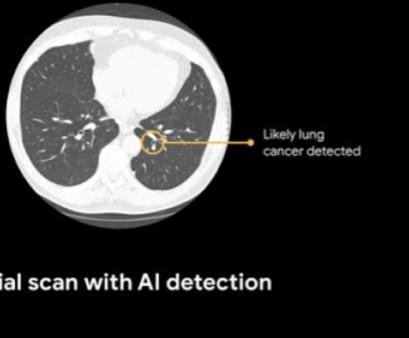




# TensorFlow Everywhere



# TensorFlow



**200M+**

Downloads

**52M+**

Visualizações  
de Tutoriais e  
guias

**8.5M+  
9.7M**

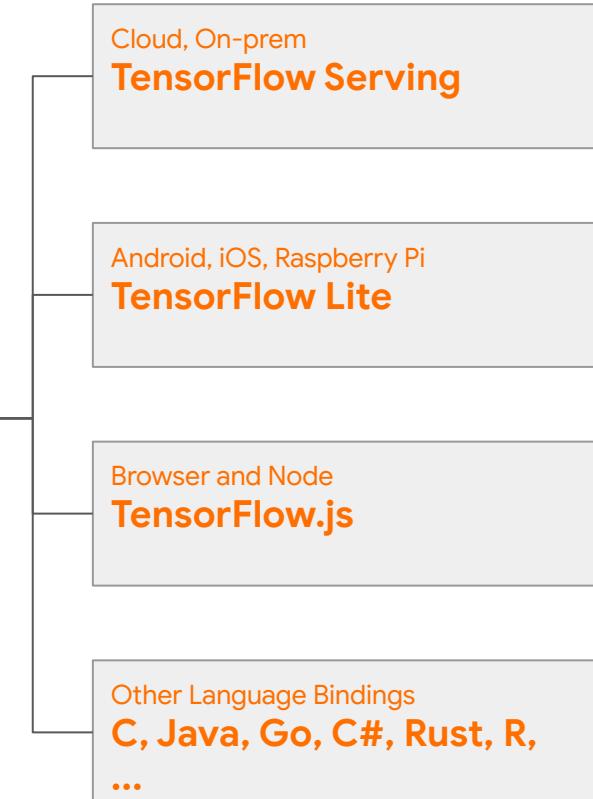
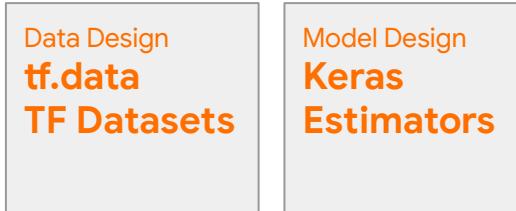
Visualizações  
do Blog &  
YouTube

**800K**

Estudantes nos  
cursos online



## Treino



## Deployment



# TensorFlow Ecosystem esta comprometido com 2.x

## TF 2.0

- Eager execution por padrão
- Integração com Keras

## TF 2.1

- Suporte melhor para treino com TPUs

## TF 2.2

- Melhorias de desempenho
- Novo TF Profiler para CPU/GPU/TPU

## TF 2.3

- `tf.data experimental` como um service
- Pre Processamento experimental com Keras para dados
- Melhorias do TF Profiler, stable `TPUStrategy`



# TensorFlow

## 2.4



### Melhorias em Treino Distribuído:

- Robust Multi-Worker Mirrored Strategy
- Experimental support for Parameter Server training

TF agora roda em **CUDA 11** e **CuDNN8** com TF-32 by por padrão.

Adicionado suporte experimental para um conjunto de APIs do numpy no `'tf.experimental.numpy'`.

Melhorias internas na API Funcional do Keras em **confiabilidade, estabilidade e desempenho**.

