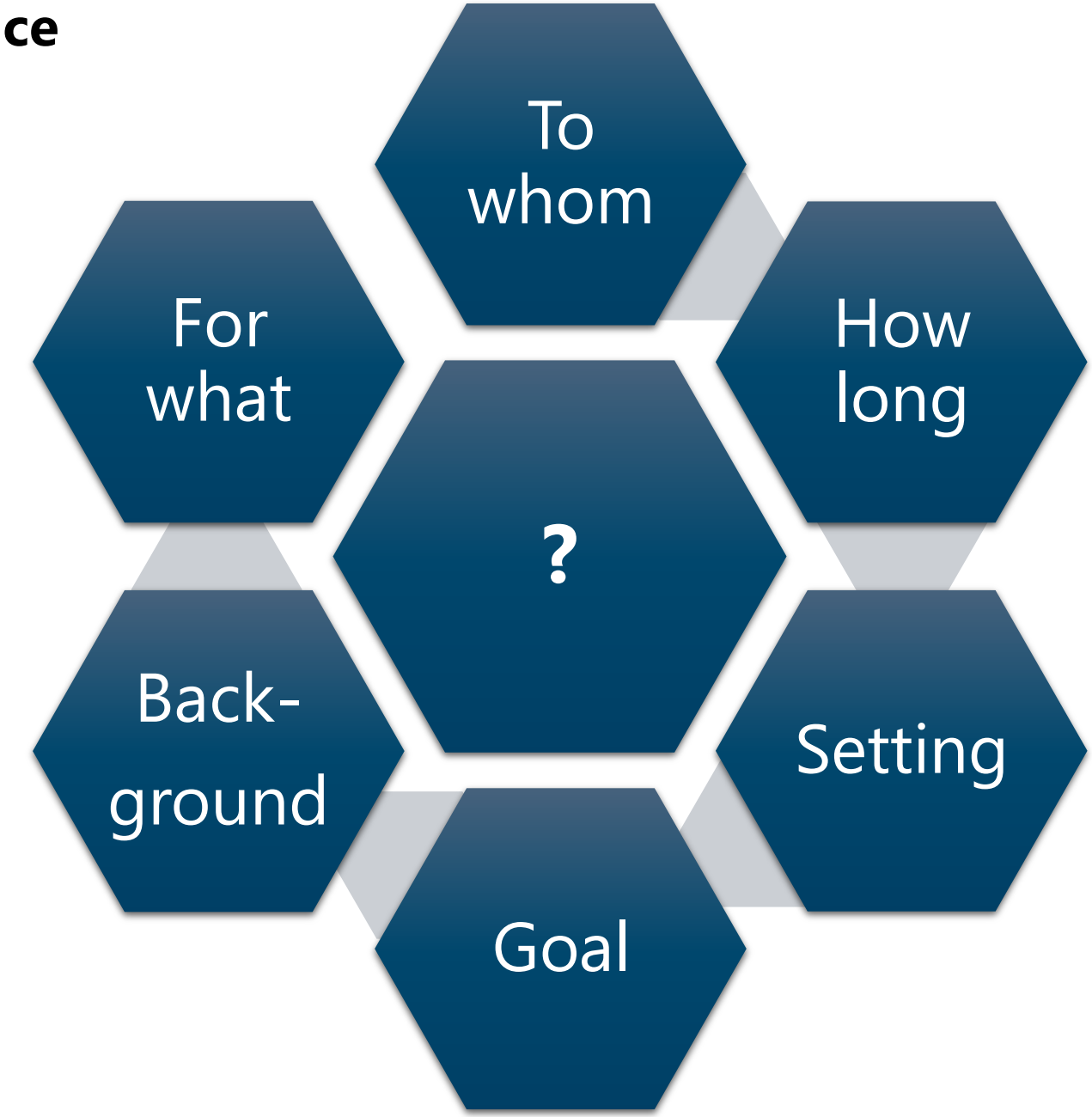




STORYBOARD

Know Your Audience

Edit/adjust your slides



STORYBOARD

Audience: University Seminar

Fellow Students

Broad technical backgrounds

Many Topics

Provide an overview of the SoTA

Message

Why is the problem important?

Investigate

Novelty and impact

Seek

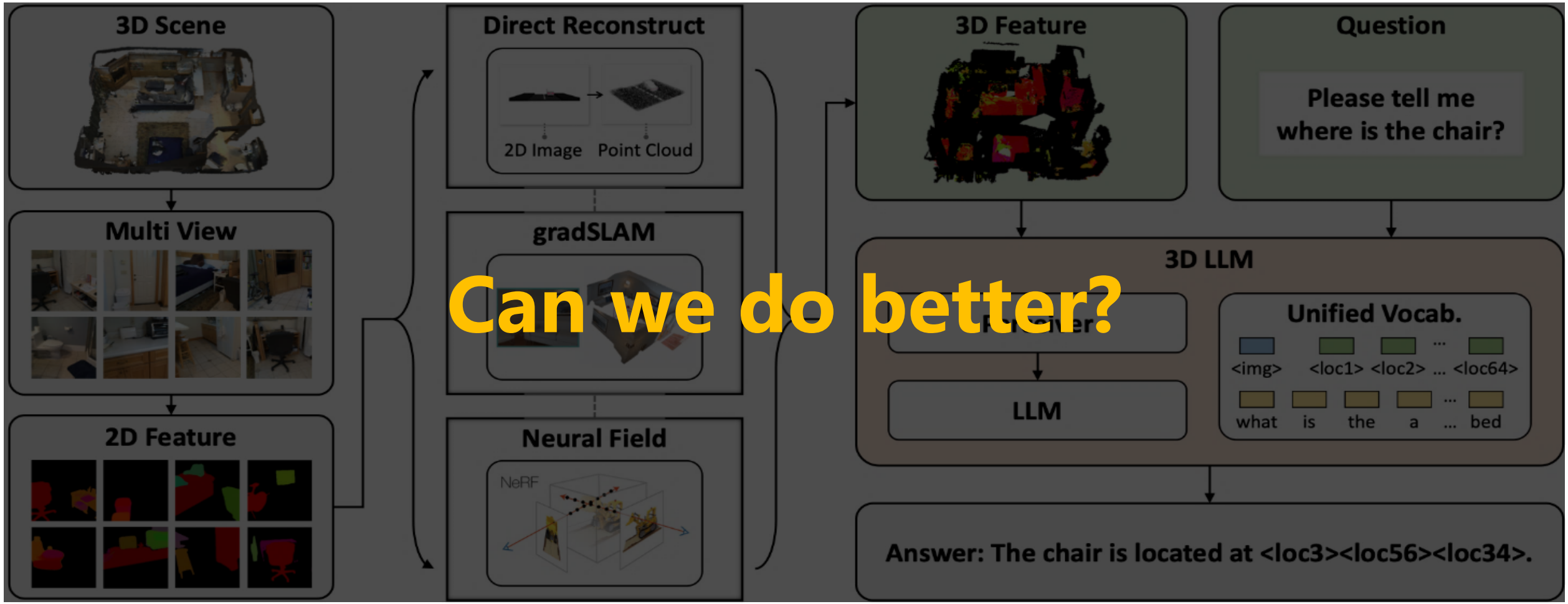
Insights and takeaways

“Not every detail is important”

OUTLINE

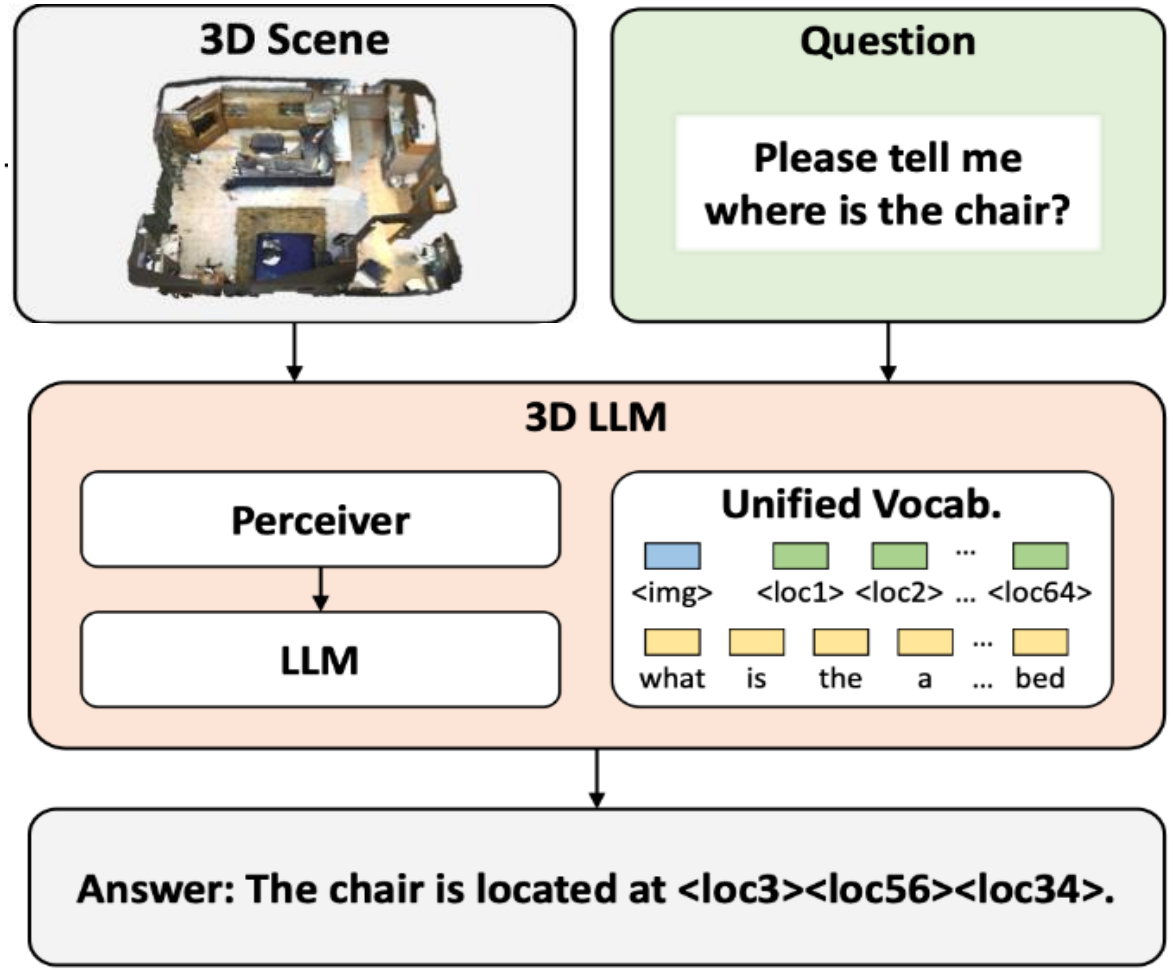
Storyboarding → Preparation → Delivery → Questions

