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Surround AI Version 1.0



*Light-Weight Machine Learning Framework*

*for Data Scientists*

**

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“At its core, Surround is a lightweight framework for serving machine learning pipelines in Python. It is designed to be flexible, easy to use and to assist data scientists by focusing them on the problem at hand rather than writing glue code.”

How Does it Work?

First, the input data is processed by three stages which can be manipulated by the users using the config, the first stage involves processing the raw input data to meaningful data.

The surround data is an object which includes useful information which is carry forwarded from one stage to another. Users can also add additional variables for transforming the input data as per their preference. Mainly variables are used for error handling, time required for execution, transformation analysis etc.

Finally, the processed data is implemented in the final stage. In the final stage the surround data is altered to achieve the desired result. Each stage in the process is designed for performing relational activities with the other stages, like the first stage prepares the data which is processed in the last stage of the process.

Running the Files Using Surround

Once the appropriate version of python is installed in the OS, users can use the surround framework implemented in python code. For that, firstly users must write the code in python and save the code in .py which is an extension for python. For executing the code using surround users need to use the following command:

For instance, the name of the file containing the code is myproject.py. The file needs to be compiled first then executed.

# **Project Resources**

## Links to key project files.

More information about this project can be found on the GitHub page repository.

Here are the links to the project resources:

<https://github.com/a2i2/surround>

<https://deakin365.sharepoint.com/sites/Surround-AI-Tribe-Squad2>

<https://github.com/Shibi8/Surround_AI_Suqad_2/>

# **Revision History (What’s New)**

The Latest Source release **2.21.0**was released on 24 February 2019

For other previous reviewed released please click on the link to access the history of releases

<https://mirrors.edge.kernel.org/pub/software/scm/git/>

# **Project Info**

## What is the project?

### Name:

Surround AI

### Purpose

To create a flexible and easy to use machine learning pipelines in python.

Help Data Scientists and software engineers to deploy AI Products in the Surround Framework.

### License

Surround is released under a [BSD-3](https://opensource.org/licenses/BSD-3-Clause) license.

## Who is working?

### Project Leader

SCOTT BARNETT

### Example Implementation Team

### Dipesh Bhatt (English Premier League Match Prediction)

### Sai Krishna Kesineni (Apple shares Price Prediction)

### 

### Sponsor Applied Artificial Intelligence Institute

## How can you find more information?

You can find most of the information on surround on the GitHub Repo by accessing the following link:

<https://github.com/a2i2/surround>

## Key Contacts

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## Releases Info

### Current Release

The Latest Source release **2.21.0**was released on 24 February 2019

### Last Reviewed Release

For other previous reviewed released please click on the link to access the history of releases

<https://mirrors.edge.kernel.org/pub/software/scm/git/>

### Other Releases

Surround Development team are working progressively to provide a better solution and is under heavy development.

# 

# Architecture of Surround

The below mentioned components are in this library that can be utilized to build surround solution.