**Melhoria de desempenho em Mirrored Variables**, sendo o padrão para TPUs, melhorando o startup time.



# TensorFlow

## Ecosystem

Pesquisa

Produção

Implantando em  
todos os lugares

Capacitando IA Responsável



# TensorFlow

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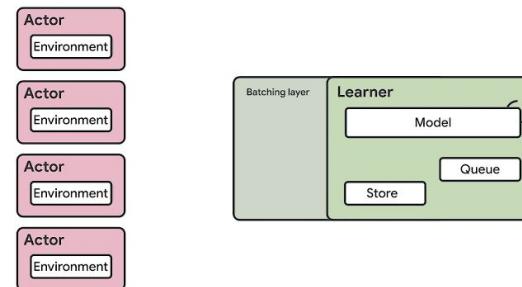
# Pesquisa de ponta com TensorFlow 2.x

Real-time sign language  
detection model



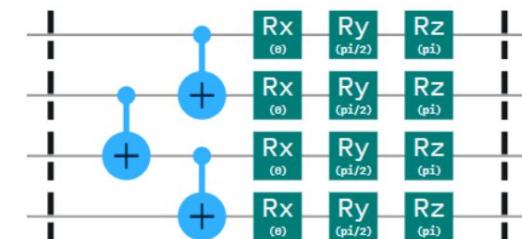
[Google Research: Real-Time Sign Language Detection using Human Pose Estimation and a Unified Text-to-Text Transformer](#)

Massively Scaling RL with  
SEED RL architecture



[Arxiv.org: SEED RL: Scalable and Efficient Deep-RL with Accelerated Central Inference](#)

RL with Quantum Variational  
Circuits

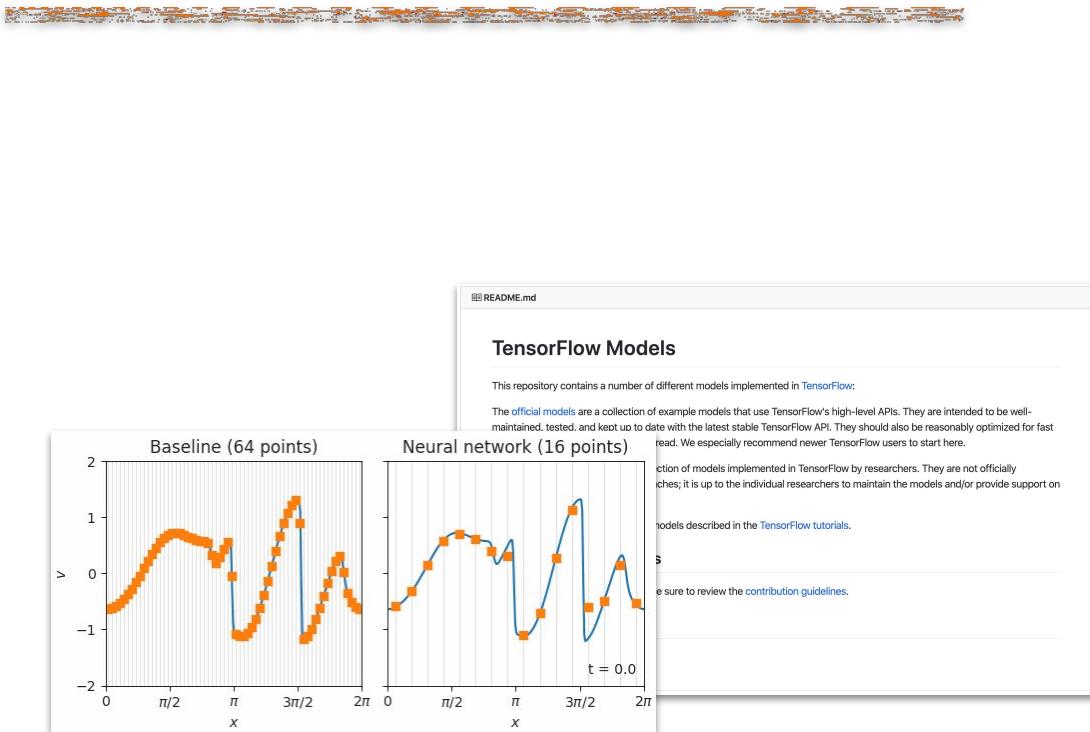


[Arxiv.org: Reinforcement Learning with Quantum Variational Circuits](#)