Overview Figures: an Example

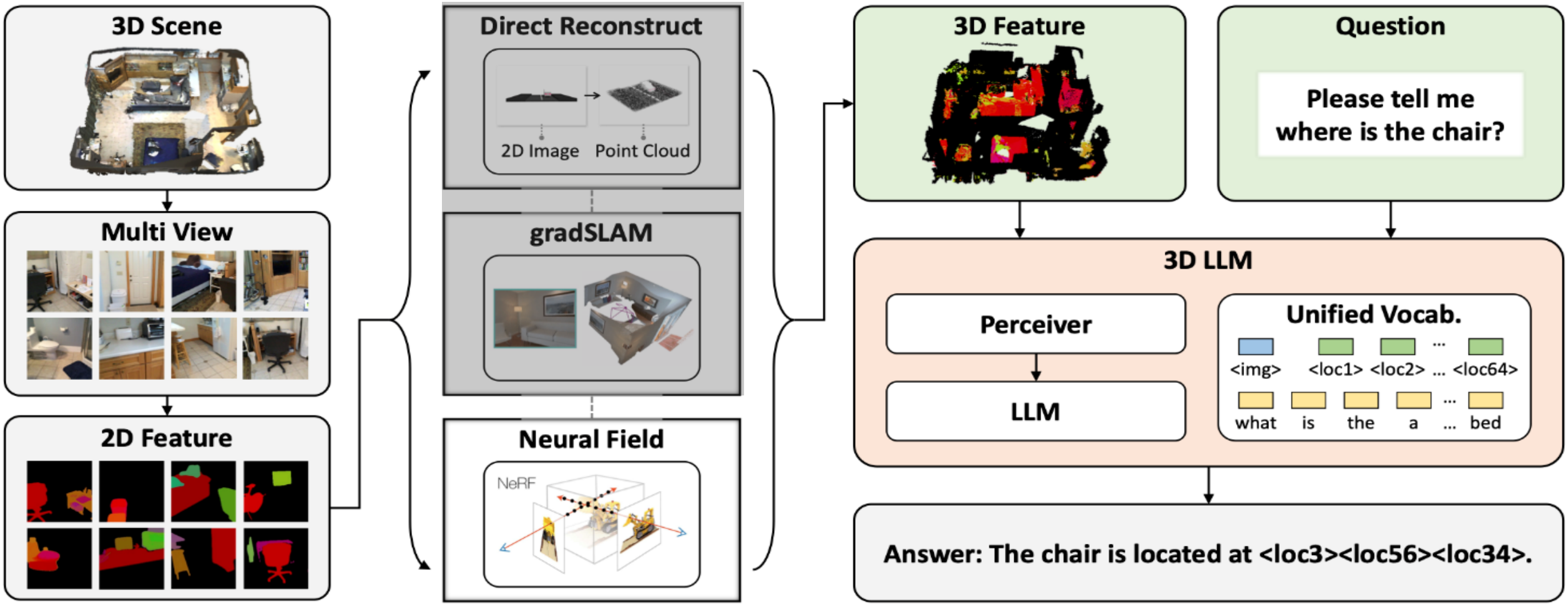


Hong et al., "3D-LLM: Injecting the 3D World into Large Language Models". NeurIPS 2023

How do we tokenize 3D data?

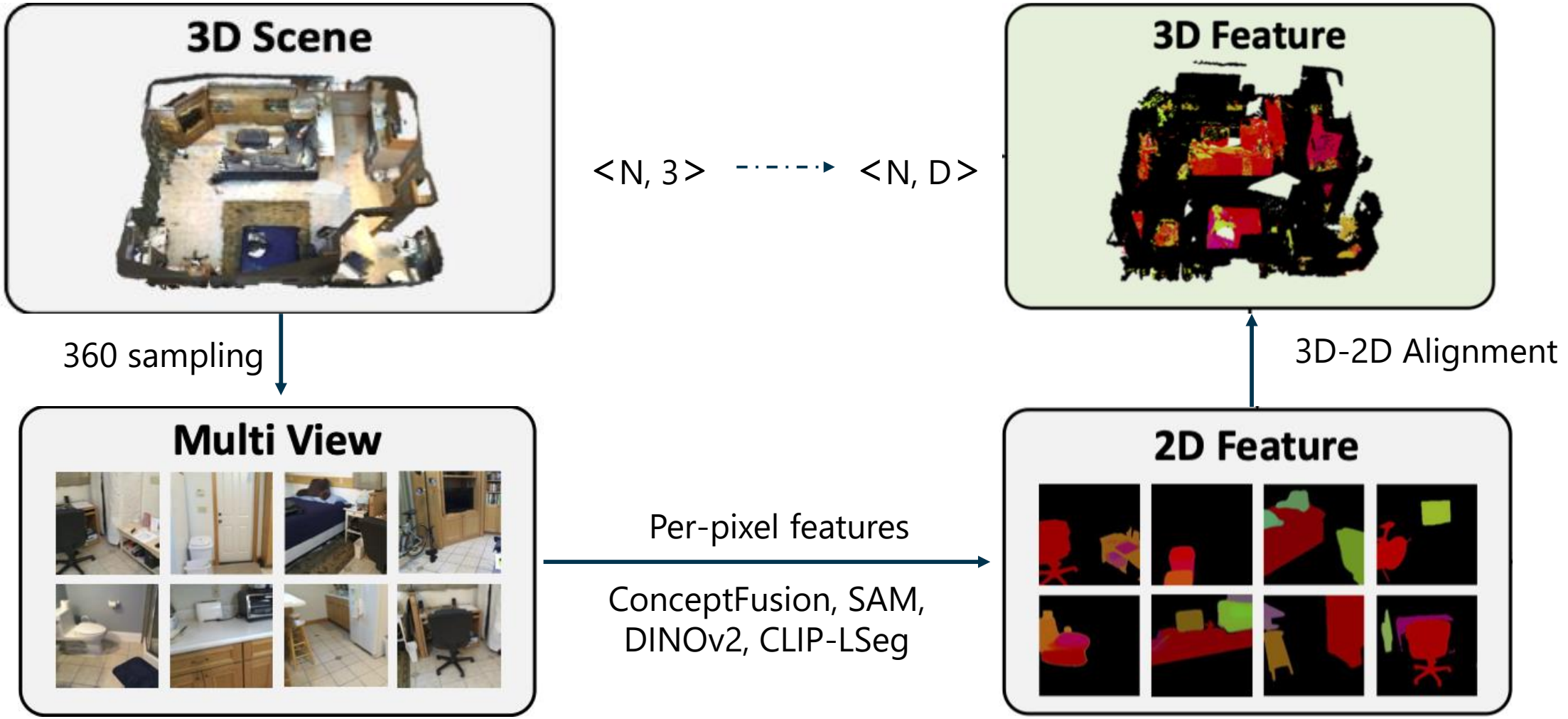


Tokens


3D Scene
Multi View
2D Feature
Direct Reconstruct
2D Image
Point Cloud
gradSLAM
Neural Field
NeRF
3D Feature
Question
Please tell me where is the chair?
3D LLM
Perceiver
LLM
Unified Vocab.
<img>
<loc1>
<loc2>
...
<loc64>
what
is
the
a
...
bed
Answer: The chair is located at <loc3><loc56><loc34>.

Tokens

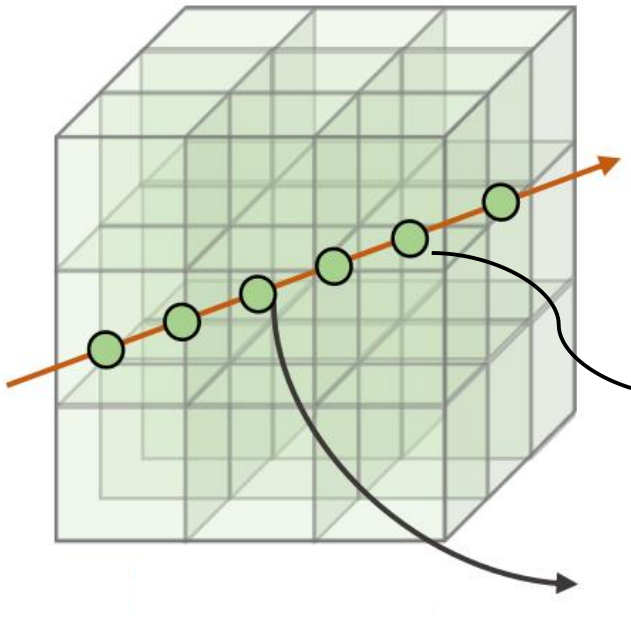
How do we tokenize 3D data?

