

「AI-Generated  
YOGA  
CLASSES

」



# 「THE YOGA INDUSTRY」

- Yoga: gradual, systematic progression
- \$ 18bn US / \$ 84bn globally
- Commercialized & consumeristic
- No official licensure

# 「THE YOGA INDUSTRY」

Lack of Safety

# 「THE HOME WORKOUT AGE」

## COVID-19

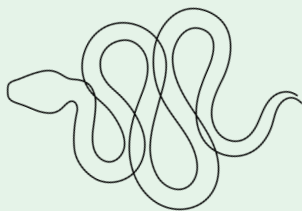
- Students need reliable, safe, unique yoga classes at home
- Current option: Take a gamble on random video



# APPLICATION



# VINYASA KRAMA



- “Wise progression”
- “A correctly organized course of asanas progressing appropriately toward a desired goal”

# VINYASA KRAMA

- Deep learning-generated yoga classes
- Emulate the well-structured sequences of Eastern tradition
- Users can receive immediate, unique & **custom** classes




┌  
APPROACH  
└



- User selects desired **peak pose**
- A unique class is generated that properly prepares them for and incorporates the peak
- Users can take the class, following along with a live animated instructor
- Yoga teachers can print the sequence to teach it to others

「APP  
DESIGN」

# 「What's in a YOGA CLASS ?」

- Natural arc 
- Physical & biomechanical consideration for joints
- Counter poses
- Step by step progression to more challenging postures

- Web scraped 50,000 classes by real yoga teachers
- Pre-processing: NLP & Industry Knowledge
- Word2Vec word embeddings
- Bi-directional LSTM
- Text generation from middle-out
- Flask app with Unity

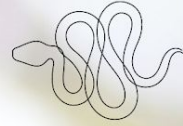
# Machine Learning Workflow

# 「Neural Network Architecture」

- Bi-directional LSTM
  - Context for poses both preceding and following the peak pose
- Text generation
  - From peak pose out in both directions
- Allowed to continue generating until natural convergence on entry and exit poses







# Vinyasa Krama

## Deep Learning Generated Yoga Classes

Select A Peak Pose:

Beginner

Intermediate

Advanced

Print Class Sequence

Take Class



# Vinyasa Krama

## Deep Learning Generated Yoga Classes

Select A Peak Pose:

Beginner

- ✓ Dancer Pose
- Half Moon Pose
- Tripod Headstand Pose
- Revolved High Lunge Pose
- Revolved Extended Side Angle Pose
- Standing Hand To Big Toe Pose
- Revolved Hand To Big Toe Pose
- Humble Warrior Pose
- Warrior Pose III
- Airplane Pose
- Wheel Pose

Advanced





# Vinyasa Krama

## Deep Learning Generated Yoga Classes

Select A Peak Pose:

Beginner

Intermediate

Advanced

Print Class Sequence

Take Class

# Your Yoga Class

## Your Dancer Pose Class:

Easy Pose

Upward Facing Dog Pose

Downward Facing Dog Pose

Plank Pose

Wild Thing Pose

Cobra Pose

Plank Pose

Standing Forward Fold Pose

Standing Backbend Pose

Mountain Pose

Five Pointed Star Pose

Goddess Pose

Goddess Pose, Repeat Other Side

# Demo Yoga Class

Vinyasa Krama







## Chosen Peak Pose: “Eagle Pose”

easy pose  
happy baby pose  
shoulderstand pose  
reclined big toe pose  
bridge pose  
low lunge pose  
warrior pose 2  
chair pose  
mountain pose  
one legged mountain pose  
dancer pose  
dancer pose, repeat other side  
flamingo pose  
flamingo pose, repeat other side  
one legged mountain pose  
mountain pose  
five pointed star pose  
wide legged forward fold  
wide legged forward fold, other side  
goddess pose  
goddess pose, repeat other side  
garland pose  
eagle pose  
eagle pose, other side  
reverse warrior pose  
goddess pose  
wide legged forward fold  
warrior pose 3  
mountain pose  
eagle pose  
easy pose  
bound angle pose  
seated straddle pose  
seated straddle pose, repeat other side  
torso stretch pose  
staff pose  
eye of the needle pose  
bound angle pose  
bound angle pose, repeat other side  
bound angle pose  
boat pose  
corpse pose



