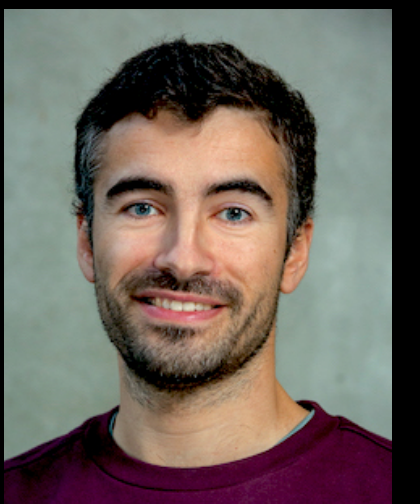


Introduction: Tutorials and Final Project

Release Engineering for Machine Learning Applications (CS4295)

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Luís Cruz <L.Cruz@tudelft.nl>
REMLA 2021



Agenda

Tutorial classes

Tutorial Project

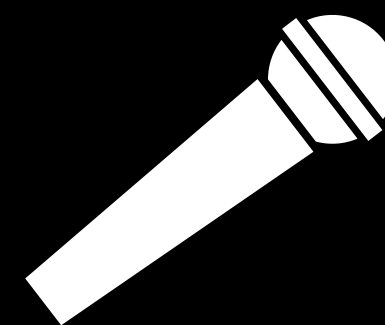
Final Project

Project Outputs

Steering Meetings

Final announcements

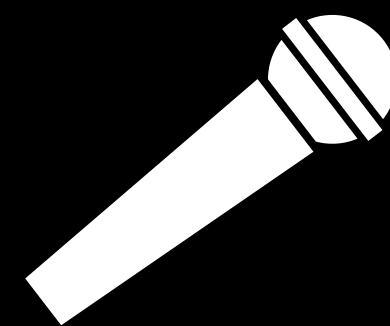
Question: Why did you choose REMLA?