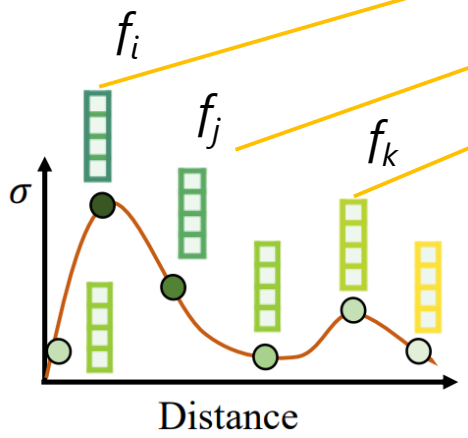


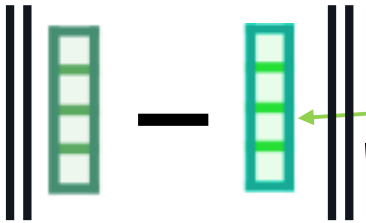
Tokens

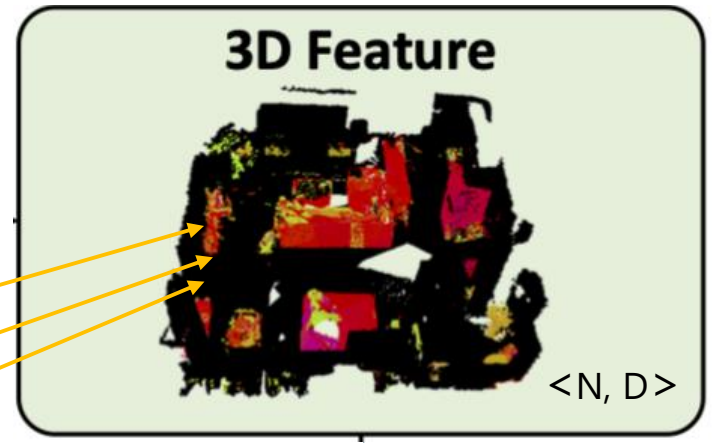
How do we tokenize 3D data?

But what about language?

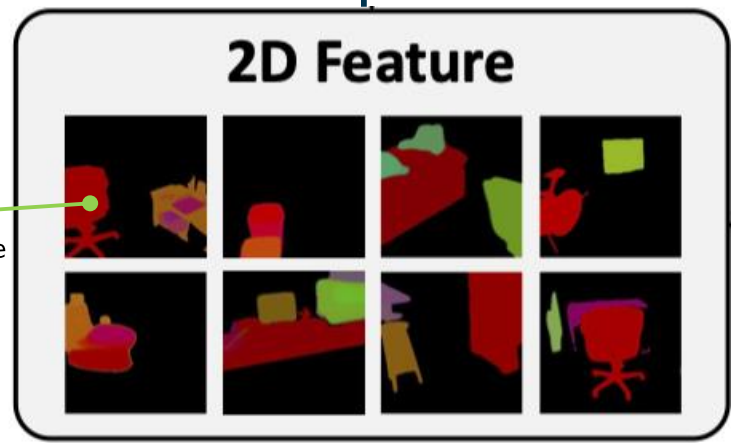








3D-2D Alignment



Pixel Feature

<c, σ, >

<c, σ, f_i >

Sun et al., Direct Voxel Grid Optimization

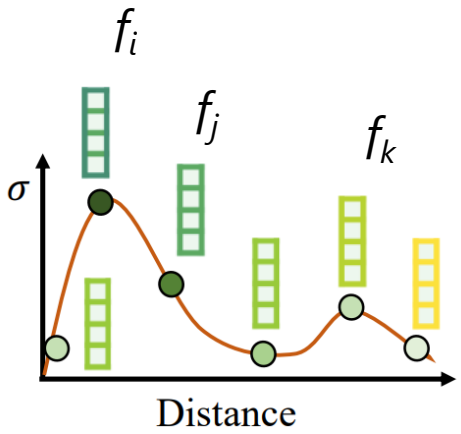
Tokens

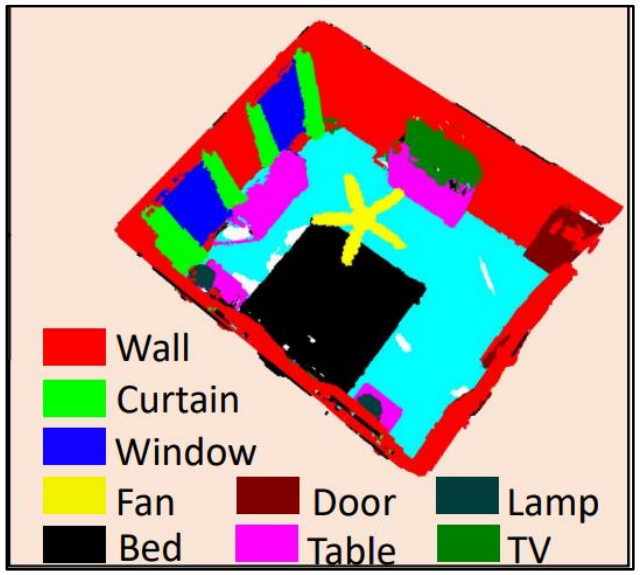
Concept Grounding

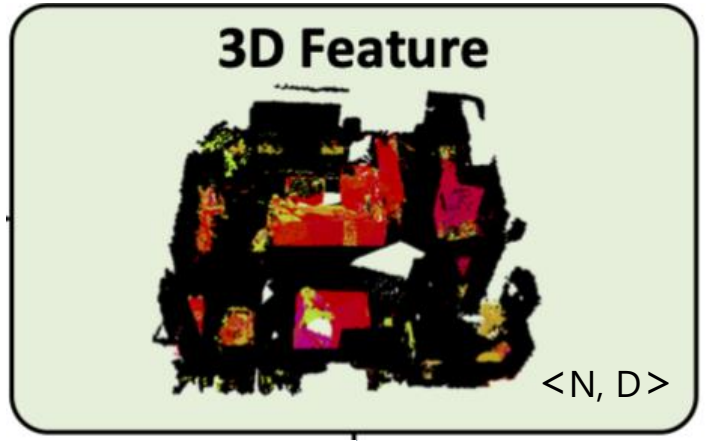
Concepts:
<Wall>, <Curtain>, <Shiny>,
<Heavy>, <Big>, <Edible>

CLIP

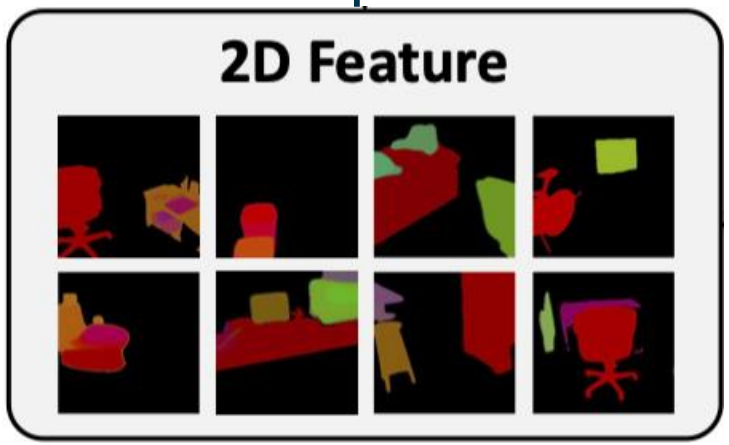
Attn: $<f_i, v>$



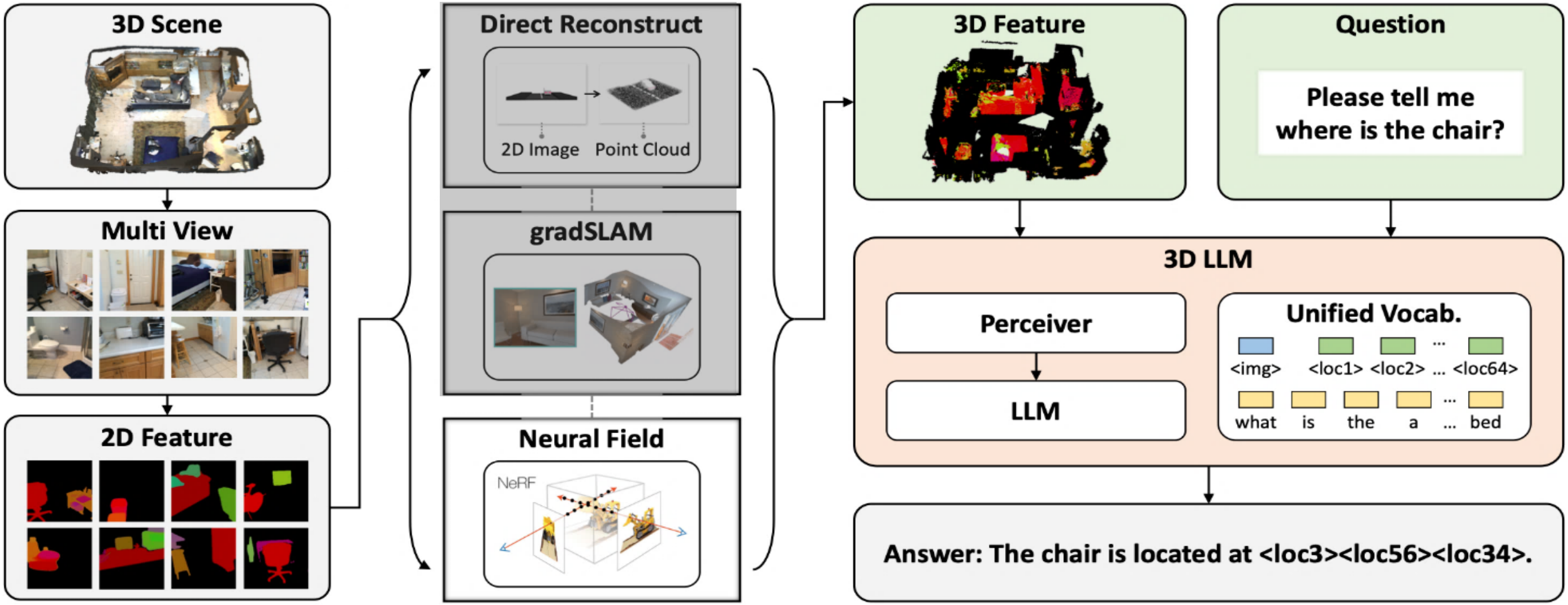




3D-2D Alignment



Overview Figures: an Example



Hong et al., "3D-LLM: Injecting the 3D World into Large Language Models". NeurIPS 2023

