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UE : Veille Technologique

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IVY

The Unified Machine Learning Framework





Ø1

Introduction

Ø2

Motivation

Ø3

Marché

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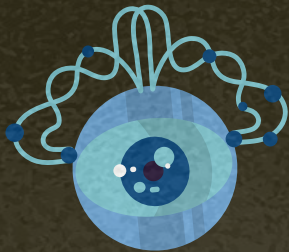
Solution

Ø5

Démo

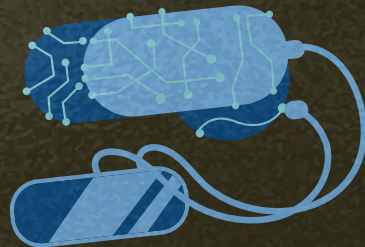
Ø6

Conclusion



Introduction

- Conversion de code automatique entre frameworks.
- Un framework qui en supporte plusieurs.

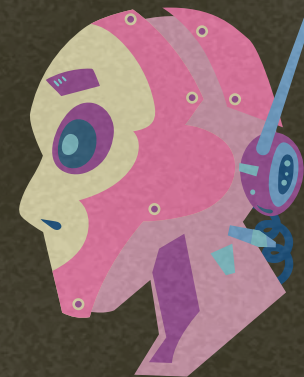
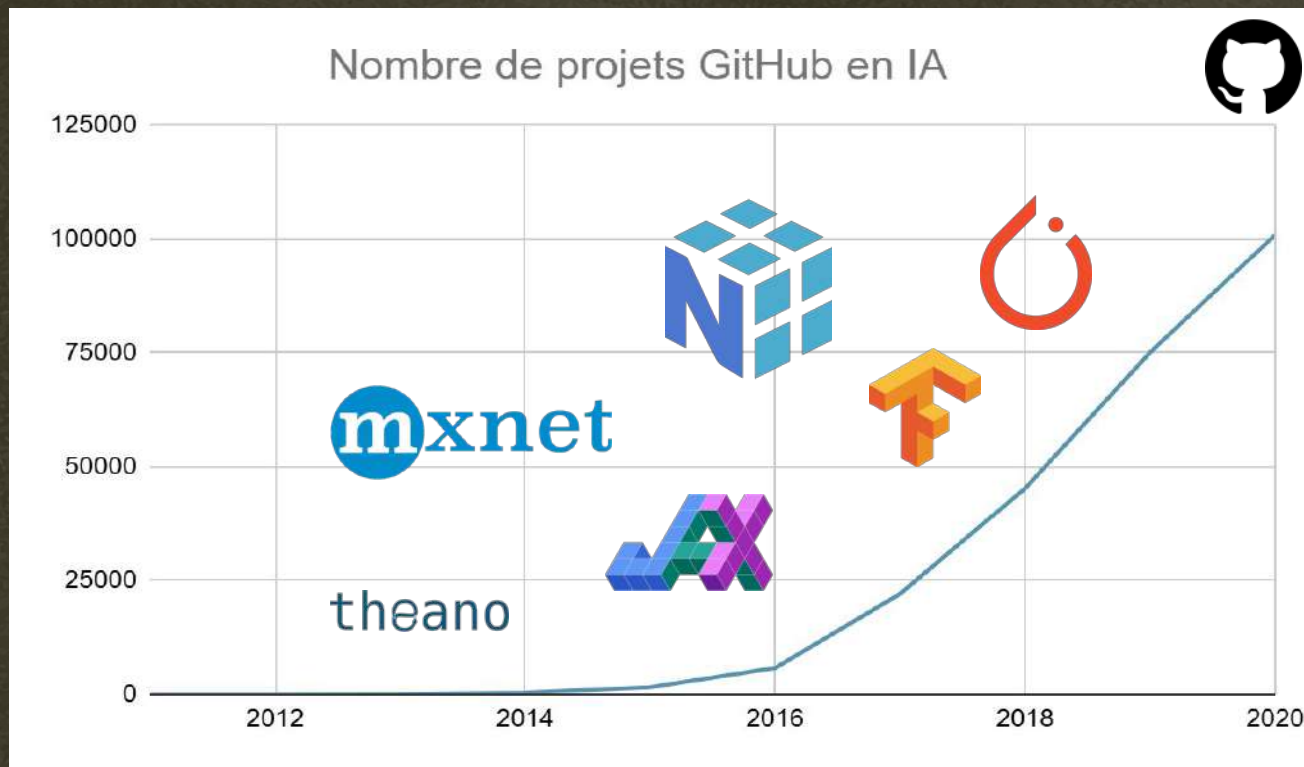