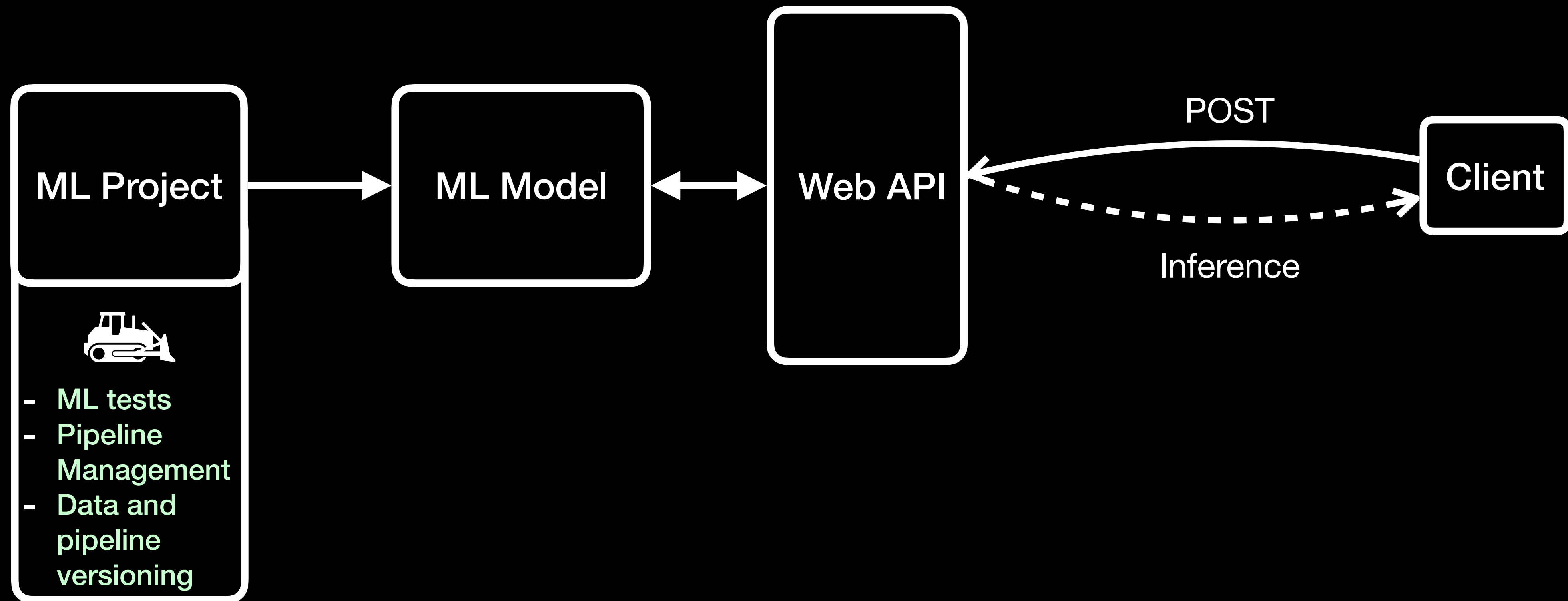
Tutorials

- 4 tutorial classes. Weeks 1–4.
- Practice concepts taught in the lectures.
- Improve an **existing basic ML application** (tutorial project).
 - Decision tree to detect spam in text messages.
1) Collect data, 2) preprocess; 3) train; 4) serve.
 - <https://github.com/luiscruz/SMS-Spam-Detection>
- Focus on a different angle of the application to make it production-ready.
 - Deployment
 - Docker, Kubernetes
 - ML testing, ML Pipeline management (DVC)
 - Define Metrics, Instrument App, Logging

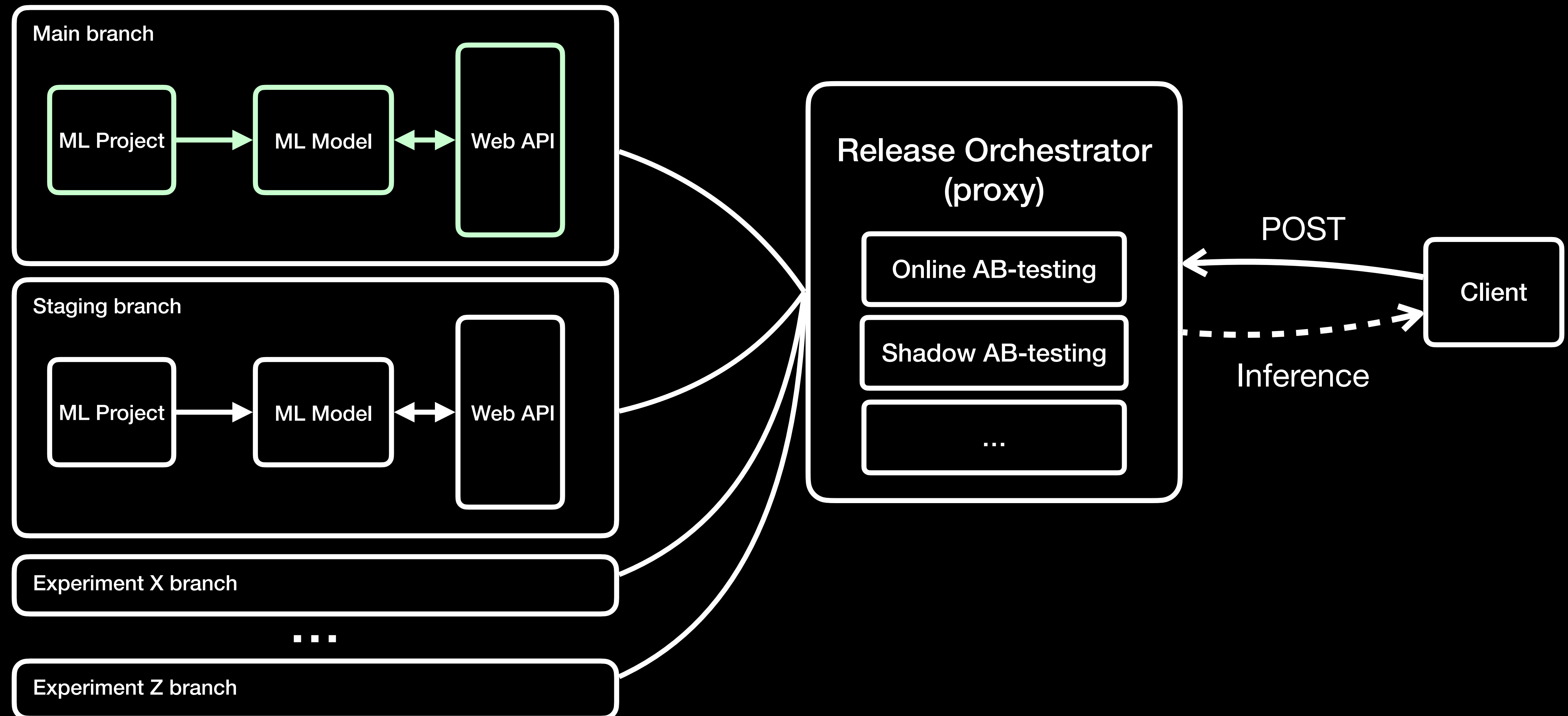
Question: How have you previously deployed your ML applications?