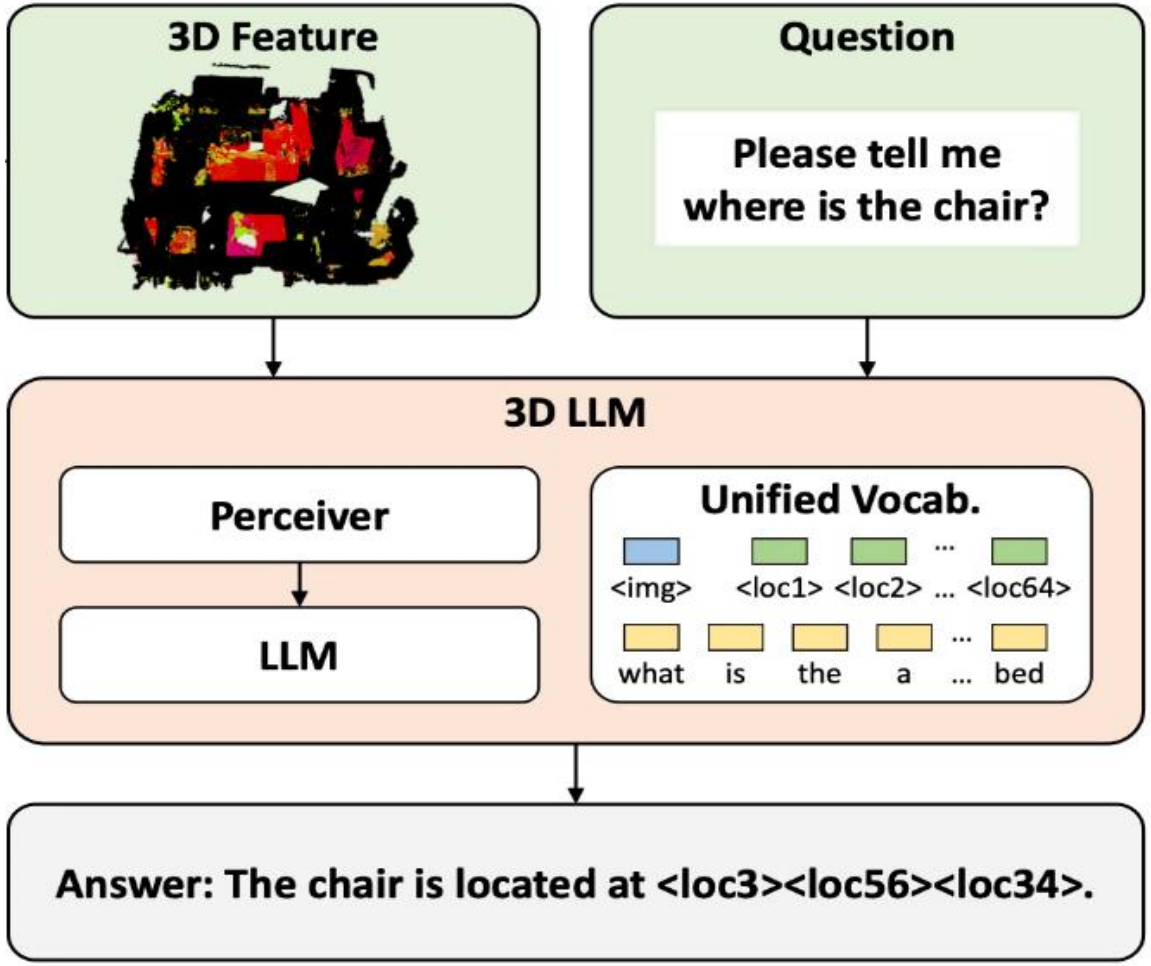
PREPARATION

Overview Figures: an Example

Overview figures typically:

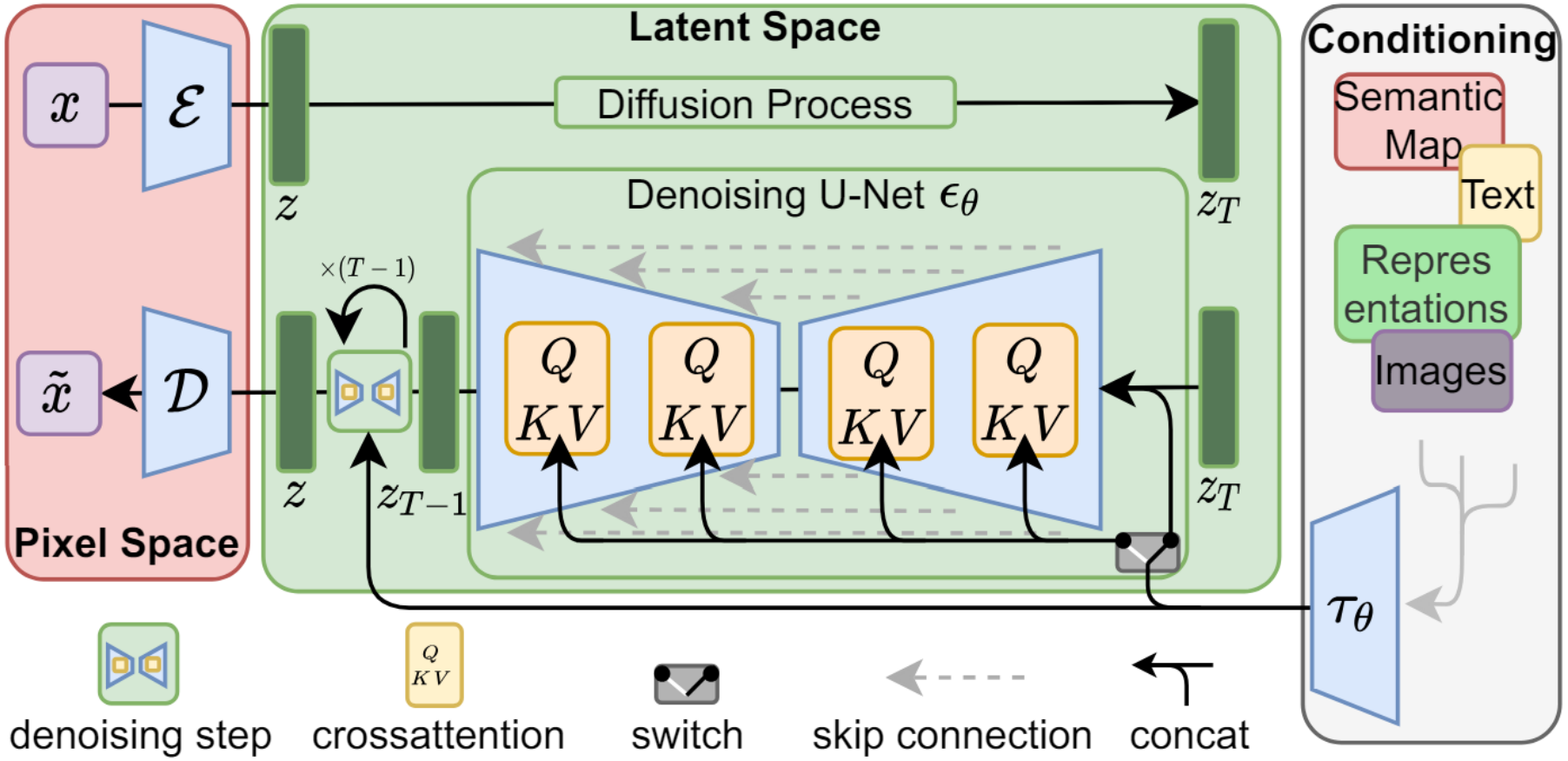
- Introduce the core-concept
- Illustrate the inputs/outputs
- Describe the method's workflow

If you use web sources, do not forget to reference them.