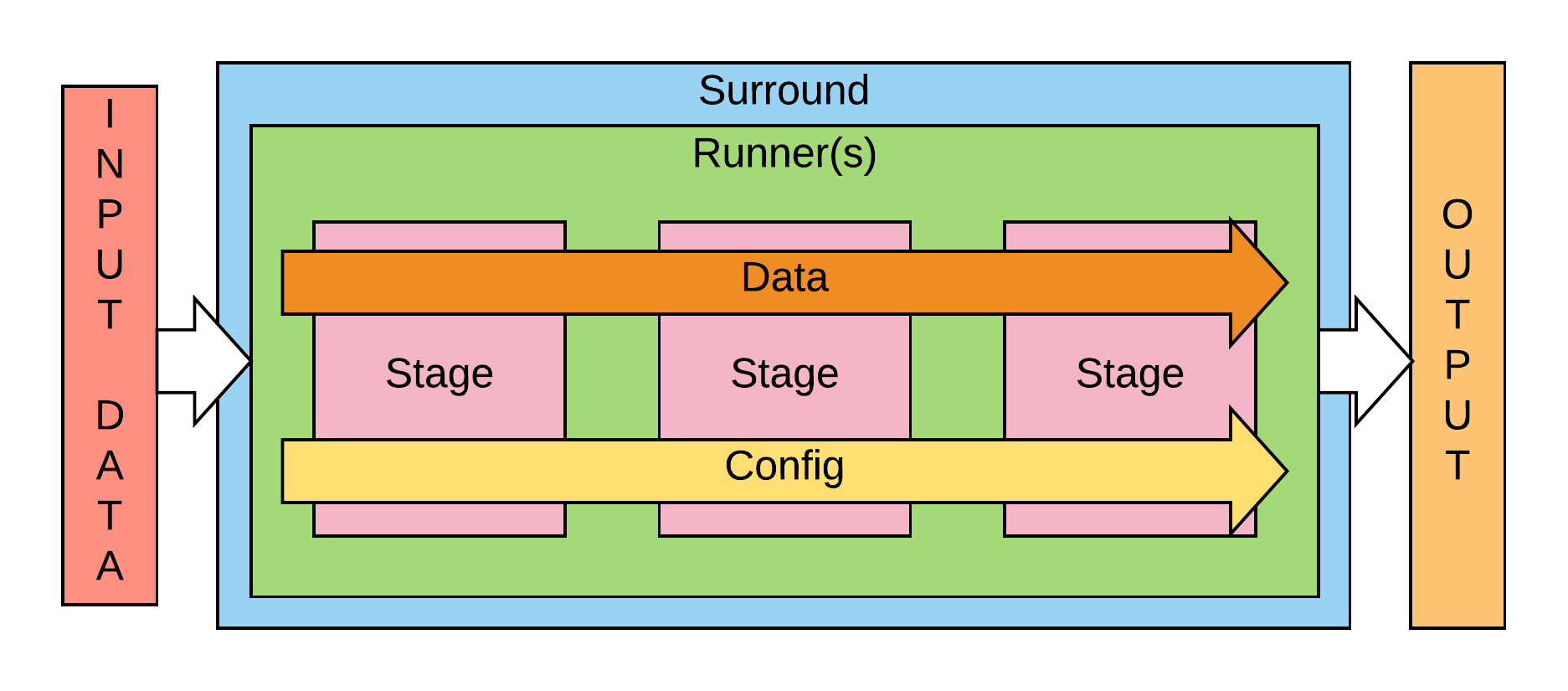
1. Surround

2. Surround Data

3. Stage

4. Runner

* 1. **Surround**: It is a group of numerous stages or just an initial stage to change raw information into meaningful data. You can set the order of stages directly or by means of a config file. The config file enables you to characterize more than 1 pipeline execution and after that you can switch between them effectively.
  2. **Surround Data**: A sharable item between stages that holds vital data for each stage. A phase will read some data from Surround Data, process it, at that point set back new data that will be utilized by different stage(s). When you broaden this class, you can include as many numbers of variables as you require to enable you to change input data into output data. In any case, there are 4 center factors that are being utilized.
* stage\_metadata is information that can be used to identify a stage.
* execution\_time is recorded time to complete a process.
* errors are information to identify failure of a stage.
* warnings are information when transformation is not 100% right.
  1. **Stage**: A usage of information change. Here is the place Surround Data is altered to accomplish the outcome that you need. Each stage is just meant to execute out a lot of related actions. First stage can be where you get ready information to be prepared and last stage can be the place you populate information to be sent back to the client.
     + **operate** is a function that you need to override when you extend stage class. It should contain data transformation implementation
  2. **Runner**: (optional) An interface to connect Surround to/from data.



Fig(a) Surround framework components

# Classes and Methods

Classes are used to create Objects.

Methods are a special kind of function that are defined within a class. Method cannot be called by its name only, we need to invoke the class by a reference of that class in which it is defined, i.e. method is defined within a class and hence they are dependent on that class.

#### 1. class Stage(ABC):

class Stage(ABC):

def dump\_output(self, surround\_data, config):

The method is used to dump the output of each stage.

1. parameter surround\_data is used to store intermediate data from each stage in the pipeline
2. surround\_data must be an instance or child of the SurroundData class
3. parameter config is the Config of the pipeline
4. type config: <class 'surround.config.Config'>
5. @abstractmethod
6. def operate(self, surround\_data, config):

A stage in a surround pipeline.

1. parameter surround\_data is used to store intermediate data from each stage in the pipeline
2. surround\_data must be an instance or child of the SurroundData class
3. the parameter config contains the settings for each stage
4. type config: <class 'surround.config.Config'>
5. def init\_stage(self, config):

This method is used to Initialise stage with some data

1. the parameter config contains the settings for each stage
2. type config: <class 'surround.config.Config'>

#### 2. class Surround(ABC):

class Surround(ABC):

def \_\_init\_\_(self, surround\_stages=None, module=None):

self.surround\_stages = surround\_stages

The collections module has some concrete classes that derive from ABCs; these can be further derived. In addition, the collections.abc submodule has some ABCs that can be used to test whether a class or instance provides a particular interface, for example, is it hashable or a mapping.

Each abstract base class (ABC) in the collections module provides a common feature (or set of features) with the method functions that are required to implement that feature. In some cases, the features build on each other, and a number of method functions are required.

Since each of the ABC classes is abstract, they’re missing the implementation of one or more methods. To use these classes, you’ll have to provide the necessary methods.

One very important consequence of using the collections base classes is that it creates standardized names for the various features. This simplifies the assertions that might be required when checking the argument values to a function or method function.