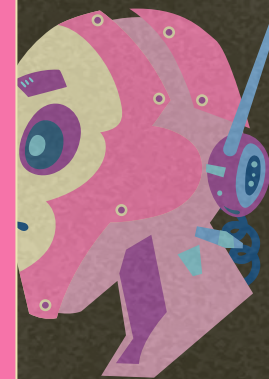
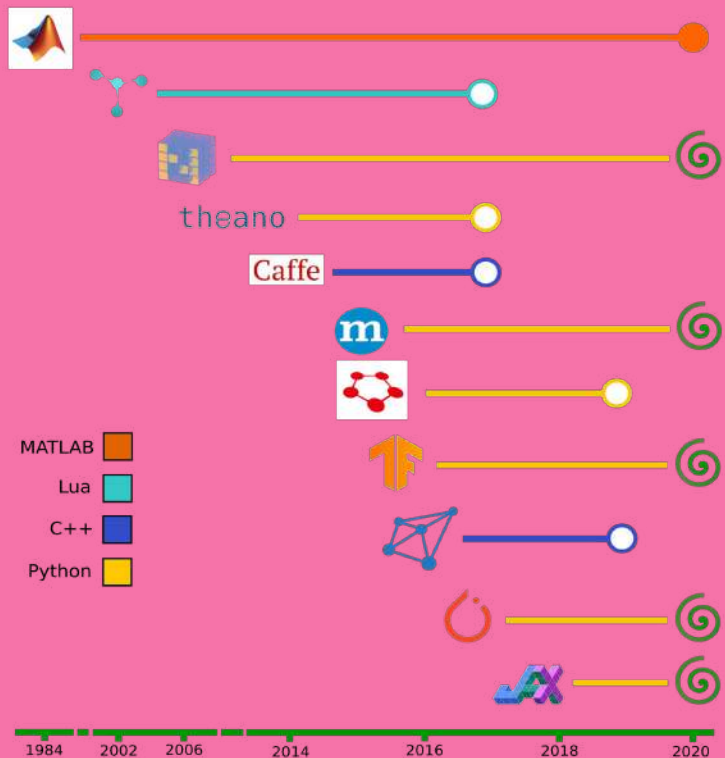
MOTIVATION

Problèmes abordés

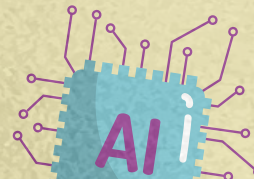
Évolution des frameworks de ML





Évolution des frameworks de ML



Problème de développement en ML





TensorFlow

	magneta
	dopamine
	sonnet

MXNet

	gluon
	author code

JAX

	acme
	author code

PyTorch

	geometric
	kornia
	lightning



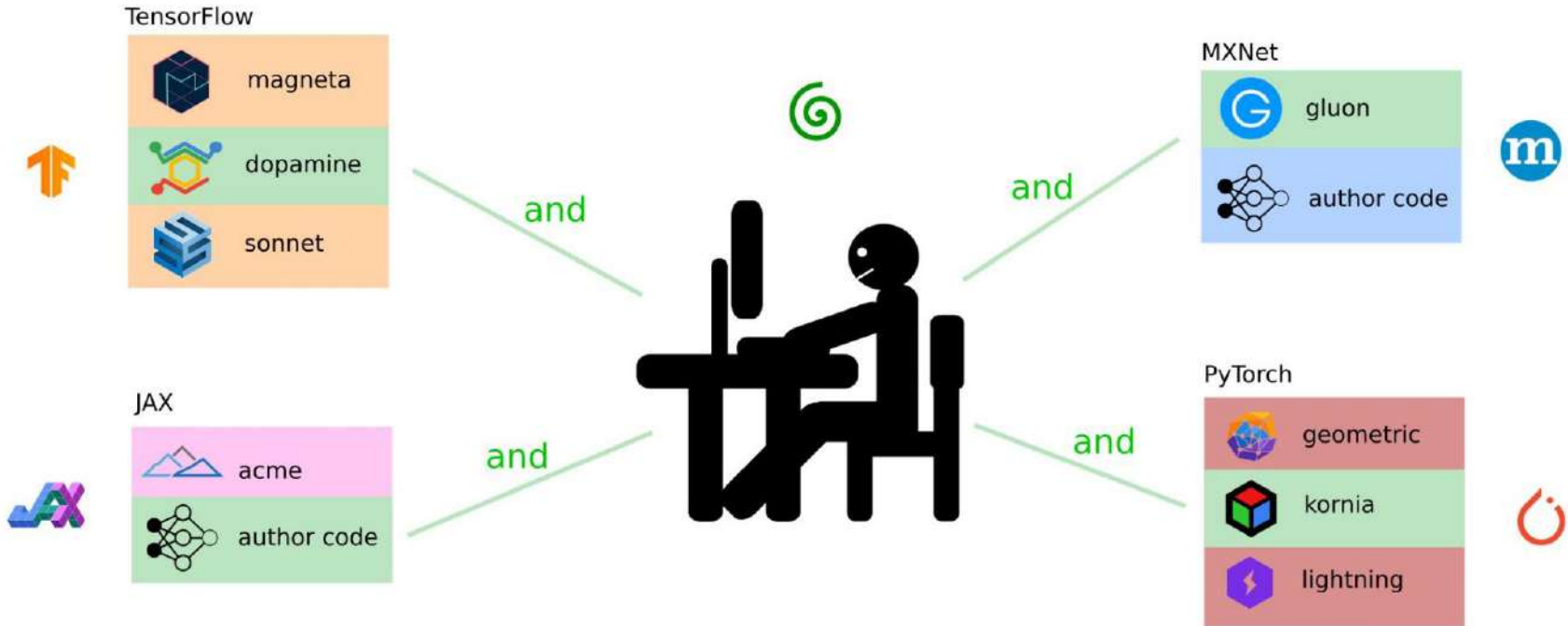
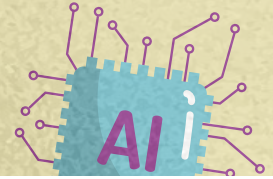
or