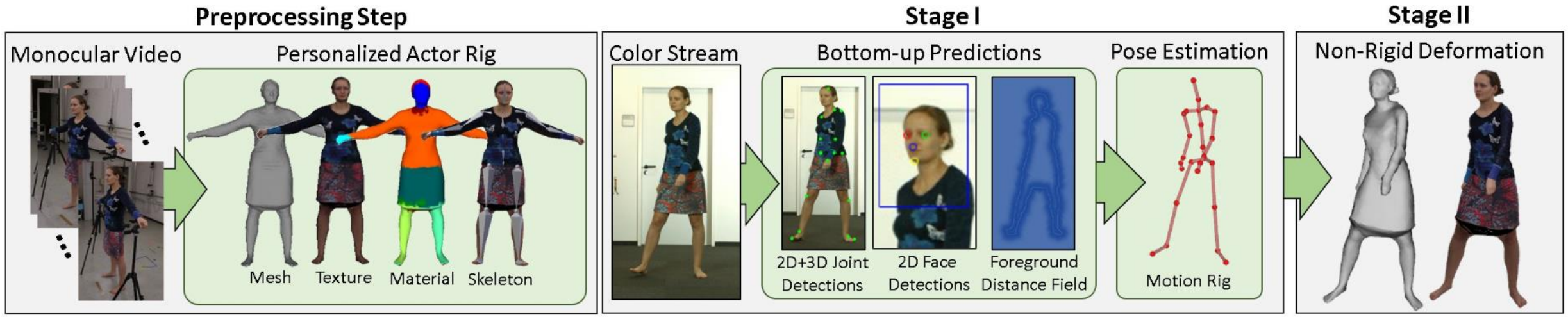


Hong et al., "3D-LLM: Injecting the 3D World into Large Language Models". NeurIPS 2023

Overview Figures: More Examples

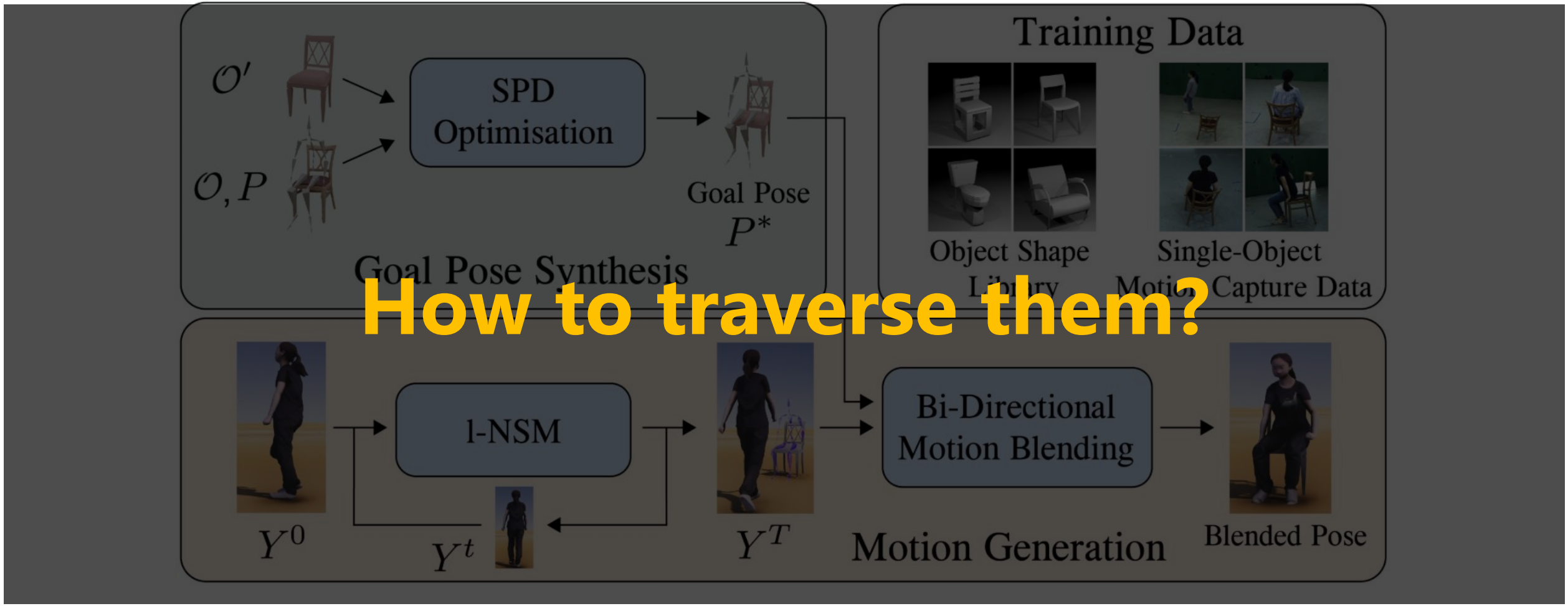


Overview Figures: More Examples



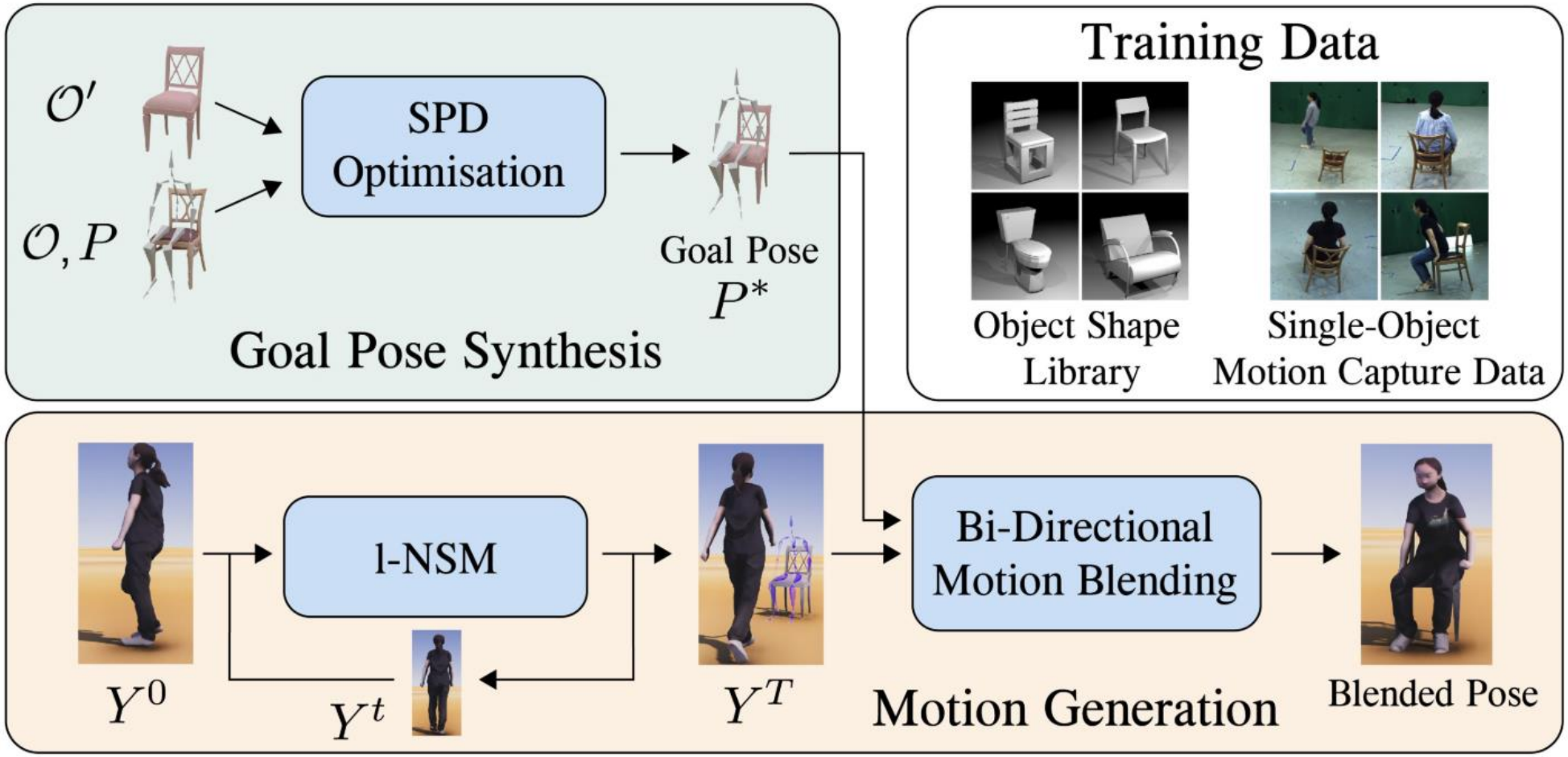
Habermann et al., "LiveCap: Real-time Human Performance Capture from Monocular Video". ToG 2019