Here, this method is used to carryout initialization of the class and it can also be used to initialize objects of the class. An instance is created using surround\_stages which is assigned to self.surround\_stages.

if module:

# Module already imported and has a file attribute

mod = sys.modules.get(module)

if mod is not None and hasattr(mod, '\_\_file\_\_'):

package\_path = os.path.dirname(os.path.abspath(mod.\_\_file\_\_))

root\_path = os.path.dirname(package\_path)

else:

raise ValueError("Invalid Python module %s" % module)

self.set\_config(Config(root\_path))

If the module has an attribute, the defined package path is called or accessed, and root\_path is set to the package\_path. Else, a ValueError is thrown with the message "Invalid Python module %s" % module.

#### 3. class Wrapper():

class Wrapper():

def \_\_init\_\_(self, surround, type\_of\_uploaded\_object=None):

self.surround = surround

self.actual\_type\_of\_uploaded\_object = None

A wrapper class wraps an object which it then proxies unhandled calls. Wrapper functions can be used as an interface to adapt to the existing codes, to save from changing current codes back and forth.

#### 4. class AllowedTypes(Enum):

class AllowedTypes(Enum):

JSON = ["application/json"]

FILE = ["file"]

An enumeration is a set of symbolic names (members) bound to unique,

constant values. Within an enumeration, the members can be compared by identity, and the enumeration itself can be iterated over.

Here, an Enum class AllowedTypes has been created which specifies the types, with attributes JSON and FILE called enumeration members. These members are constants. If we try and modify any of the members, we will get an error saying AttributeError.

# Contributing to Surround

### Reporting issues

* Describe what you expected to happen.
* If possible, include a [minimal, complete, and verifiable example](https://stackoverflow.com/help/mcve) to help us identify the issue. This also helps check that the issue is not with your own code.
* Describe what happened. Include the full traceback if there was an exception.
* List your Python and Surround versions. If possible, check if this issue is already fixed in the repository.

## New features

* Feel free to make feature requests especially if you are willing to contribute a pull request!
* For new features, please create an issue outlining the design of the proposed feature before writing code.

## Code patches

* Include tests if your patch is supposed to solve a bug and explain clearly under which circumstances the bug happens. Make sure the test fails without your patch.
* Try to follow PEP8, but you may ignore the line length limit if following it would make the code uglier.

### First time setup

* Download and install the [latest version of git](https://git-scm.com/downloads).
* Configure git with your [username](https://help.github.com/articles/setting-your-username-in-git/) and [email](https://help.github.com/articles/setting-your-commit-email-address-in-git/):

git config --global user.name 'your name'

git config --global user. Email 'your email'

* Make sure you have a [GitHub account](https://github.com/).
* Fork Surround to your GitHub account by clicking the [Fork](https://github.com/dstil/surround/fork) button.
* [Clone](https://help.github.com/articles/fork-a-repo/#step-2-create-a-local-clone-of-your-fork) your GitHub fork locally:

git clone https://github.com/{username}/surround

cd surround

* Add the main repository as a remote to update later:

git remote add upstream https://github.com/dstil/surround

git fetch upstream

* Install Surround in editable mode with:

pip install -e

### Start coding

* Create a branch and identify the issue you would like to work on.
* Using your favorite editor, make your changes, [committing as you go](https://dont-be-afraid-to-commit.readthedocs.io/en/latest/git/commandlinegit.html#commit-your-changes).
* Try to follow [PEP8](https://pep8.org/), but you may ignore the line length limit if following it would make the code uglier.
* Use [YAPF](https://github.com/google/yapf) to check the formatting.
* Include tests that cover any code changes you make. Make sure the test fails without your patch. [Run the tests](https://github.com/a2i2/surround/blob/master/docs/CONTRIBUTING.md#running-the-tests)
* Push your commits to GitHub and [create a pull request](https://help.github.com/articles/creating-a-pull-request/).

### Running the tests

Run the basic test suite with:

python setup.py test

### Examples

* Make sure example works
* Make sure main.py class can be executed with python main.py so that it can be executed by the CircleCI. If your example requires parameters to run it with, make main.py as a wrapper to run your code.
* Add instruction of how-to setup and run your example.

## Code of Conduct

Everyone interacting in the Surround project's codebase and issue tracker is expected to follow the [PyPA Code of Conduct](https://www.pypa.io/en/latest/code-of-conduct/).

# Overview of the Surround

## Overview of Surround

## Why was surround created?

## Issues being addressed.

## Provide enough context to understand the project.

# Description

## Add more robust project Description

## Purpose of the project

## How it can be used and value it provides to the end users

| Sprint | Deliverable | Description |
| --- | --- | --- |
|  | Framework Documentation Layout. | Learning and understanding of Surround and selecting the deliverables  Generate ideas for the machine learning project.  Add features and update feature to the deliverables.  Context and value creation to the project. Creating repository, gather data, describing the problem and taking suggestions from the group.  Creating road map and collaborating with the squad to work together and diving work. |
| 2. | Example Implementation |  |
| 3. |  |  |
| 4. |  |  |