or

or



or

Problème résolu par Ivy





MARCHÉ ET ACTEURS



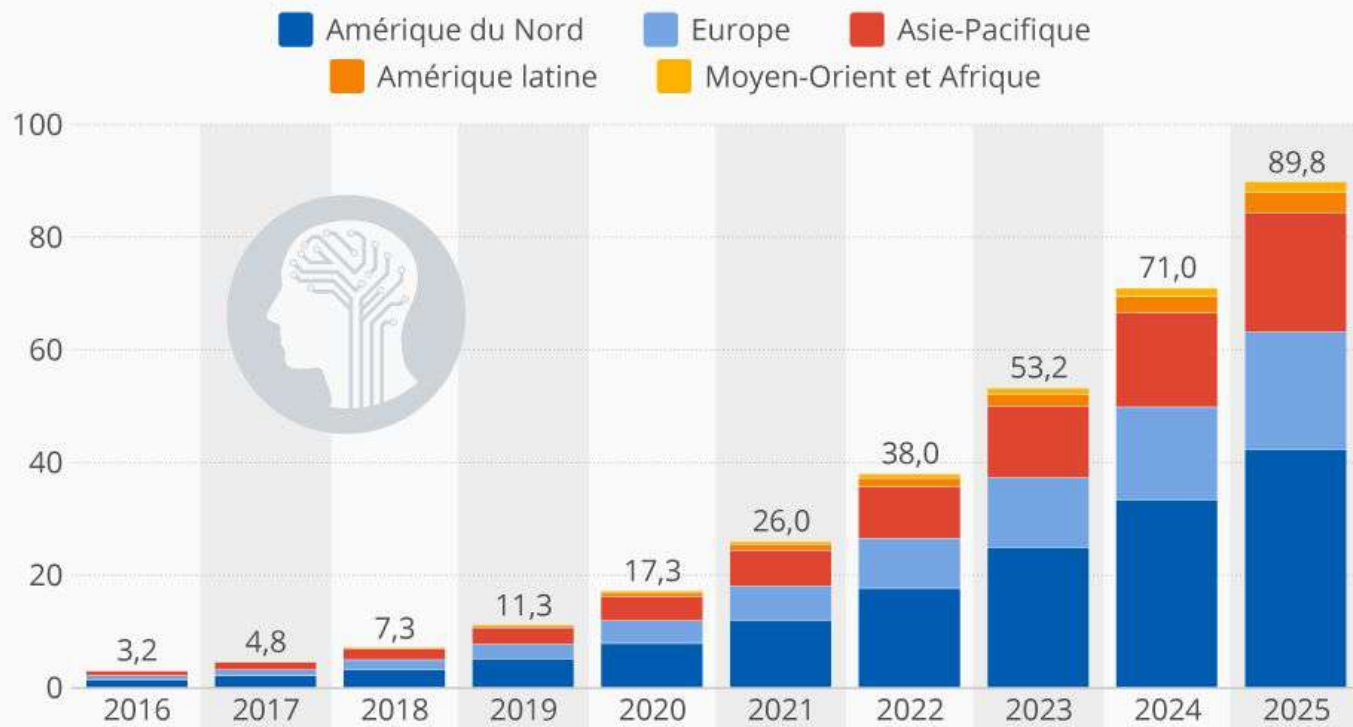
Un marché en pleine croissance

Secteurs Santé, finance, commerce électronique, transport.

- Adoption rapide dans l'industrie Manufacturière et l'énergie.