# Extensões para o Ecossistema TF

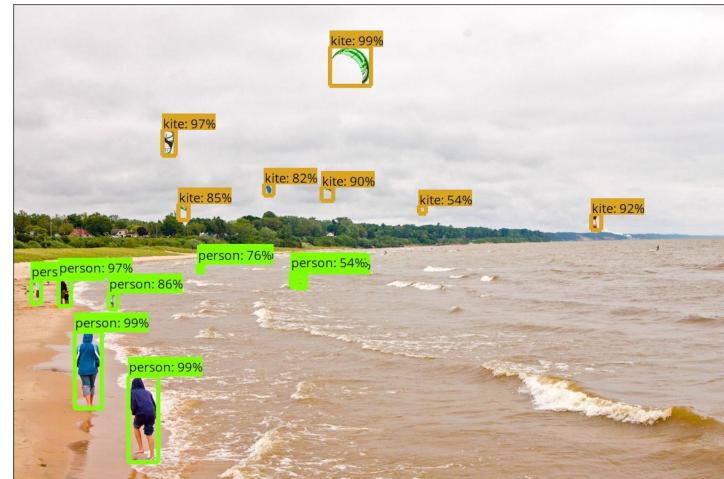
- TF Probability
- TF Graphics
- Mesh TensorFlow
- TF Model Garden
- TF Agents
- TF Text
- Sonnet
- Neural Structured Learning
- TF Quantum
- ...and more on tensorflow.org!





# Pesquisadores migrando para TF 2.x

Object Detection API



TF Recommenders (TFRS)

[TF Blog: TF 2 meets the OD API](#)

[TF Blog: Introducing TF Recommenders](#)



# TensorFlow Recommenders

End-to-end recommender systems

- Built on TensorFlow 2.0 and Keras.
- Flexible, multi-objective retrieval and ranking models.
- Easy path to production via TensorFlow Serving and approximate nearest neighbour retrieval.



<http://tensorflow.org/recommenders>



# TensorFlow

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Capacitando IA Responsável

# TensorFlow Cloud

## Flexibilidade Local com a Escalabilidade da Cloud

Python package with APIs to go from local debugging to distributed Cloud training

Minimal Setup - No changes to your model

```
(x_train, y_train), (_, _) = tf.keras.datasets.mnist.load_data()
x_train = x_train.reshape((60000, 28 * 28)).astype("float32") / 255

model = tf.keras.Sequential([
    tf.keras.layers.Dense(512, activation="relu", input_shape=(28 * 28,)),
    tf.keras.layers.Dropout(0.2),
    tf.keras.layers.Dense(10, activation="softmax"),
])
model.compile(optimizer="adam",
              loss="sparse_categorical_crossentropy",
              metrics=["sparse_categorical_accuracy"])
model.fit(x_train, y_train, epochs=10, batch_size=128)
```



