

darkmachines

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Why darkmachines ?

The darkmachines initiative is a result of the workshop:

Accelerating the Search for Dark Matter with Machine Learning

from 15 Jan 2018 through 19 Jan 2018



Our objective :

We aim to ***explore, and to encourage, the utilization of state-of-the-art machine learning algorithms for research in dark matter physics and astronomy.*** Our objective is to accelerate the identification of Dark Matter with a ***multidisciplinary*** approach:

bringing together expertise in experimental and theoretical particle physics, astrophysics, astronomy, statistics and Machine Learning.

We like to generate ***a new open research community.***

We plan a ***whitepaper, follow-up workshops, a webpage and a mailing list*** for the DM-ML community.

We plan to work on/organize **problems/challenges**

What we are and what we are not?

Darkmachines likes to provide a **forum and infrastructure**:

- Meetings (CERN indico project, categories for challenges, general meeting once per month)
 - Webpage (www.darkmachines.org to find us)
 - Workshops (Next darkmachines likely in Trieste in 2018)
 - Challenges (see next slide)
 - Slacks (for communication in challenges)
 - Software developed for the challenges might be public via a darkmachines github repo.
 - Data gathering (try to gather data for our projects, work on data-base + visualisation)
 - white-paper (white paper about the project)
 - contact with machine learning experts (invite experts to present news in ML)
 - Contact with DM experts (invite experts to present news on Dark Matter)
 - List of interested people & contact with possible collaborators etc.
- We are open, we have almost no hierarchy, we are flexible

Meetings

- Invite Dark Matter experts to present new developments
 - Invite Machine Learning experts to present new developments
 - Invite people presenting the paper submitted to arxiv last week using ML for Astrophysics/BSM/DarkMatter research
- + Presentations about new challenges
- + Presentations about milestones (new on arxiv) of ongoing challenges

Challenges / Projects

A challenge is a scientific project related to Dark Matter and Machine Learning.

Think about a research question which you think could be solved/approached with state-of-the-art Machine Learning methods

Our January workshop resulted in about 10 challenges

We asked some of you to coordinate those.

Question: How should people subscribe ? Email to darkmachines or session coordinators ?

Challenge/Projects

A “challenge/project” is defined via :

Project: What is the goal ?

Protection: Is the challenge open (everybody sees what is ongoing?) or closed (you agree to not scoop your collaborators)

Dataset: Is there open data ? Can data be generated ?

People: Who likes to work on this challenge

Communication: Weekly or biweekly challenge meetings + e.g. slack

Publication: The goal is that a challenge finally appears on arXiv or e.g. a Kaggle challenge

Coordination: 1-3 challenge organisers (they also define the author list)

(new challenges can be proposed, challenges can be closed if no interest etc.)

Today

- What is darkmachines ?
- Brief presentation of a few projects
- Feedback ? Ideas ? → Let us know !
- You like to help / participate ? → Let us know !