L'IA, un marché qui vaut des milliards

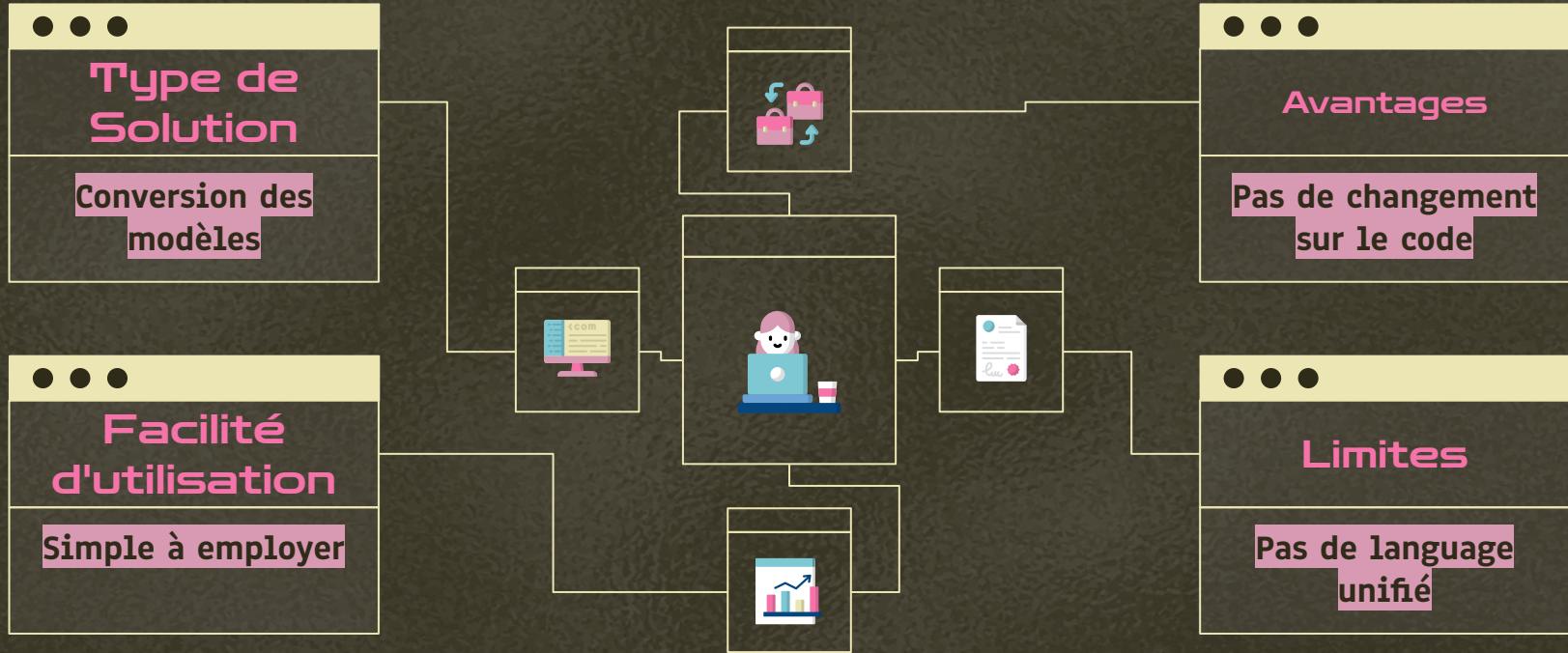
Chiffre d'affaires généré par l'intelligence artificielle dans le monde, en milliards de dollars *