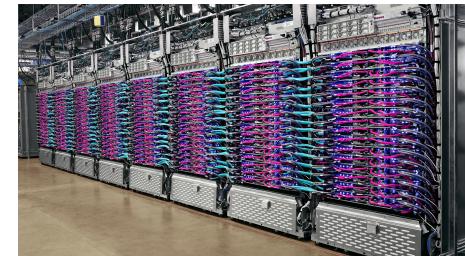
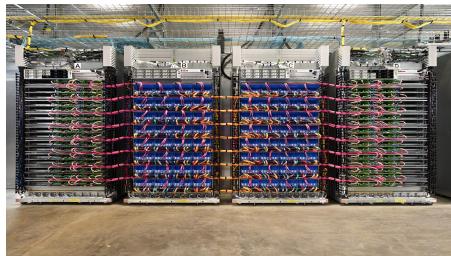
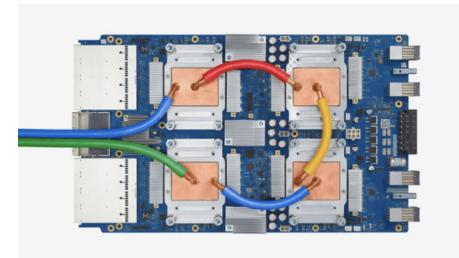
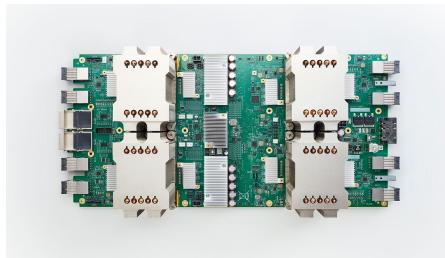
```
tfc.run(docker_image_bucket_name=gcp_bucket)
```



# TensorFlow 2.x com TPUs



+





# TensorFlow

## Ecosystem

From research

To production

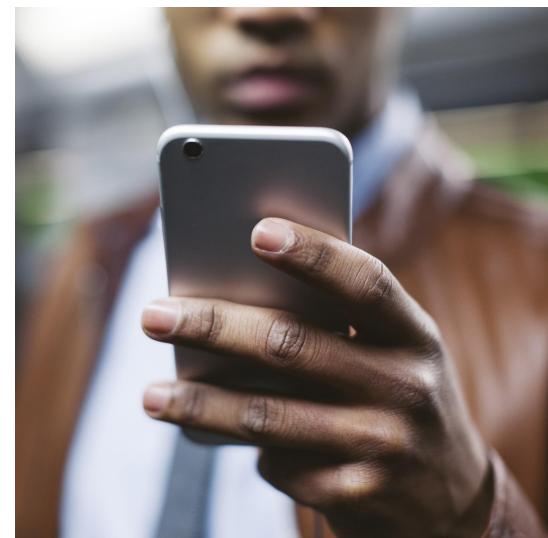
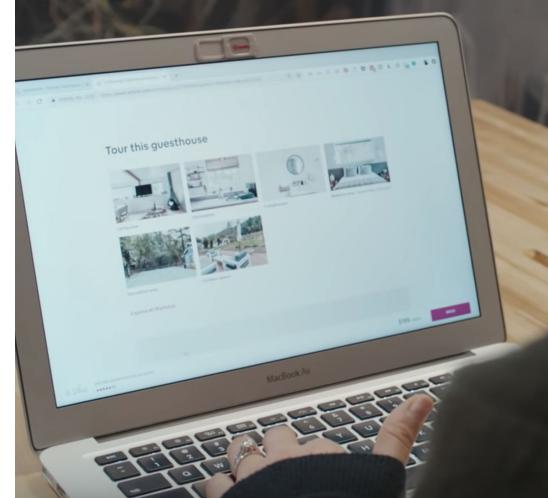
Implantando em  
todos os lugares