Peak Pose

# Chosen Peak Pose: “Eagle Pose”

easy pose

happy baby pose

shoulderstand pose

reclined big toe pose

bridge pose

low lunge pose

warrior pose 2

chair pose

mountain pose

one legged mountain pose

dancer pose

dancer pose, repeat other side

flamingo pose

flamingo pose, repeat other side

one legged mountain pose

mountain pose

five pointed star pose

wide legged forward fold

wide legged forward fold, other side

goddess pose

goddess pose, repeat other side

garland pose

eagle pose

eagle pose, other side

reverse warrior pose

goddess pose

wide legged forward fold

warrior pose 3

mountain pose

eagle pose

easy pose

bound angle pose

seated straddle pose

seated straddle pose, repeat other side

torso stretch pose

staff pose

eye of the needle pose

bound angle pose

bound angle pose, repeat other side

bound angle pose

boat pose

corpse pose



Peak Pose

# Chosen Peak Pose: “Eagle Pose”

easy pose  
happy baby pose  
shoulderstand pose  
reclined big toe pose  
bridge pose  
low lunge pose  
warrior pose 2  
chair pose  
mountain pose  
one legged mountain pose  
dancer pose  
dancer pose, repeat other side  
flamingo pose  
flamingo pose, repeat other side  
one legged mountain pose  
mountain pose  
five pointed star pose  
wide legged forward fold  
wide legged forward fold, other side  
goddess pose  
goddess pose, repeat other side  
garland pose  
eagle pose  
eagle pose, other side  
reverse warrior pose  
goddess pose  
wide legged forward fold  
warrior pose 3  
mountain pose  
eagle pose  
easy pose  
bound angle pose  
seated straddle pose  
seated straddle pose, repeat other side  
torso stretch pose  
staff pose  
eye of the needle pose  
bound angle pose  
bound angle pose, repeat other side  
bound angle pose  
boat pose  
corpse pose



Body Position/Height

laying on back/prone

sitting

standing/lunging

balancing

easy pose  
happy baby pose  
shoulderstand pose  
reclined big toe pose  
bridge pose  
low lunge pose  
warrior pose 2  
chair pose  
mountain pose  
one legged mountain pose  
dancer pose  
dancer pose, repeat other side  
flamingo pose  
flamingo pose, repeat other side  
one legged mountain pose  
mountain pose  
five pointed star pose  
wide legged forward fold  
wide legged forward fold, other side  
goddess pose  
goddess pose, repeat other side  
garland pose  
eagle pose  
eagle pose, other side  
reverse warrior pose  
goddess pose  
wide legged forward fold  
warrior pose 3  
mountain pose  
eagle pose  
easy pose  
bound angle pose  
seated straddle pose  
seated straddle pose, repeat other side  
torso stretch pose  
staff pose  
eye of the needle pose  
bound angle pose  
bound angle pose, repeat other side  
bound angle pose  
boat pose  
corpse pose



Chosen Peak Pose:  
“Flying Pigeon  
Pose”

“Flying Pigeon Pose”

easy pose  
cat cow pose  
wind release pose  
plough pose  
happy baby pose  
corpse pose  
legs up the wall pose  
eye of the needle pose  
half lord of the fishes pose  
eye of the needle pose  
happy baby pose  
reclined big toe pose  
supine spinal twist pose  
supine spinal twist pose, repeat other side  
bridge pose  
garland pose  
seated forward bend pose  
seated forward bend pose, repeat other side  
bound angle pose  
bound angle pose, repeat other side  
extended side angle pose  
flamingo pose  
flamingo pose, repeat other side  
crane pose  
crane pose, repeat other side  
baby crow pose  
flying pigeon pose  
flying pigeon pose  
wind release pose  
lotus pose  
happy baby pose  
child pose  
half lord of the fishes pose  
half lord of the fishes pose, repeat other side  
bow pose  
cobra pose  
cow face pose  
pigeon pose  
pigeon pose, repeat other side  
sphinx pose  
bridge pose  
bridge pose, repeat other side  
corpse pose