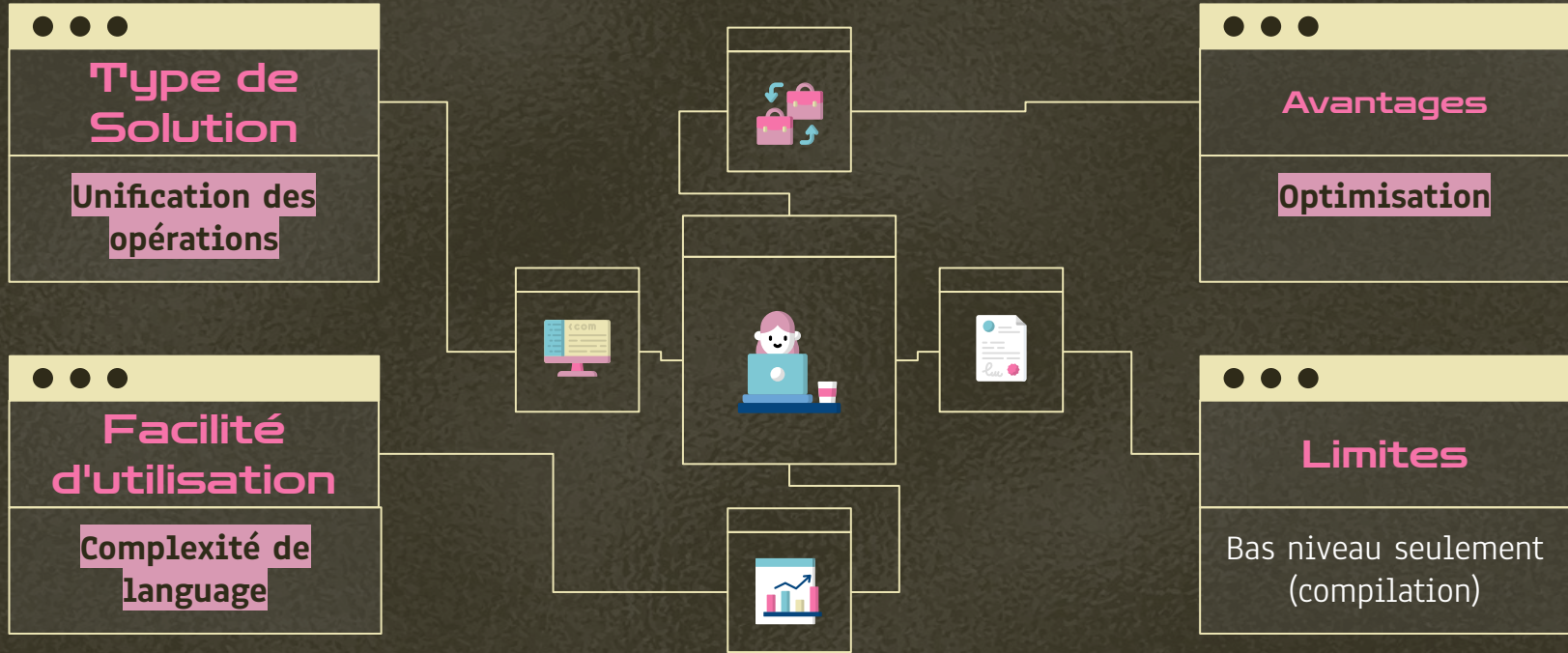


Consortium for Python Data API standards

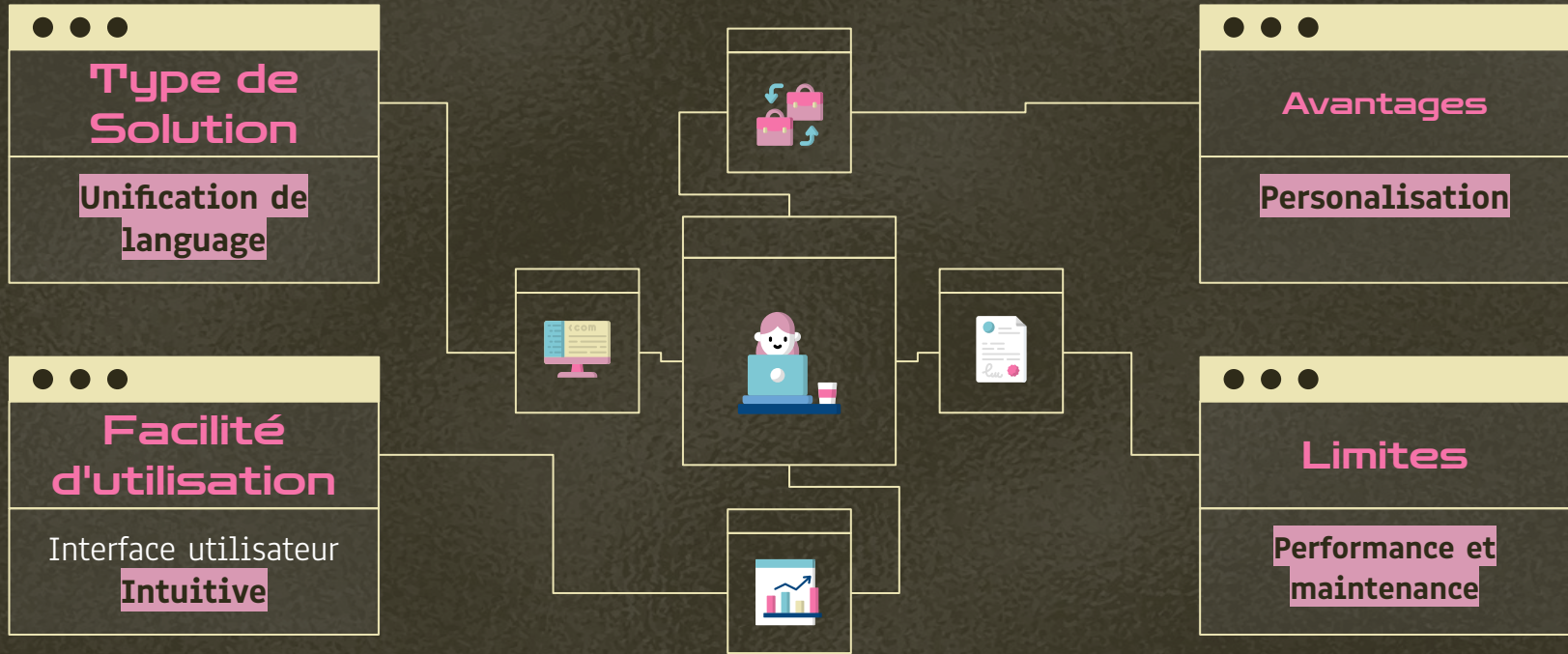
Concurrent : Θ NNX



Concurrent : MLIR



Comparaison avec Ivy



HOW STANDARDS PROLIFERATE:
(SEE: A/C CHARGERS, CHARACTER ENCODINGS, INSTANT MESSAGING, ETC.)

SITUATION:
THERE ARE
14 COMPETING
STANDARDS.

14?! RIDICULOUS!
WE NEED TO DEVELOP
ONE UNIVERSAL STANDARD
THAT COVERS EVERYONE'S
USE CASES. YEAH!



SOON:

SITUATION:
THERE ARE
15 COMPETING
STANDARDS.