Capacitando IA Responsável



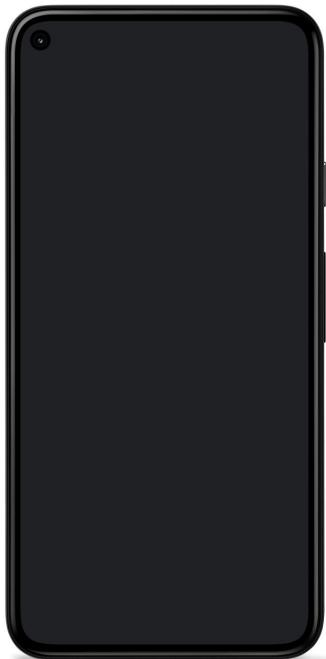
# TensorFlow Lite

- Baixa Latencia
- Execução offline
- Atenção a Privacidade





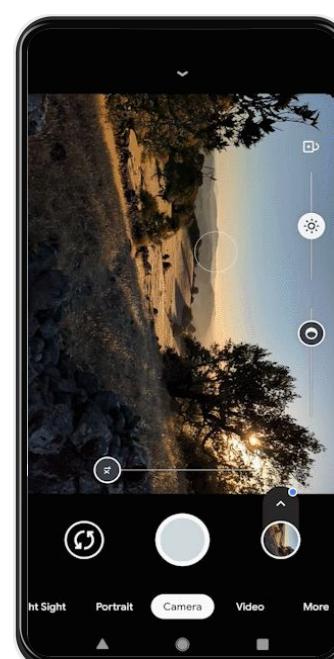
# Últimos on-device ML com TensorFlow Lite



Hold For Me nos  
Pixel 5/4a



OCR translation in  
Google Translate



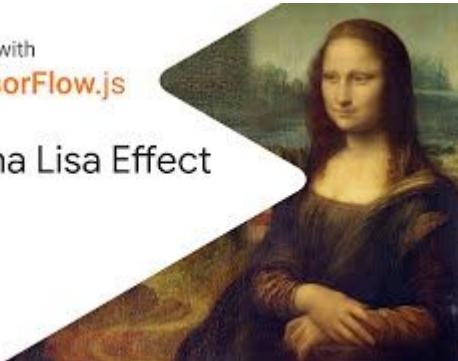
HDR+ on Pixel 4a



# TensorFlow.js : Treino + Deploy de ML no Navegador



The Mona Lisa Effect



Customizable  
augmented reality  
face masks



Touchless interfaces  
for gaming and  
kiosks



Thumbs Up to select



Scroobly: Motion  
capture for character  
animation





# TensorFlow

## Ecosystem

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todos os lugares

Capacitando IA Responsável



# O que é IA Responsável?



Recommended best  
practices for AI



Fairness



Interpretability



Privacy

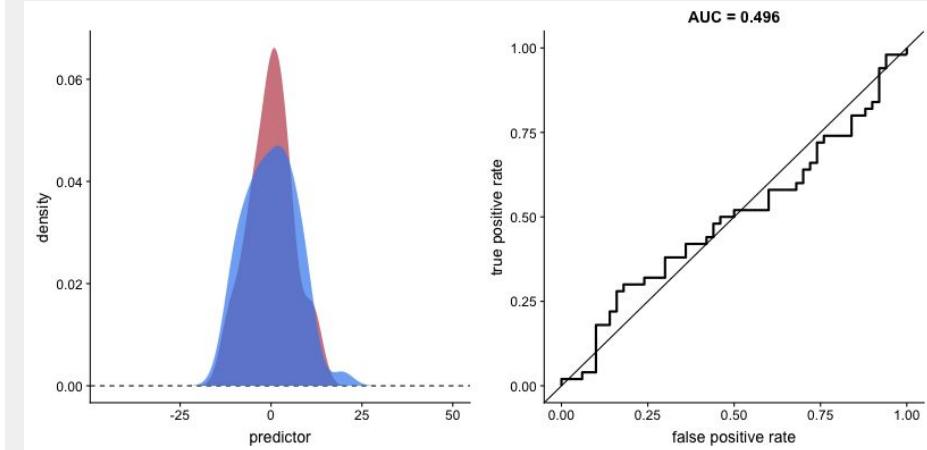


Security





# TF Privacy: Introduzindo novas análises





# Model Card Toolkit: Automatizando Relatórios de Transparência

## Model Card for Census Income Classifier

### Model Details

#### Overview

This is a wide and deep Keras model which aims to classify whether or not an individual has an income of over \$50,000 based on various demographic features. The model is trained on the UCI Census Income Dataset. This is not a production model, and this dataset has traditionally only been used for research purposes. In this Model Card, you can review quantitative components of the model's performance and data, as well as information about the model's intended uses, limitations, and ethical considerations.

