

mlpack is a fast, flexible machine learning library that is written in C++ and built on the Armadillo linear algebra library and the ensmallen numerical optimization library.

The project aims to provide fast, extensible implementations of cutting-edge machine learning algorithms to users using the C++ API, or via a number of popular languages (Python, Julia, R, Go) and the command-line interface (CLI).

PROJECT STATISTICS:

- Github stars (3800+)
- Forks (1400+)
- Number of contributors (200+)
- Years active (13+)
- Citations (240+)

USE CASES

Telecommunications and Astrophysics:

- **RLNN:** A software developed by NASA that uses mlpack to implement a cognitive communication engine. It aims to improve communications with satellites and the ISS. The software has been integrated with the space-ground system (SCaN) located at NASA Glenn Research Center.
- **AperC4:** An algorithm that uses mlpack to find galaxy clusters using non-parametric methods applied to catalogs of galaxies generated from multi-colour CCD observations.

Robotics / Biomedical:

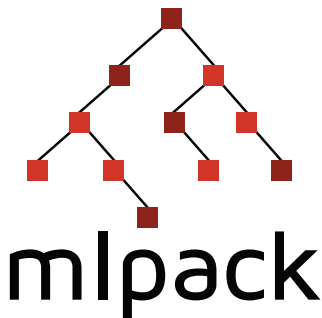
- **MagicFlock:** A robotic framework dedicated to drone swarms that allows users to fly drones inside a simulator. It uses the mlpack library to provide predictive and reactive models for drones to achieve the swarming behavior.
- **iMOKA:** A biomedical software that uses mlpack to enable the analysis of sequencing data to generate robust classification models or explore specific genetic elements associated with disease etiology.
- **Vespucci:** An image analysis software that uses mlpack to perform data-processing operations, such as filtering, normalization, baseline correction. The software is capable of analyzing spectroscopic images, X-ray diffraction, in addition to surface-enhanced Raman spectroscopies.

PLANNED FEATURES

- + Optimize mlpack for lightweight installation and deployment, reducing compile times and dependency overhead for use cases including embedded and low-resource applications.
- + Provide initial GPU support for mlpack via the Bandicoot project: This will enable mlpack algorithms to train models on GPU machines and provide diverse deep learning functionalities.
- + Improve the accessibility and discoverability of mlpack's documentation and tutorials, to ease onboarding for new users.
- + Add support and utilities for handling non-numeric data (image data, text data, etc.)

PROJECT NEEDS

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| C++ lead Engineer | 1.5 year of dev time |
| Technical writer / content creator | 6 months of dev time |
| Revamping documentation | 6 months of dev time |
| Enabling initial GPU support | 1 year of dev time |
| Integration support with other toolkits, languages, and environments | 6 months of dev time |
| Optimize mlpack's algorithms for speed and memory usage | 1+ years of dev time |



For more information on mlpack, including our governance structure and project roadmap, please visit

<https://www.mlpack.org/>

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