SOLUTION

Principes de mise en œuvre et architecture

Net = ivy.to_ivy_module (perceiverIO)

Net = ivy.compile_graph ()

Net = ivy.to_backend ('torch')



[deepmind / deepmind-research](#)
[deepmind-research / perceiver /](#)

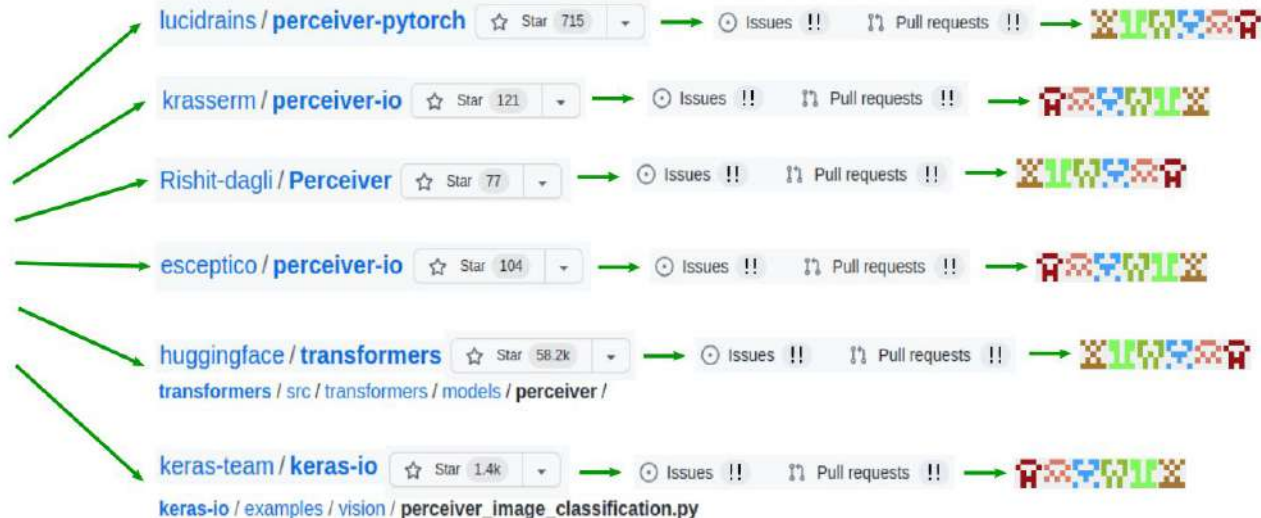
Perceiver IO: A General Architecture for Structured Inputs & Outputs

Andrew Jaegle, Sebastian Borgeaud, Jean-Baptiste Alayrac, Carl Doersch, Catalin Ionescu,

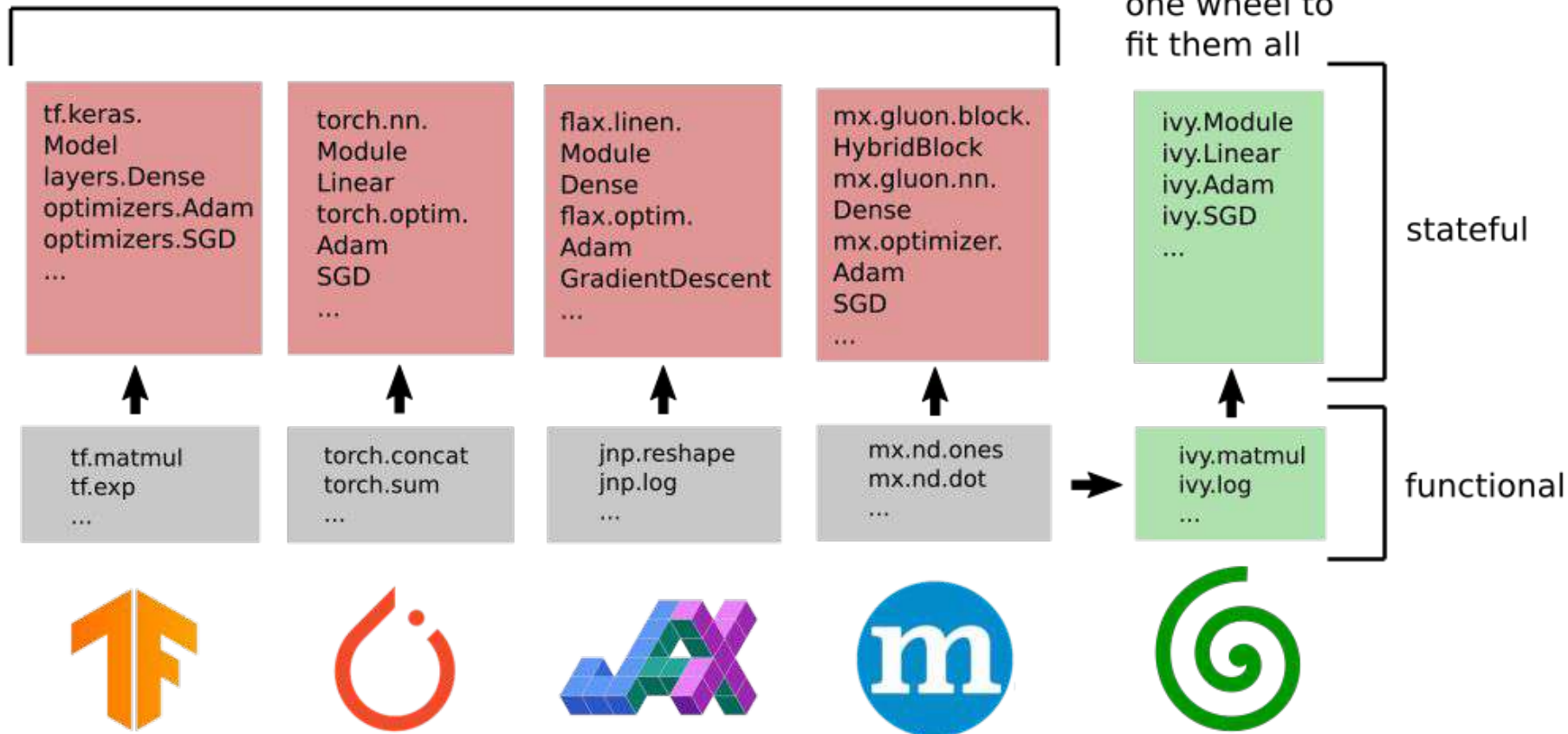
David Ding, Skanda Koppula, Daniel Zoran, Andrew Brock, Evan Shelhamer, Olivier Hérouf,