#### Version

name: 36dea2e860670a74691b569558afe7

#### Owners

- Model Cards Team, model-cards@google.com

#### References

- interactive-2020-07-28T20\_17\_47.911887

### Considerations

#### Use Cases

- This dataset that this model was trained on was originally created to support the machine learning community in conducting empirical analysis of ML algorithms. The Adult Data Set can be used in fairness-related studies that compare inequalities across sex and race, based on people's annual incomes.

#### Limitations

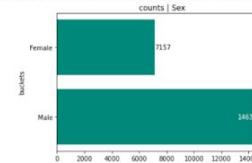
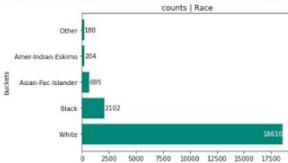
- This is a class-imbalanced dataset across a variety of sensitive classes. The ratio of male-to-female examples is about 2:1 and there are far more examples with the "white" attribute than every other race combined. Furthermore, the ratio of \$50,000 or less earners to \$50,000 or more earners is just over 3:1. Due to the imbalance across these attributes, we can see that our true negative rate seems quite high, while our true positive rate is quite low. This is likely due to the fact that we have a much smaller "white" and "male" sub-group, because there are even fewer female examples in the \$50,000+ earner group, causing our model to overfit these examples. To avoid this, we can try various remediation strategies in future iterations (e.g. undersampling, hyperparameter tuning, etc), but we may not be able to fix all of the fairness issues.

#### Ethical Considerations

- Risk: We risk expressing the viewpoint that the attributes in this dataset are the only ones that are predictive of someone's income, even though we know this is not the case.  
Mitigation Strategy: As mentioned, some interventions may need to be performed to address the class imbalances in the dataset.

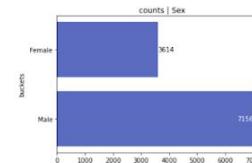
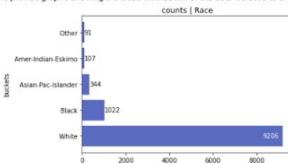
### Train Set

This section includes graphs displaying the class distribution for the "Race" and "Sex" attributes in our training dataset. We chose to show these graphs in particular because we felt it was important that users see the class imbalance.



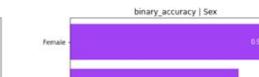
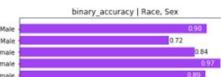
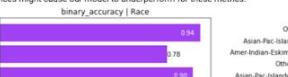
### Eval Set

Like the training set, we provide graphs showing the class distribution of the data we used to evaluate our model's performance.



### Quantitative Analysis

These graphs show how the model performs for data sliced by "Race", "Sex" and the intersection of these attributes. The metrics we chose to display are "Accuracy", "False Positive Rate", and "False Negative Rate", because we anticipated that the class imbalances might cause our model to underperform for these metrics.





# IA Responsavel com TensorFlow Toolkit

The screenshot shows the TensorFlow website's "Resources" section, specifically the "Responsible AI" page. The page features a large orange header with the text "Learn how to integrate Responsible AI practices into your ML workflow using TensorFlow". Below this, there is a brief description of TensorFlow's commitment to responsible AI and a 3D illustration of a computer system with neural network components. The main content area is titled "What is Responsible AI?" and includes five sections: "Recommended best practices for AI", "Fairness", "Interpretability", "Privacy", and "Security". Each section has an icon and a brief description.

Learn how to integrate Responsible AI practices into your ML workflow using TensorFlow

TensorFlow is committed to helping make progress in the responsible development of AI by sharing a collection of resources and tools with the ML community.

### What is Responsible AI?

The development of AI is creating new opportunities to solve challenging, real-world problems. It is also raising new questions about the best way to build AI systems that benefit everyone.