Overview Figures: More Examples



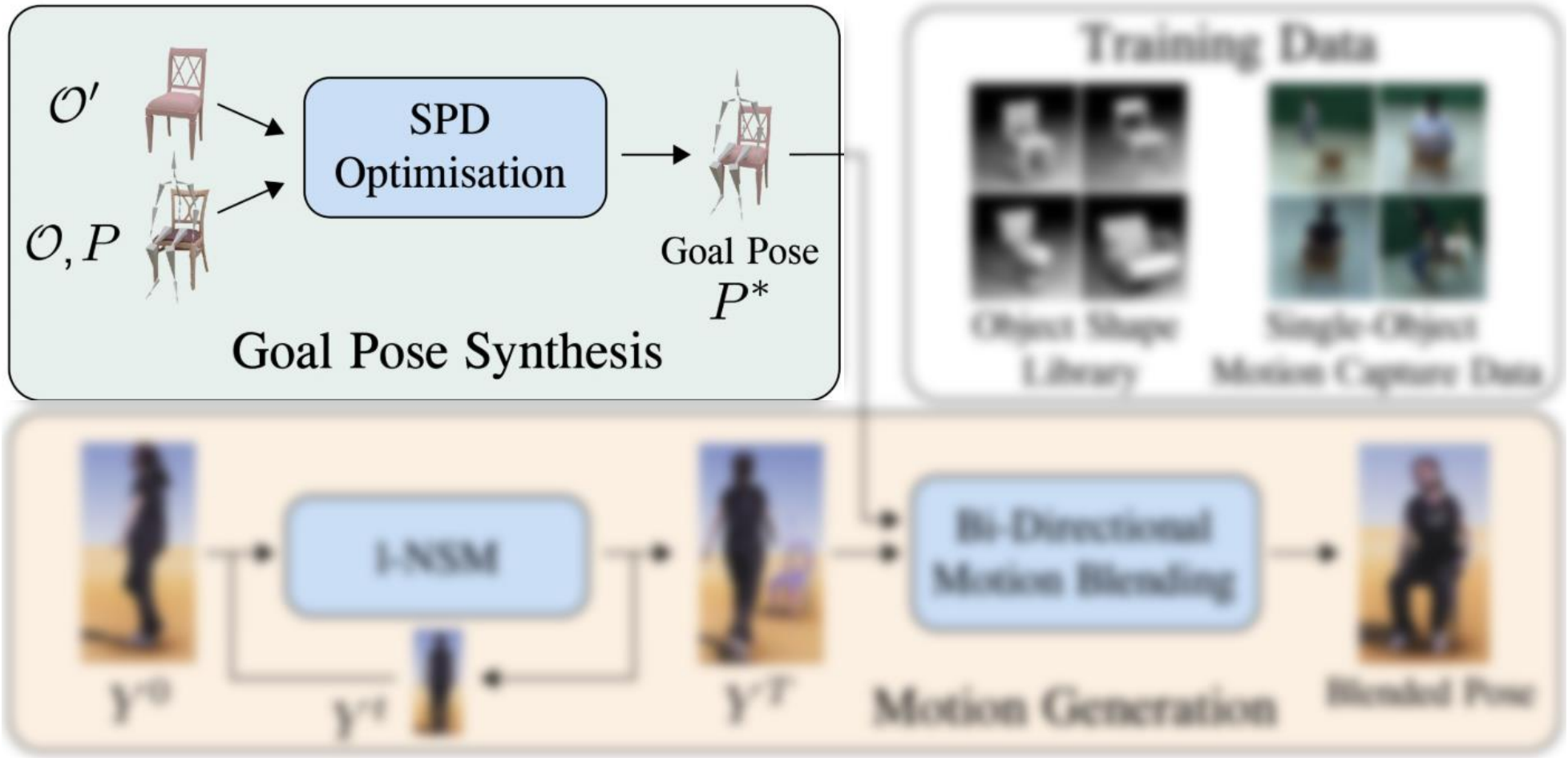
Zhang et al., "ROAM: Robust and Object-Aware Motion Generation Using Neural Pose Descriptors". 3DV 2023

Overview Figures: More Examples



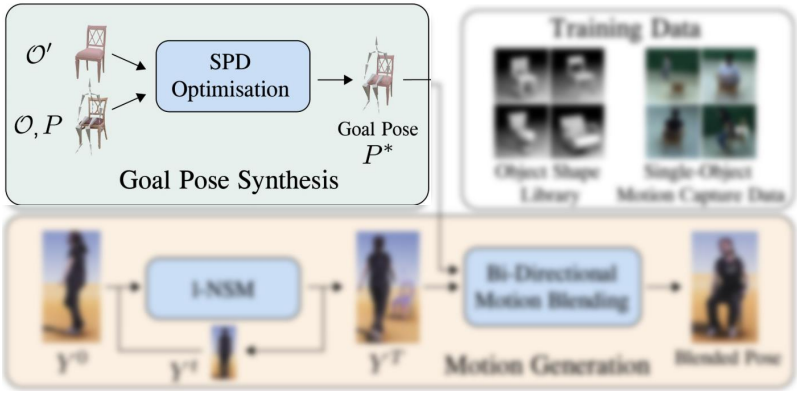
Zhang et al., "ROAM: Robust and Object-Aware Motion Generation Using Neural Pose Descriptors". 3DV 2023

Overview Figures: More Examples



Zhang et al., "ROAM: Robust and Object-Aware Motion Generation Using Neural Pose Descriptors". 3DV 2023

Overview Figures: Tip



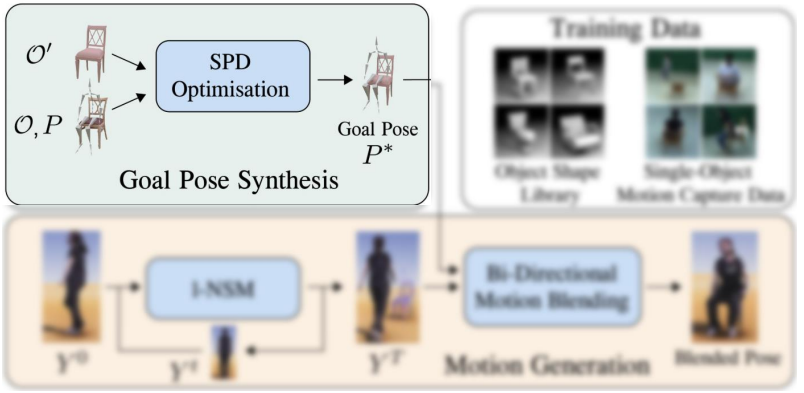
<Your creative explanation here>

Caption your figures; esp. for the method and the results.

Zhang et al., "ROAM: Robust and Object-Aware Motion Generation Using Neural Pose Descriptors". 3DV 2023

PREPARATION

Overview Figures: Tip



<Your creative explanation here>
Attention is precious, don't lose it

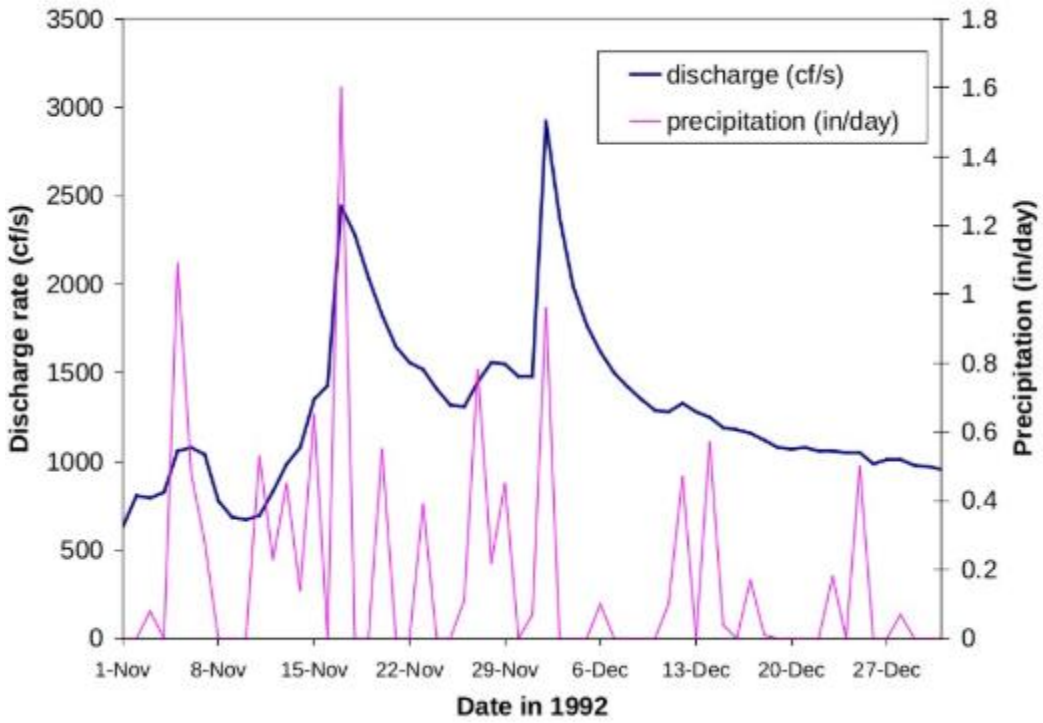
Zhang et al., "ROAM: Robust and Object-Aware Motion Generation Using Neural Pose Descriptors". 3DV 2023

Using Tables

date	discharge (cf/s)	precipitation (in/day)
1-Nov	631	0
2-Nov	808	0
3-Nov	794	0.08
4-Nov	826	0
5-Nov	1060	1.09
6-Nov	1080	0.48
7-Nov	1040	0.28
8-Nov	779	0
9-Nov	686	0
10-Nov	670	0
11-Nov	696	0.53
12-Nov	831	0.23
13-Nov	985	0.45
14-Nov	1080	0.14
15-Nov	1350	0.65
16-Nov	1430	0
17-Nov	2440	1.6
18-Nov	2280	0
19-Nov	2040	0
20-Nov	1830	0.55
21-Nov	1650	0
22-Nov	1560	0
23-Nov	1520	0.39
24-Nov	1410	0
25-Nov	1320	0
26-Nov	1310	0.11
27-Nov	1450	0.78
28-Nov	1560	0.22
29-Nov	1550	0.45
30-Nov	1480	0

date	discharge (cf/s)	precipitation (in/day)
1-Dec	1480	0.07
2-Dec	2920	0.96
3-Dec	2380	0
4-Dec	1990	0
5-Dec	1770	0
6-Dec	1620	0.1
7-Dec	1500	0
8-Dec	1420	0
9-Dec	1350	0
10-Dec	1290	0
11-Dec	1280	0.1
12-Dec	1330	0.47
13-Dec	1280	0
14-Dec	1250	0.57
15-Dec	1190	0.04
16-Dec	1180	0
17-Dec	1160	0.17
18-Dec	1120	0.01
19-Dec	1080	0
20-Dec	1070	0
21-Dec	1080	0
22-Dec	1060	0
23-Dec	1060	0.18
24-Dec	1050	0
25-Dec	1050	0.5
26-Dec	986	0
27-Dec	1010	0
28-Dec	1010	0.07
29-Dec	977	0
30-Dec	972	0
31-Dec	957	0

VS



Caption your tables;
explain the units.

Discharge of the Esopus Creek (Coldbrook, NY) and precipitation at Slide Mountain, NY (source: USGS/NCDC)

PREPARATION

Using Maths and Equations

Use equations to **express**,
not to **impress**.

If you **show** it,
you must **explain** it.