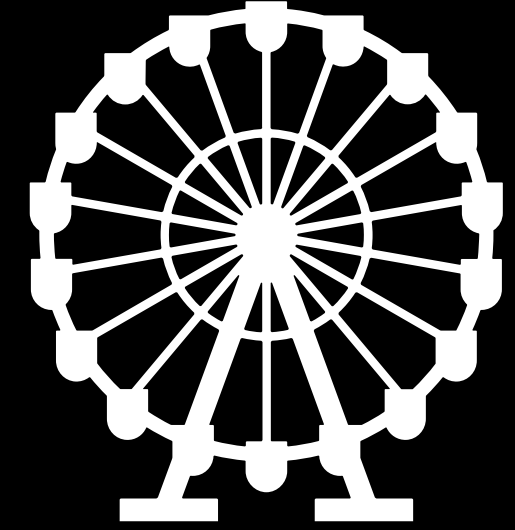
Tutorial Project



Tutorial Project



Final Project Description

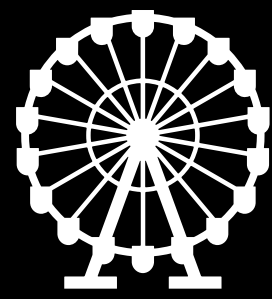


- Based on the ML application developed in the lab classes, **propose a solution** that will improve an engineering process of the application.
 - Idea needs to be **relevant, novel, and creative.**
- **The best projects generalise** to other ML applications as well. E.g., as a tool, framework, or learning materials.
 - It can be specific to **Release Engineering**. E.g., implement “shadow mode” model releases; create a tool to monitor “shadow mode” models, etc.
 - Or specific to **ML Engineering**. E.g., create a framework that promotes the usage of Scikit-learn Pipelines for both data processing and model training; create a diffing tool for ML artefacts; create a catalog of ML testing examples.

Final Project Description

- Groups of pairs. (Max. of 12 groups)
- **≈5 weeks** (weeks 5–10)
- Weekly **steering meetings**. Feedback and formative assessment.
- **Rubrics** are currently work in progress and posted **online**:
 - <https://se.ewi.tudelft.nl/remla/rubrics.html>
 - Used for both formative and summative assessment

Project Outputs



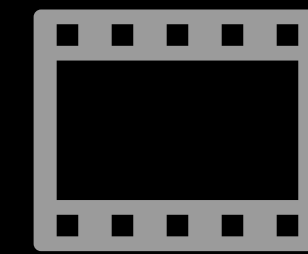
Project Codebase

- Solution on top of the **lab project**.
- Improve **Release or ML Engineering** processes.
- **Publish a tool** that helps the community.



Essay

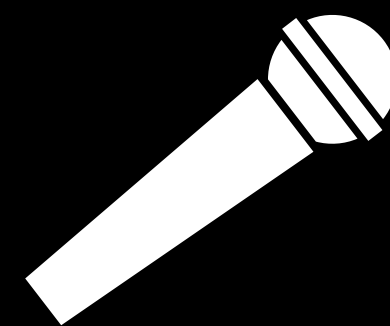
- Clearly explain the underlying **engineering problem**.
- Explain and **motivate** the solution.
- Class on week 5 about **essay best practices**.



Presentation with Q&A

- Pre-recorded **video**.
- Quick demo.
- Discussion.
- Used to assess **differences between teammates**.

