universidade de aveiro

Milestone 3: Prototype

ML/AI model evaluation platform

Plataforma de avaliação de modelos ML/AI

Course: "Projeto em Informática"
Supervisor: Prof. Mário Luís Pinto Antunes

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Context

The need to handle **large amounts of data** and advances in processing technologies have led to the mass development of intelligent systems.

Machine Learning (ML) algorithms are often applied to optimise **multiple real-life scenarios**, leading to cost saving and increased productivity.

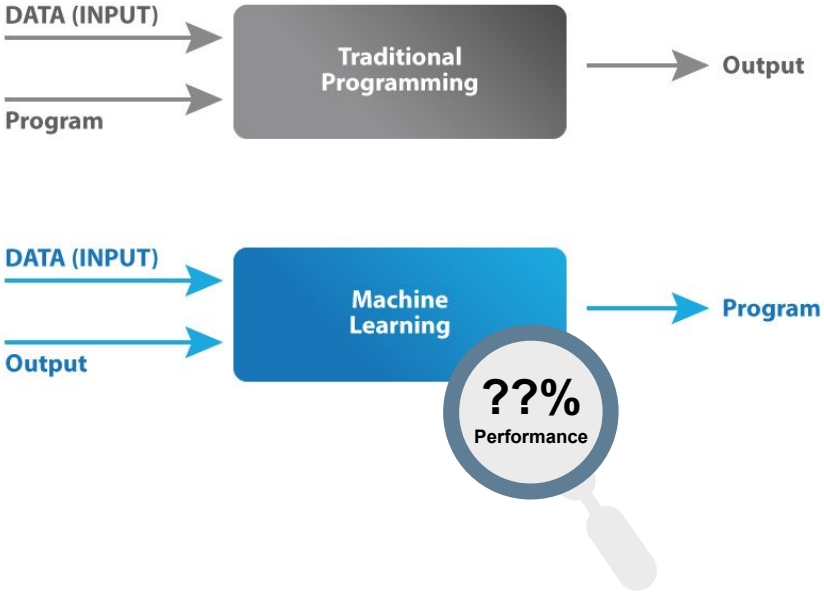
ML/AI examples

ChatGPT

GitHub Copilot

That's why promoting a better ML/AI education is so important!

Our product



MepML

Concept:
ML/AI model evaluation system, based on performance metrics provided by teachers.

The models are trained by users, who then **just upload the results**.

The server side performs a quick **analysis** of the models.

Adapted from: Advani, V. (2020). *What is Machine Learning? How Machine Learning Works and future of it?* [online]. GreatLearning. https://www.mygreatlearning.com/blog/what-is-machine-learning

Main Functionalities

Professors will be able to:

- Group students into classes
- Add new metrics
- Create exercises
- View students' results
- Access students' code

Students will be able to:

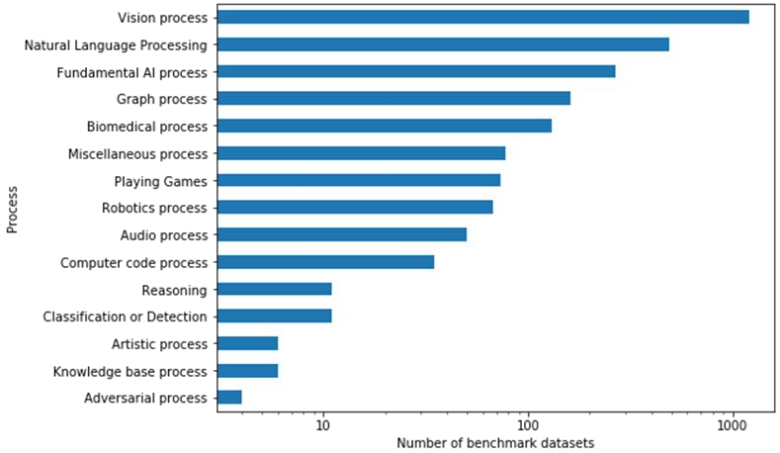
- See public exercises
- See assigned exercises
- Download exercise related content
- Upload code and results
- View results table