Using Maths and Equations

$$\mathfrak{E}(\mathbf{T}^1, \mathbf{T}^2, \ldots, \mathbf{T}^{|\mathrm{Z}|}, \mathbf{w}) = \sum_{\zeta \in \mathrm{Z}} \alpha_\zeta \, \mathfrak{E}_{\text{data}}(\mathbf{T}^\zeta) +$$

$$+ \sum_{\zeta \in \mathrm{Z}} \beta_\zeta \, \mathfrak{E}_{\text{pICP}}(\mathbf{T}^\zeta) \; + \gamma_\zeta \sum_{\zeta \in \mathrm{Z}} \mathfrak{E}_{\text{l.reg.}}(\mathbf{T}^\zeta, \mathbf{w}) +$$

$$+ \eta \, \mathfrak{E}_{\text{r.opt.}}(\mathbf{w}) + \sum_{\zeta=3}^{|\mathrm{Z}|} \lambda_\zeta \, \mathfrak{E}_{\text{c.}}(\mathbf{T}^\zeta).$$

Using Maths and Equations

$$\mathfrak{E}(\mathbf{T}^1, \mathbf{T}^2, \ldots, \mathbf{T}^{|Z|}, \mathbf{w}) = \sum_{\zeta \in Z} \alpha_\zeta \, \mathfrak{E}_{\text{data}}(\mathbf{T}^\zeta) + \\ + \sum_{\zeta \in Z} \beta_\zeta \, \mathfrak{E}_{\text{pICP}}(\mathbf{T}^\zeta) \; + \gamma_\zeta \sum_{\zeta \in Z} \mathfrak{E}_{\text{l.reg.}}(\mathbf{T}^\zeta, \mathbf{w}) + \\ + \eta \, \mathfrak{E}_{\text{r.opt.}}(\mathbf{w}) + \sum_{\zeta=3}^{|Z|} \lambda_\zeta \, \mathfrak{E}_{\text{c.}}(\mathbf{T}^\zeta).$$

vector of frame-to-frame segment transformations

segment-to-segment connectivity weights

brightness constancy

$$\mathfrak{E}(\mathbf{T}^1, \mathbf{T}^2, \ldots, \mathbf{T}^{|Z|}, \mathbf{w}) = \sum_{\zeta \in Z} \alpha_\zeta \, \mathfrak{E}_{\text{data}}(\mathbf{T}^\zeta) +$$

projective ICP

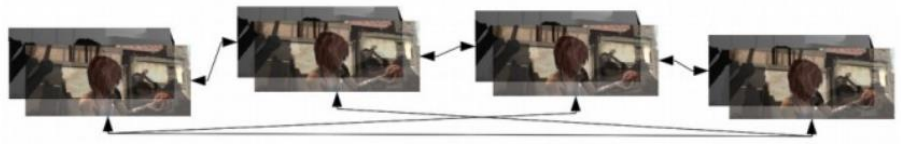
$$+ \sum_{\zeta \in Z} \beta_\zeta \, \mathfrak{E}_{\text{pICP}}(\mathbf{T}^\zeta) \; + \sum_{\zeta \in Z} \gamma_\zeta \, \mathfrak{E}_{\text{l.reg.}}(\mathbf{T}^\zeta, \mathbf{w}) +$$

lifted segment pose regularizer

$$+ \eta \, \mathfrak{E}_{\text{r.opt.}}(\mathbf{w}) + \sum_{\zeta=3}^{|Z|} \lambda_\zeta \, \mathfrak{E}_{\text{c.}}(\mathbf{T}^\zeta).$$

robust weight optimizer

multiframe pose concatenation

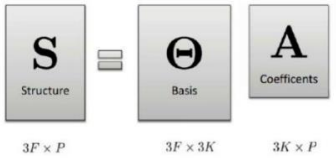


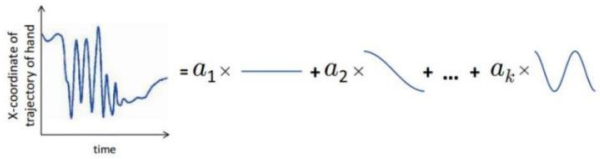
optimization over multiple frames

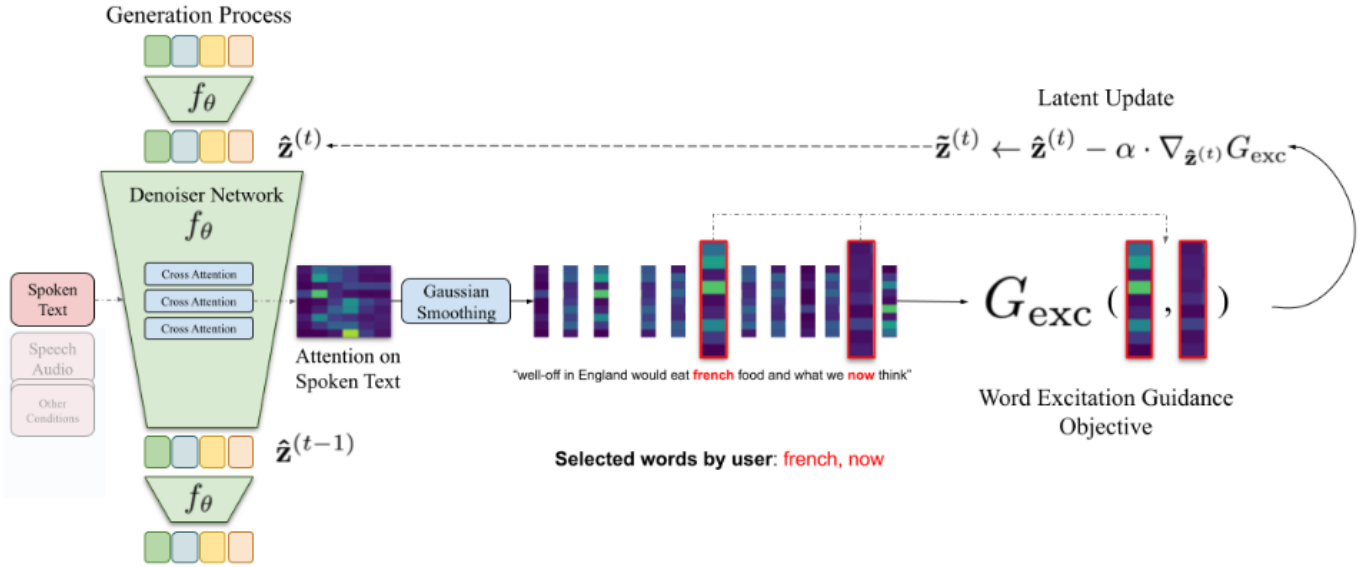
PREPARATION

Using Maths and Equations

$$\mathbf{E}_{\text{traj}}(\boldsymbol{\theta}, \mathbf{z}) = \left\| (\mathbf{1}_T \otimes \bar{\mathbf{S}}) + f_{\boldsymbol{\theta}}(\mathbf{z}) - (\boldsymbol{\Phi} \otimes \mathbf{I}_3)\mathbf{A} \right\|_{\epsilon}, \quad \boldsymbol{\Phi} = \begin{pmatrix} \phi_{1,1} & \cdots & \phi_{1,K} \\ \vdots & \ddots & \vdots \\ \phi_{T,1} & \cdots & \phi_{T,K} \end{pmatrix}$$







Sidhu et al., ECCV 2020; Mughal et al., CVPR 2024

General Rules

A scientific talk is about **How** and **Why**.

Explain what you do.

What is new and innovative.

Motivate why this is the way to go

PREPARATION

General Rules

- No more than one minute per slide on average.
  - Avoid writing complete sentences. But if you must write them, READ them. Else the audience will be split between reading the text and listening to you.
- Check the slide apearance consistency; colors are important.
- No sound, unless it is part of the results.
- Videos are not allowed. Use animated GIFs. Double-check that they work properly, esp. for cloud-based presentation tools.
- Spelling and writing style:
  - Use the same font (or a few fonts).
  - Check the text for typos; check te grammar.
  - Decide between British and American English, and use the chosen language consistently.

3-5 bullets per slide

If a static slide takes 2+ minutes, consider splitting it.

OUTLINE

Storyboarding → Preparation → Delivery → Questions

Preparing yourself

Presentation Matters

The way you present is as important as your slides.

DELIVERY

Preparing yourself

Presentation Matters

Immerse Yourself

Speak with conviction.
Be excited about your talk.

DELIVERY

Preparing yourself

Presentation Matters

Immerse Yourself

Body Language

Eye Contact

Just the right amount

Intonation

Avoid reading from a script

DELIVERY

Preparing yourself

Presentation Matters

Immerse Yourself

Body Language

Rehearse! Rehearse! Rehearse!

Duration Check

To avoid 'skipping slides in the interest of time'

Logistics Check

Projectors, connectors, power, A/V

Logic Check

Is the flow right?

DELIVERY

Preparing yourself

Presentation Matters

Immerse Yourself

Body Language

Rehearse! Rehearse! Rehearse!