Peak Pose

# Chosen Peak Pose: “Flying Pigeon Pose”

Arm Balance  
Preparation

Counter Pose

## “Flying Pigeon Pose”

easy pose  
cat cow pose  
wind release pose  
plough pose  
happy baby pose  
corpse pose  
legs up the wall pose  
eye of the needle pose  
half lord of the fishes pose  
eye of the needle pose  
happy baby pose  
reclined big toe pose  
supine spinal twist pose  
supine spinal twist pose, repeat other side  
bridge pose  
garland pose  
seated forward bend pose  
seated forward bend pose, repeat other side  
bound angle pose  
bound angle pose, repeat other side  
extended side angle pose  
flamingo pose  
flamingo pose, repeat other side  
crane pose  
crane pose, repeat other side  
baby crow pose  
flying pigeon pose  
flying pigeon pose  
wind release pose  
lotus pose  
happy baby pose  
child pose  
half lord of the fishes pose  
half lord of the fishes pose, repeat other side  
bow pose  
cobra pose  
cow face pose  
pigeon pose  
pigeon pose, repeat other side  
sphinx pose  
bridge pose  
bridge pose, repeat other side  
corpse pose



# “Flying Pigeon Pose”



easy pose  
cat cow pose  
wind release pose  
plough pose  
happy baby pose  
corpse pose  
legs up the wall pose  
eye of the needle pose  
half lord of the fishes pose  
eye of the needle pose  
happy baby pose  
reclined big toe pose  
supine spinal twist pose  
supine spinal twist pose, repeat other side  
bridge pose  
garland pose  
seated forward bend pose  
seated forward bend pose, repeat other side  
bound angle pose  
bound angle pose, repeat other side  
extended side angle pose  
flamingo pose  
flamingo pose, repeat other side  
crane pose  
crane pose, repeat other side  
baby crow pose  
flying pigeon pose  
flying pigeon pose  
wind release pose  
lotus pose  
happy baby pose  
child pose  
half lord of the fishes pose  
half lord of the fishes pose, repeat other side  
bow pose  
cobra pose  
cow face pose  
pigeon pose  
pigeon pose, repeat other side  
sphinx pose  
bridge pose  
bridge pose, repeat other side  
corpse pose

# “Humble Warrior Pose”



easy pose  
revolved chair pose  
low lunge pose  
side plank pose  
locust pose  
bound angle pose  
bound angle pose, repeat other side  
downward facing dog pose  
dolphin pose  
dolphin pose, repeat other side  
high lunge pose  
child's pose  
warrior pose 2  
half moon pose  
reverse warrior pose  
half moon pose  
warrior pose 2  
revolved triangle pose  
extended side angle pose  
extended side angle pose, repeat other side  
triangle pose  
wide legged forward fold  
standing forward fold pose  
humble warrior pose  
humble warrior pose, repeat other side  
pranayama  
low lunge pose  
cobra pose  
boat pose  
bound angle pose  
bound angle pose, repeat other side  
wind release pose  
bound angle pose  
supine spinal twist pose  
half lord of the fishes pose  
legs up the wall pose  
corpse pose

# 「STRENGTHS of NEURAL NETWORK」

- Captured intended arc
- Creates classes with overall difficulty comparable to difficulty of chosen peak pose
- Pose sequences were sensible & correlated to chosen peak pose

# STRENGTHS of APP

- Only customizable yoga application (not yet) on the market
  - Gradually work up to harder poses
- Only app which creates unique classes for teachers
  - Save time
  - Offer safer sequences
- Encourages students to have an individual home practice

# 「FUTURE WORK」

- Dynamic rendering of Unity interface
- Improve consistency
- More pose variations & transitions
- Embedding information about muscles groups



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Thank  
You  
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# References

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Motion captured Unity model: Morro Motion