Matthew M. Botvinick, Andrew Senior, Oriol Vinyals, Joto Carreira

DeepMind



re-invented wheels



-  `np.clip`
-  `mx.nd.clip`
-  `tf.clip_by_value`
-  `torch.clamp`
-  `jax.numpy.clip`

framework-specific backends

`ivy.clip`

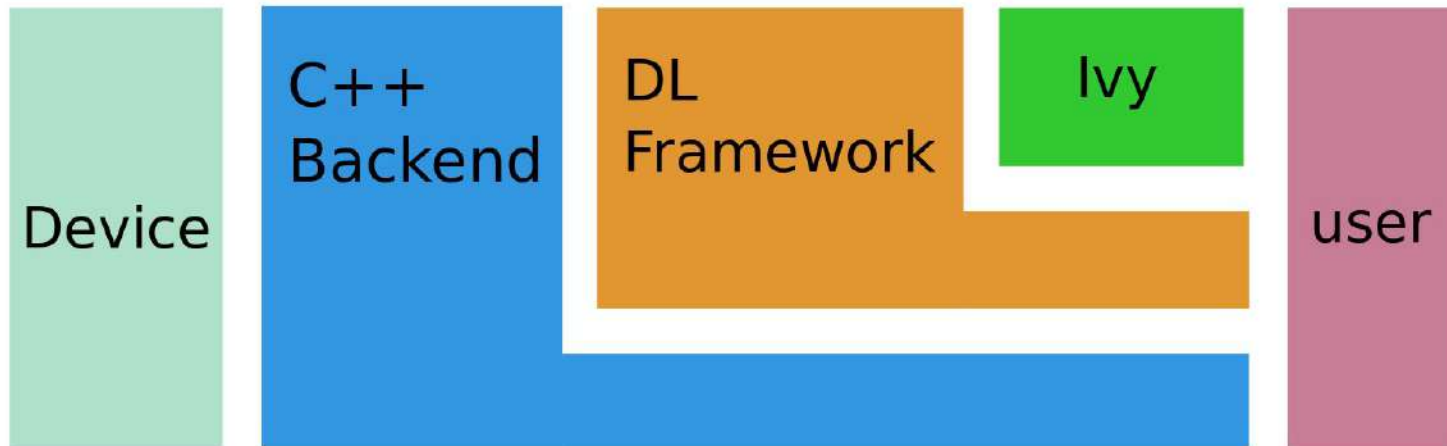
one function, accepting all tensor types