Recommended best practices for AI	Fairness	Interpretability	Privacy	Security
Designing AI systems should follow software development best practices while taking a human-centered approach to ML.	As the impact of AI increases across sectors and societies, it is critical to work towards systems that are fair and inclusive to everyone.	Understanding and trusting AI systems is important to ensuring they are working as intended.	Training models off of sensitive data needs privacy preserving safeguards.	Identifying potential threats can help keep AI systems safe and secure.

Learn more about Google's Responsible AI Practices ↗

[tensorflow.org/resources/responsible-ai](https://tensorflow.org/resources/responsible-ai)



# TensorFlow

## Ecosystem

Pesquisa

Produção

Implantando em todos os  
lugares

Capacitando IA Responsável

Alimentado pela Comunidade



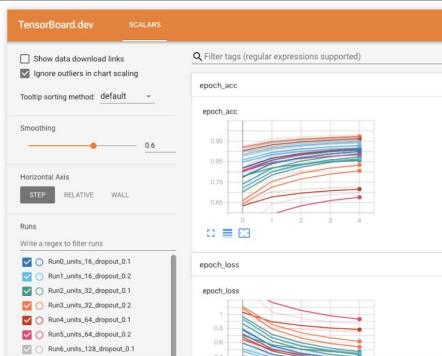
# ML colaborativa com TensorBoard.dev

TensorBoard.dev PREVIEW

Easily host, track, and share your ML experiments for free.

A managed TensorBoard experience that lets you upload and share your ML experiment results with anyone.

[Get started](#) [Example Colab](#)



Why TensorBoard.dev?



**Zero setup, free storage**

Get started easily with no deployment. Free storage up to 10 million data points.



**Familiar TensorBoard experience**

The TensorFlow visualization toolkit you know and love.



**Public, easy sharing**

Instantly share your TensorBoard ML experiment results with anyone, for publications, troubleshooting, and team collaboration.

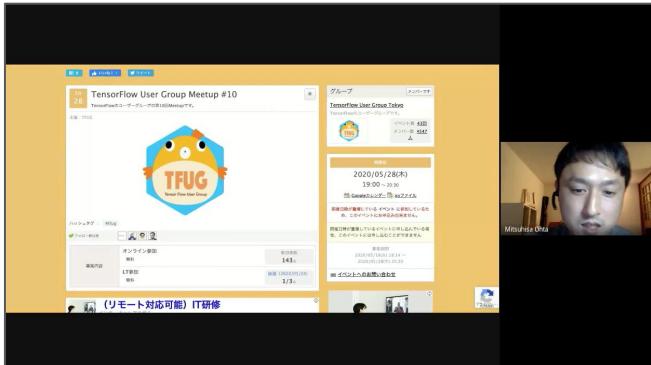


# Tradução e Localização

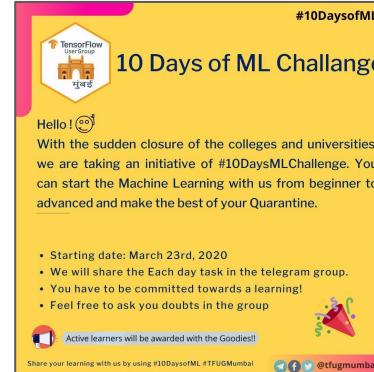
Traduções feitas pela comunidade em 13 línguas

Tradução de guias, tutoriais e documentação para Japanese, Coreano, e Chines Simplificado





**Tokyo, Japan**  
Reading Neural Network Paper meetup



#10DaysofML

## 10 Days of ML Challenge

Hello! 😊

With the sudden closure of the colleges and universities, we are taking an initiative of #10DaysMLChallenge. You can start the Machine Learning with us from beginner to advanced and make the best of your Quarantine.

- Starting date: March 23rd, 2020
- We will share the Each day task in the telegram group.
- You have to be committed towards a learning!
- Feel free to ask you doubts in the group

Active learners will be awarded with the Goodies!

