Going Beyond Fully Supervised
Welcome to the world Baby Caroline! She and Mom are resting well <3
¡Hola! ¿Están esas zapatillas todavía en venta?
Accessibility

IMAGE CONTAINS

Diana & Hanna on
Riding Bikes in
Biking Near a Red Building
Newsfeed Integrity
Social

Carson Cohen 🇨🇭 looking for recommendations
Thursday at 2:04 PM ⏰

Where should I go for dinner in San Jose?

Anna Shelley
This restaurant is amazing!

Avista Restaurant
4.9 ★ • Open Now • $$$ • Italian din ...
E Santa Clara St • (415) 737-3193
Join Other Blood Donors on Facebook

Get notified when someone nearby needs a blood donation. Respond when you can help.

JOIN NOW
Scaling to New Problems  Robustness  Feasibility  Efficiency  Data Availability
GOING BEYOND FULLY SUPERVISED LEARNING
Techniques Beyond Full Supervision
Weakly Supervised Learning
WEAKLY SUPERVISED

SEMI-SUPERVISED

SELF-SUPERVISED
REDUCTION IN ERRORS: 13.6%

TOP 1 ACCURACY ON IMAGENET: 85.4%
Top-1 Accuracy on Kinetics Dataset

- **82.8%** OUR 65M TRAINING
- **+5.1%** ACCURACY
- **≥25%** REDUCTION IN ERRORS
Semi-Supervised Learning
Semi-Supervised Learning for Image Recognition

1. Training
2. Predicting Labels
3. Pre-Training
4. Fine-Tuning

Labeled Dataset

Large Capacity Model (Teacher)

Target Model (Student)

Unlabeled Data

Top Scoring K Examples

Labeled Dataset

Large Capacity Model (Teacher)

Target Model (Student)

Unlabeled Data

Top Scoring K Examples
Top-1 Accuracy of R-50 on ImageNet-1K

- Fully Supervised: 76.4%
- Weakly Supervised: 78.2%
- Semi-Supervised: 79.1%
Top-1 Accuracy of R-50 on ImageNet-1K

<table>
<thead>
<tr>
<th>Method</th>
<th># params</th>
<th>Fully-supervised</th>
<th>Semi-supervised</th>
</tr>
</thead>
<tbody>
<tr>
<td>ResNet-50</td>
<td>25M</td>
<td>70.6%</td>
<td>79.1%</td>
</tr>
<tr>
<td>ResNetXt-50-32x4</td>
<td>25M</td>
<td>77.6%</td>
<td>79.9%</td>
</tr>
<tr>
<td>ResNetXt-101-32x8</td>
<td>88M</td>
<td>79.1%</td>
<td>81.2%</td>
</tr>
<tr>
<td>ResNetXt-101-32x48</td>
<td>829M</td>
<td>79.8%</td>
<td>—</td>
</tr>
</tbody>
</table>

**COMPUTE SAVED:**
- Fully-supervised (RX101-32x8) ~ Semi-supervised (R50) - 4x less params
- Fully-supervised (RX101-32x48) ~ Semi-supervised (RX101-32x4) - 33x less params
Self-Supervised Learning
Creating Robust Models
Self-Supervised GAN to Recover the Original
Self-Supervised GAN to Recover the Original
Violation Scores on NSFW Images

Striped

GAN Removed

62% RELATIVE IMPROVEMENT
RoBERTa: Self-Supervised NLP

Bringing the world together through AI
RoBERTa: Self-Supervised NLP
88.5% 

SCORE ON 
GLUE 
LEADERBOARD
Self-Supervised Translations
Self-Supervised Translations
Self-Supervised Translations
Self-Supervised Translations
Self-Supervised Translations

Automatic Word Dictionary

Urdu Sentence → English Word Sequence → English Sentence → Urdu-English Model

Automatic Word Dictionary

English Sentence → Urdu Word Sequence → Urdu Sentence → English-Urdu Model
Self-Supervised Translations
Self-Supervision for Audio
Cross-Modal Self-Supervision

- Positive pair
  - Video
  - Audio

- Hard negative pair
  - Video
  - Audio

- Super hard negative pair
  - Video
  - Audio
Reinforcement Learning
Reinforcement Learning for Facebook Notifications
Habitat: Platform for Embodied AI Research

**Tasks**
- EmbodiedQA
- Language grounding
- Interactive QA
- Vision-Language Navigation
- Visual Navigation
- and more...

**Simulators**
- House3D
- AI2-THOR
- MINOS
- Gibson
- CHALET
- and more...

**Datasets**
- Matterport3D
- 2D-3D-S
- and more...

**Habitat Platform**
- Habitat API
- Habitat Sim
- Generic Dataset Support
PyTorch

WSL
Horizon RL
RoBERTa
Unsupervised NMT
Thank you