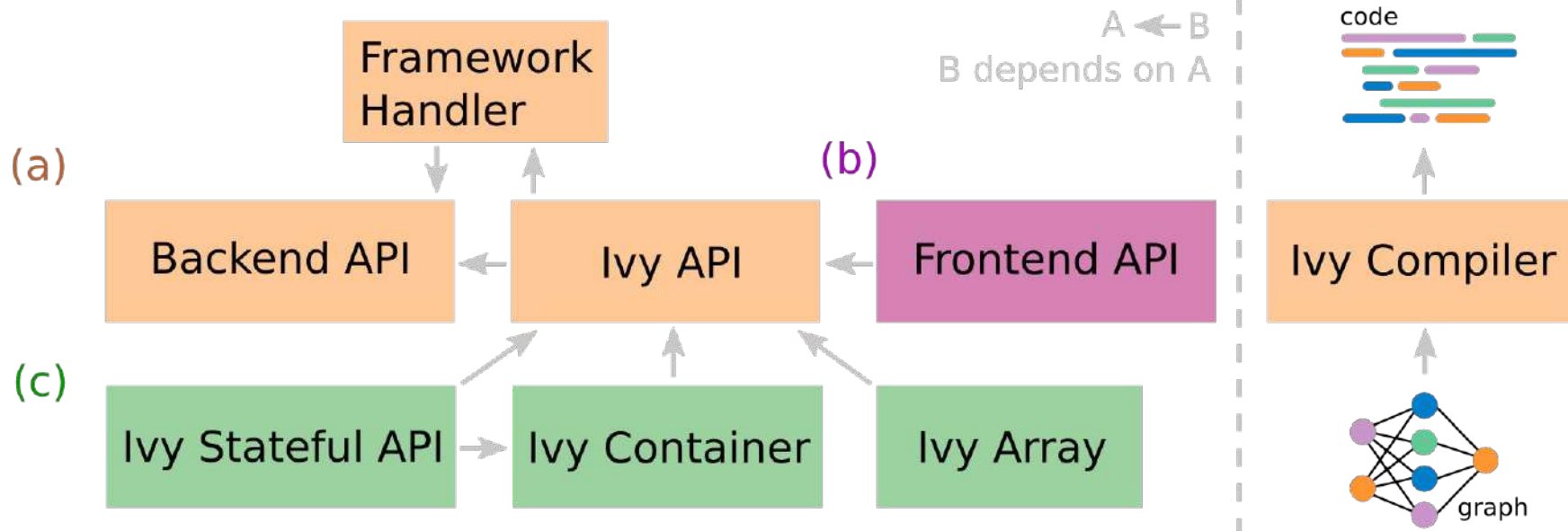
unified **syntax** and **call signature**

Ivy graph compiler means **no overhead**

- `ivy.np.clip` 
- `ivy.mx.nd.clip` 
- `ivy.tf.clip_by_value` 
- `ivy.torch.clamp` 
- `ivy.jax.numpy.clip` 

framework-specific frontends





(a) Building Blocks

(b) Ivy as a code Converter

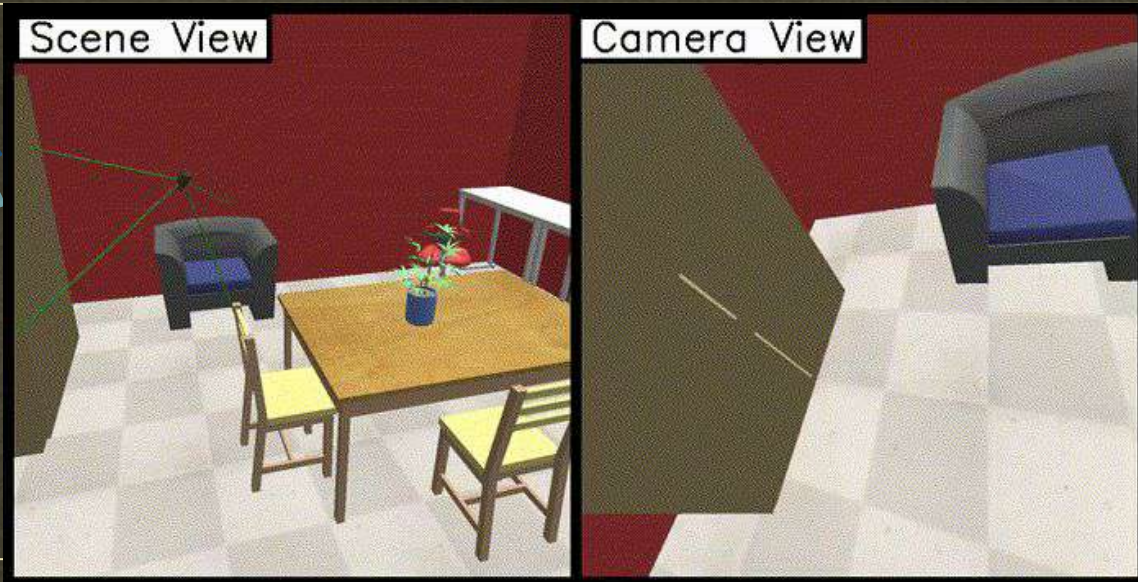
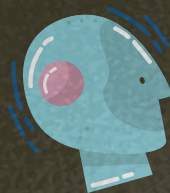
(c) Ivy as a Framework



DÉMÉ

Débruitage d'image avec Ivy et Kornia

Exemple Ivy Mech



En utilisant Ivy, on a réalisé une démo ou une plante est déplacé dans une salle, la caméra a été programmée à suivre la plante dynamiquement avec `ivy_mech.target_facing_rotation_matrix`

Pourquoi Ivy ?

Efficacité

Simplify le développement,
réduit les coûts



Interopérabilité

Interface unique pour tous
les frameworks

Communauté

Évolution basée sur des
besoins réels, OpenSource

**Auriez-vous des
questions ?**