Question: What were the main engineering issues in your previous ML projects?

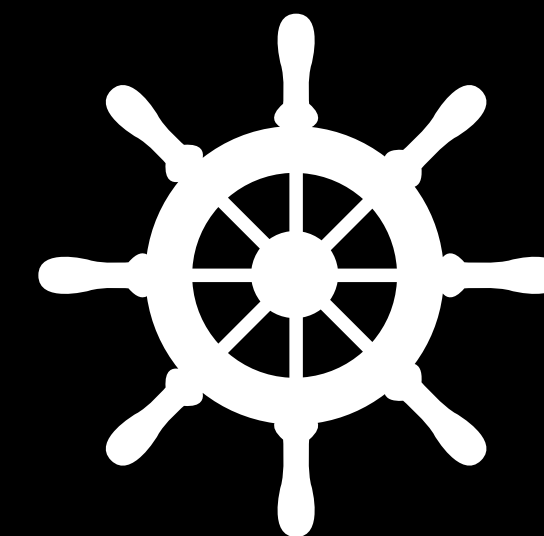


Examples of Projects

- Come up with your own ideas.
 - Meaningful and useful.
 - Use the tutorial project and/or your own data pipeline.
- Evaluate and extend an existing tool:
 - mllint: <https://github.com/bvobart/mllint>
 - dslinter: <https://github.com/markhaakman>
- Investigate unexplored KPIs:
 - Use energy-efficiency KPIs to affect release behaviour.
 - Adopt a different release pattern.
 - Create a drag and drop tool for release selection.



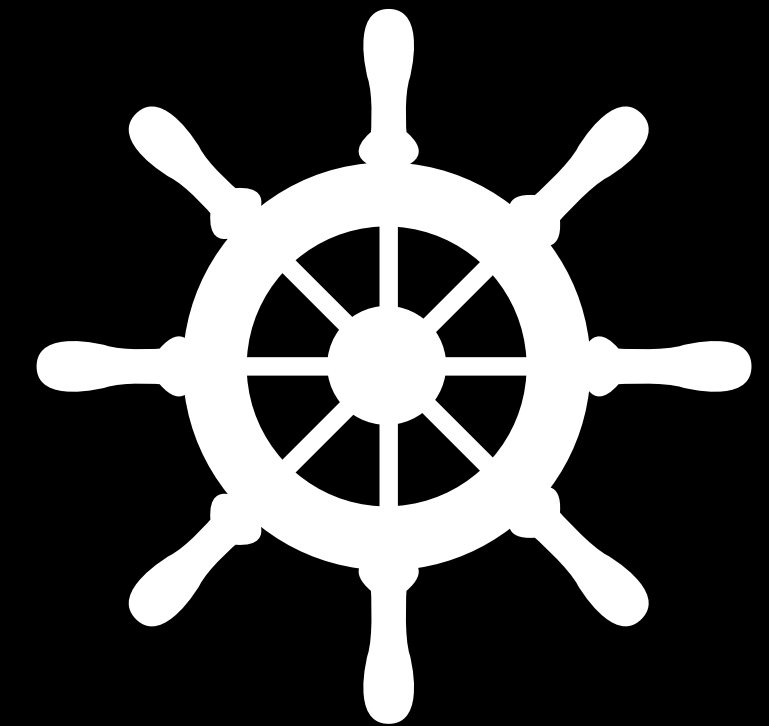
```
→ ml_project git:(master) remla run
```



⚠ Steering Meetings will help you be important to give you feedback on your ideas, before you set yourselves into the implementing a solution. ⚠

Steering Meetings

- One of the teachers will **meet every week** with each team (weeks 5–10).
- Provide **feedback** (formative assessment).
- Help understanding the **potential** of a given proposal/idea.
- Making sure students are **on track** and don't feel lost.



Guest Lecture on SE4ML best practices

Announcement



- On May 3 (week 3, class 7), we will have a guest lecture by **Alexandru Serban**.
- Researcher at the **Leiden University** and **SIG**.
- Author of
 - **Adoption and effects of software engineering best practices in machine learning**. ESEM 2020. (Preprint in REMLA's website.)
 - **Catalog of Engineering best practices for Machine Learning**.
<https://se-ml.github.io/practices/>