Feynmann Technique

Introspect

What you know, and what you don't

Teach a Child

Sans jargons, with brevity

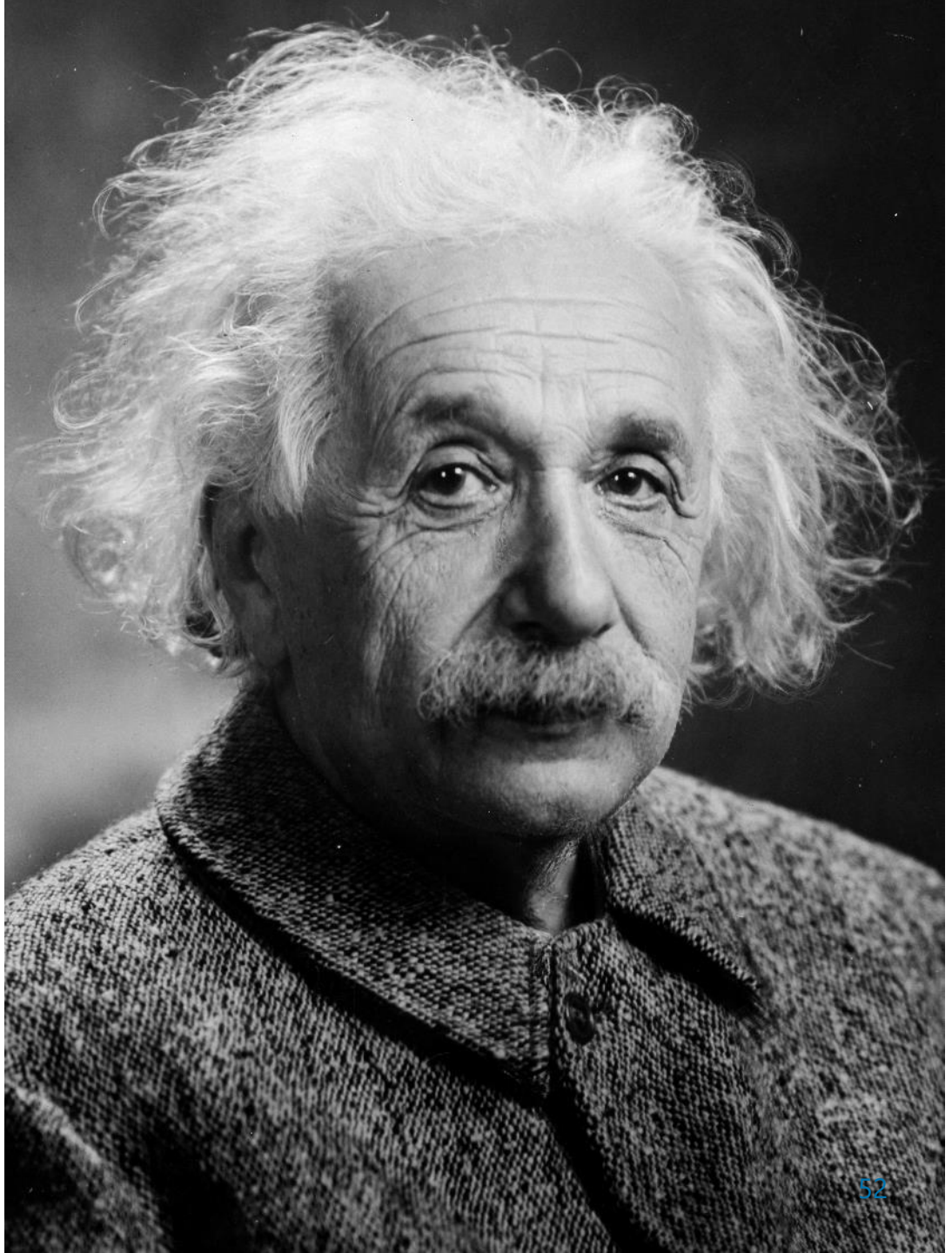
Upgrade

Identify the knowledge gaps, and re-organize

Preparing yourself

"If you can't explain it simply, you don't understand it well enough."

https://wikipedia.org/wiki/Albert_Einstein



DELIVERY

At the Stage

1

Make yourself comfortable

2

Ensure audibiliy and visibility

3

Start strong, maybe memorise the start

4

Nervousness is normal

Feel the mood of the room!

DELIVERY

Concluding the Presentation

1

Announce the ending

2

Focus on the core points

3

Come back to the big picture

New Perspectives

Describe future works
Discuss potential implications

DELIVERY

Concluding the Presentation

1

Announce the ending

2

Focus on the core points

3

Come back to the big picture

Tip

Put some graphics back

DELIVERY

For this Seminar

Compare and Correlate the two papers

Propose a common conclusion

Present own ideas/extensions

OUTLINE

Storyboarding → Preparation → Delivery → Questions

QUESTIONS

Questions are Useful

Instant feedback on your presentation.

Can add additional dimensions to the discussion

QUESTIONS

Rephrase in your words

Gives you time to think

Helps the audience too

Opportunity to clarify

QUESTIONS

When Replying

Be concise
Do not drift from the topic

Anticipate questions
Prepare backup slides

Be positive
Never demean the question/questioner

QUESTIONS

Moderators

*Your job is to **foster discussion**, not to pit the presenter against the audience.*

QUESTIONS

For Moderators

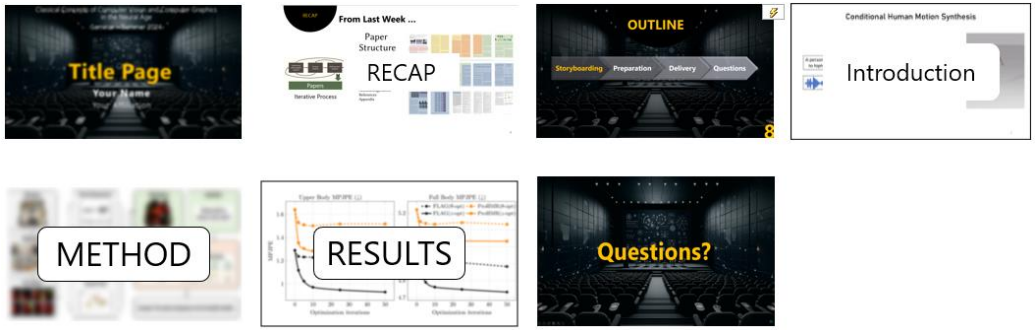
Prepare a mini-presentation

Weaknesses/limitations of the methods
Summarize & compare
Ask other participants about their ideas
Unclear points

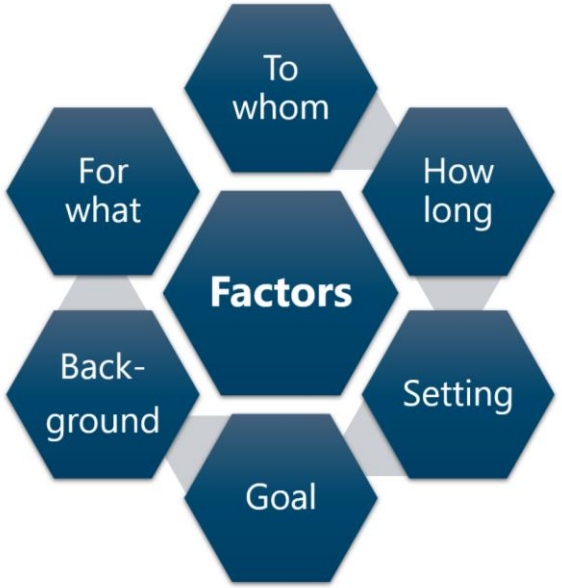

Conclusion

CONCLUSION

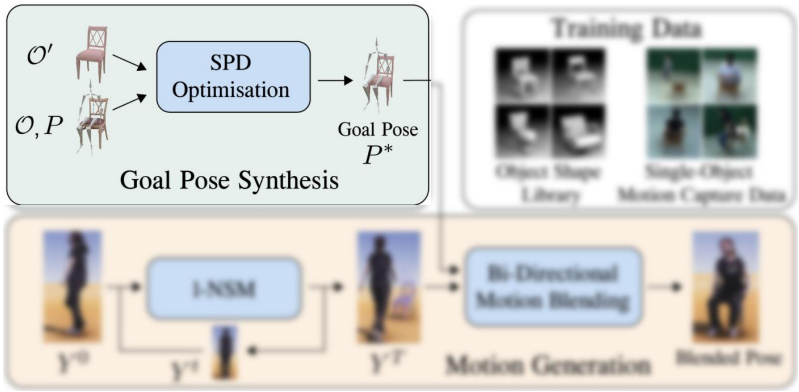
Takeaways



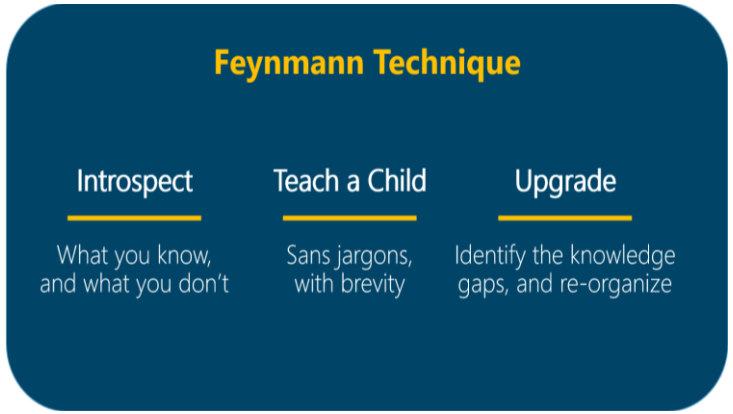
Structure your story



Filter the core message



Use figures, tables and maths approriately



Practice your presentation

Be prepared for questions

CONCLUSION

Best Presentation-Ever Bingo

Didn't pre-load the presentation	Over-ran time	Used as many bullet points as humanly possible	
	Apologized for unreadable slides	Acted as if had never used PowerPoint	Embraced Obfuscation
Used incredibly complex plots		Used as many slides as humanly possible	Crammed as much as possible onto each slide
Included a video fail	Didn't check the presentation worked beforehand		Used tables with more data than any sane person could read

https://medium.com/edge-of-innovation/how-to-give-the-best-scientific-presentation-ever-c87e202718cf

Materials Used

This talk is a revised version of *How to Give a Good Scientific Talk* by Prof. Dr. Christian Theobalt, 2017.

Some ideas are from:
How to Give a Good Talk by S. Pfirman (Cornell University), and
How to Give Scientific Presentations by T. Williams (Texas A&M University).


Questions?

Questions / Ideas