Related Work

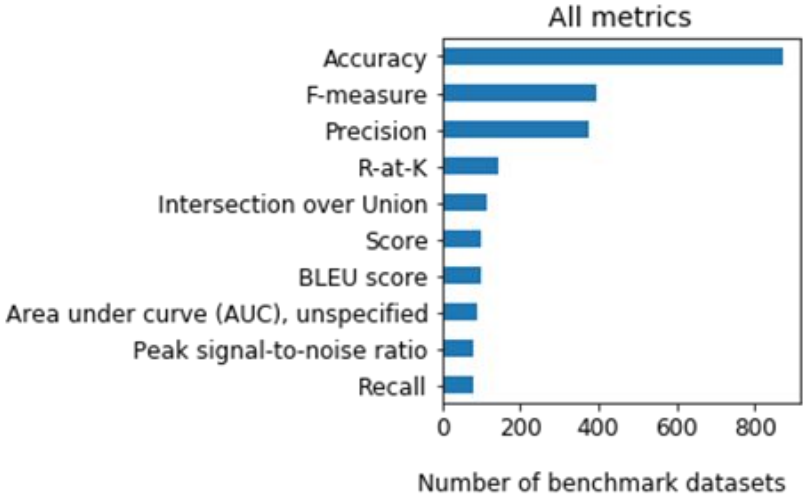
	Kaggle	CodaLab	Weights and Biases	Machine Hack	MepML
Professor can create exercises and students can join them	✓	✓	✗	✗	✓
Define exercise visibility	✓	✓	✗	✗	✓
Exercise Leaderboard	✓	✓	✗	✓	✓
Define exercise deadline	✓	✓	✗	✓	✓
Define exercise maximum number of tries	✗	✓	✗	✗	✓
Add/remove/import students to a restricted group	✗	✗	✗	✗	✓
Add new and reuse Metrics	✗	✗	✗	✗	✓
Use UA IdP to authenticate students and professors	✗	✗	✗	✗	✓
Check assigned exercises	✓	✓	✓	✓	✓
Download exercise related content	✓	✓	✓	✓	✓
View Students Code and results	✓	✗	✗	✗	✓
Students and professor user types	✗	✗	✗	✗	✓

Most Used metrics

We are taking advantage of some Python libraries, such as **Scikit-learn**.



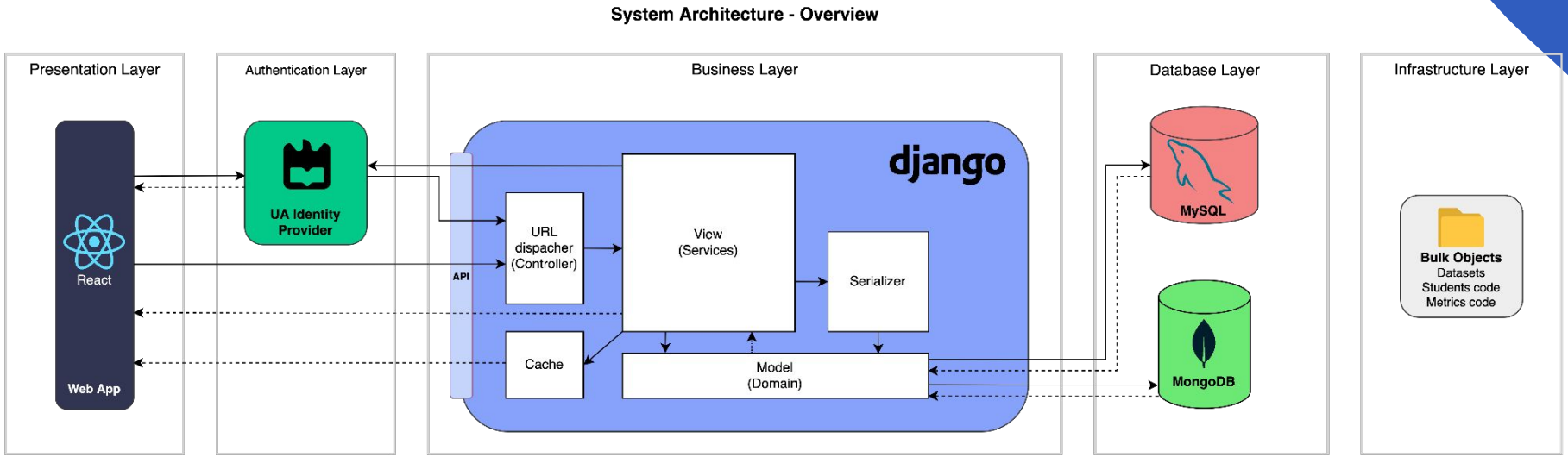
Number of benchmark datasets per higher level process



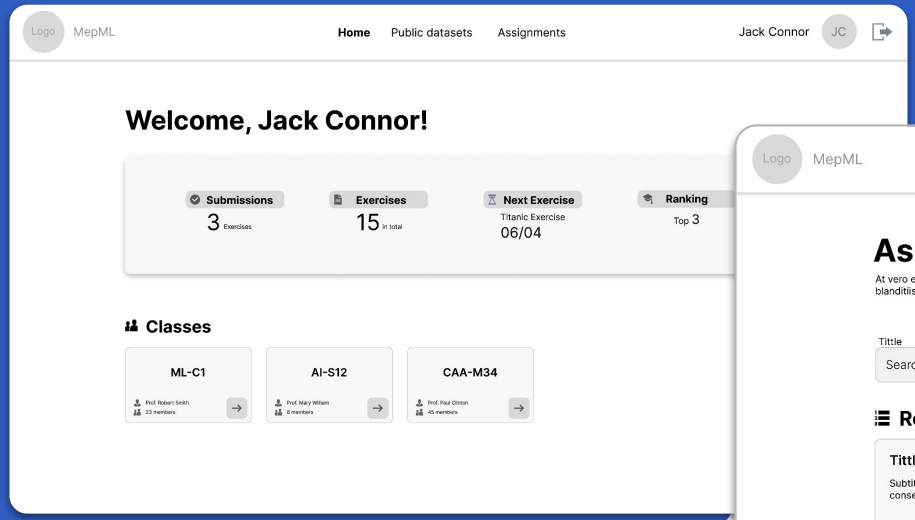
Top 10 most frequently reported performance metrics