Share your learning with us by using #10DaysofML #TFUGMumbai

@tfugmumbai



## TensorFlow.js Community Show & Tell #2

Demos that give you super powers by using Machine Learning in JavaScript :-)  
Let's hack together!

Add to calendar, invite a friend, and tune in on:

Sat 30th May, 5pm JST  
[jasonmayes.com/live](https://jasonmayes.com/live)

Hosted by Jason Mayes, Developer Advocate for TensorFlow.js.

#MadeWithTFJS

**Kolkata, India**  
100 Days of ML Challenge

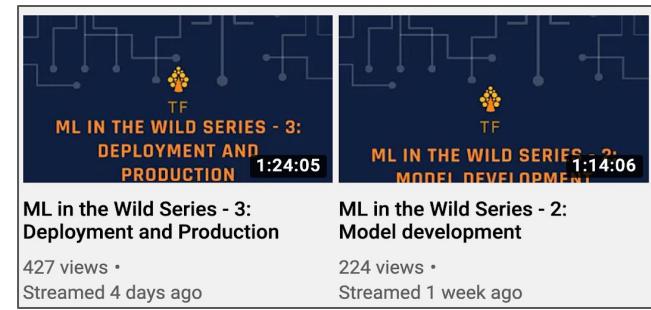
**Melbourne, Australia**  
TensorFlow.js Show & Tell



**Korea**  
Celebration of 50K members



**Shanghai and Zhuhai, China**  
TensorFlow Dev Summit 2020 Viewing Party



**Turkey**  
Online event series



Get Involved

# TensorFlow User Groups



80 TFUGs em todo o mundo

- Por exemplo, TFEverywhere Brasil organizado pelo TFUG Goiás e São Paulo

Interested in creating one? Email  
[tfug-help@tensorflow.org](mailto:tfug-help@tensorflow.org)



Get Involved

# Google Developer Experts

The screenshot shows a video conference interface. At the top, there's a red 'REC' button, a profile picture of a woman, and the text 'Charmi Chokshi is presenting'. To the right, there's a list of participants with their names and unique IDs. The main content area has a title 'Classical Programming vs ML' and two side-by-side boxes. The left box is titled 'Classical Programming' with a red icon and contains the text: 'Explicit instructions from programmer' and 'Improvements come from better algorithms'. The right box is titled 'Machine Learning' with a yellow icon and contains the text: 'System learns patterns from data' and 'Improvements may also come from additional data'. At the bottom of the slide, there are small icons for 'Experts' and 'Google Developers'.

REC Charmi Chokshi is presenting  
201951094 MONIKINDERJIT S...  
and 61 more  
M 0:13 5:50 PM You  
K  
... Charmi Chokshi 201851059 KISHAN RAJ...  
T D  
Technical Committee 201851038 DEVANSH A...  
S S  
201952234 SIDHARTH K. 201951134 SAMEER A...  
R P  
201951122 RAHUL DHA... 201951110 PARMAR DE...  
N  
201952021 NARAYAN KALANI

## Classical Programming vs ML

Classical Programming	Machine Learning
Explicit instructions from programmer	System learns patterns from data
Improvements come from better algorithms	Improvements may also come from additional data

Experts Google Developers

## 167 ML GDES no mundo

- Em 2020, deram 961 techtalk/workshops e 620 videos/articles
- Colaboraram em projetos como [Background Stylizer](#) e [AI vs COVID](#),



Education

# Certificação em TensorFlow Development

Parabéns aos 1K+  
desenvolvedores de 50+  
países que passaram!



## Topics:

- Basic ML programming concepts in TensorFlow
- Text Classification
- Computer Vision
- Sequences and Prediction

\*Stipends available

[TensorFlow.org/certificate](https://TensorFlow.org/certificate)

[developers.google.com/learn/certificates](https://developers.google.com/learn/certificates)



Muito Obrigado!

#TFEverywhere2021