Source: Blagec, K., Dorffner, G., Moradi, M., & Samwald, M. (2020). *A critical analysis of metrics used for measuring progress in artificial intelligence*. doi:10.48550/ARXIV.2008.02577

System Architecture



Mock-up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MepML
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Public datasets
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Jack Connor
JC
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Submissions
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Exercises
Exercises
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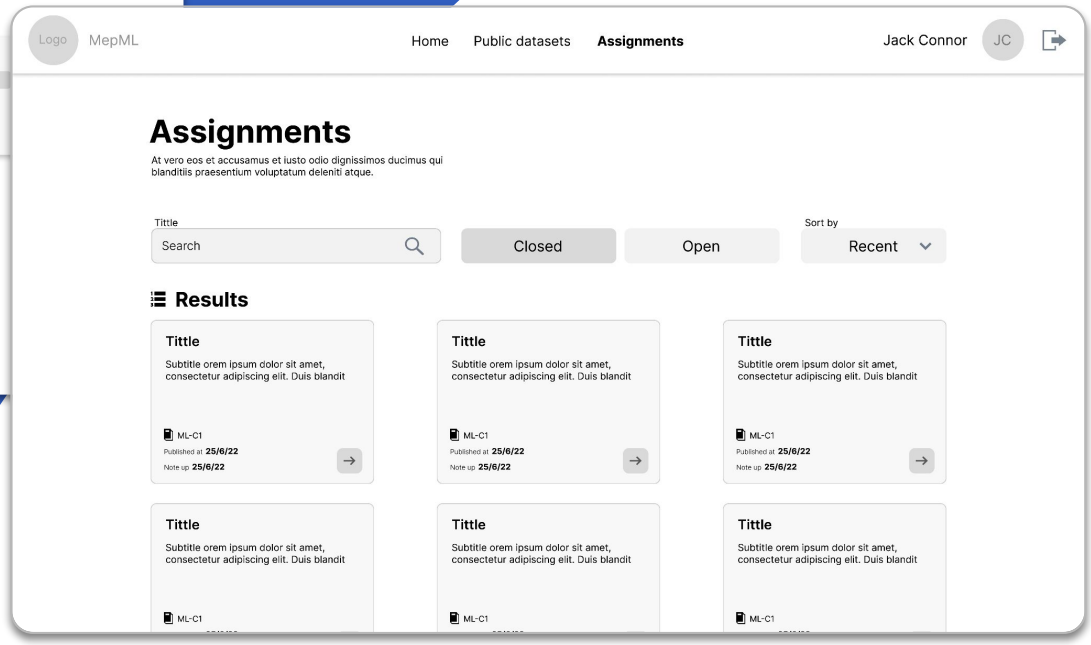
06/04
Ranking
Top 3
Classes
ML-C1
AI-S12
CAA-M34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ML-C1
Published at 25/6/22
Note up 25/6/22

Prototype

Simulate the user experience and thereby give a clear idea of the main functionalities of the website.

MepML

https://mep-org.github.io/Prototype/

Next steps

- Usability tests
- Continue backend development
- Continuous deployment to Google Cloud
- Continue technical report writing

Resources

- https://slidesgo.com/theme/retato-slideshow#position-38&results-1357
- https://storyset.com
- https://www.pexels.com/
- https://www.utm.mx/~caff/doc/OpenUPWeb/index.htm
- https://www.kaggle.com
- https://wandb.ai/site
- https://machinehack.com/
- https://codalab.lisn.upsaclay.fr
- https://online.visual-paradigm.com/pt/
- https://www.analyticsinsight.net/top-5-model-evaluation-metrics-for-machine-learning-projects/
- https://blog.idexlab.com/state-of-the-art-example
- https://towardsdatascience.com/4-data-science-competition-platforms-other-than-kaggle-6d1795ff46a

Relevant paper:

Alex Serban, Koen van der Blom, Holger Hoos, and Joost Visser. 2020. **Adoption and Effects of Software Engineering Best Practices in Machine Learning**. In *Proceedings of the 14th ACM / IEEE International Symposium on Empirical Software Engineering and Measurement (ESEM)*, ACM . DOI:https://doi.org/10.1145/3382494.3410681

AI research has much to improve, hence the need for our platform.