Bolinho

Solution for data gathering, processing and interaction

Table of contents

1. Home

1.1 Home

Documentation of the FullStack solution **bolinho**.

This documentation automatically generates a PDF file from it's content. You can download it here.

1.1.1 You can see the React Front-end HERE!

This is a static version of the app, without access to the server, therefore most features won't work.

> **Info**
>
> Remember that you need to build the app for it to show on the static page, so run `npm run buildWeb` or something similar to build it.

Use the **Tabs** above to navigate through the documentation.

1.1.2 Running

As for running the program we have a few options:

- Run only the frontend `npm run startWeb`
- Run only the backend `npm run startEel`
- Serve the full application `npm run serve`

  This command will start the eel as headless and start the web serve, it doesn't need to build the front end before executing. **Less performant**.

  > To update the backend ability to call front end functions you should first build the front.

- Run the full application `npm run start`

  With this command it will first build the react front end, then run the python script.

- Build the react frontend `npm run buildWeb`
- Build binaries. `npm run buildBin`
- You can build the "binaries", more like a python environment wrapper, it uses PyInstaller to generate the bins.
- The output path is `bolinho/src/dist/`

> Did you like this documentation? You can check out the repo ZRafaF/ReadTheDocksBase for more info 😄.

1.2 Setup

This page will define the step-by-step to build this project.

This project assumes you have the latest version of Python, **PIP** and **GIT**,

This project was developed using python version `Python 3.10.x`

1.2.1 Clone the repo

Bash

```
git clone https://github.com/HefestusTec/bolinho

cd bolinho
```

1.2.2 Creating a virtual environment

The following step isn't mandatory but **recommended**.

Bash

```
python -m pip install --user virtualenv

python -m venv venv
```

The a directory `venv` should be created in the root folder.

How to activate:

> **Windows activation**
>
> ```
> venv/Scripts/activate
> ```

or

> **Linux activation**
>
> ```
> source venv/bin/activate
> ```

1.2.3 Installing dependencies

Bash

```
npm run installDep
```

1.2.4 Documentation

The following step is only required for those that want to **edit the documentation**.

Installing dependencies

Bash

```
pip install -r docs/requirements.txt
```

Build

We have two options to create a build:

· **Serve**:

This option is used for debugging, it will open the static page in one of the localhost ports.

```
mkdocs serve
```

· **Build**:

This option creates a build of the documentation and saves it on de directory `/site/` .

```
mkdocs build
```

> **Note**
>
> Be aware of the **Environment Variable** `ENABLE_PDF_EXPORT` , it will only generate the PDF if this variable is set to `1` .
>
> You can change the `mkdocs.yml` file and remove this line if you so choose.

For more info about the documentation please checkout ZRafaF/ReadTheDocksBase.

2. How to use

2.1 How to use

This chapter will expose the principal use cases of this application.

3. Embedded

3.1 Embedded

Bolinho uses a microcontroller esp32-s3 for controlling the hardware.

The microcontroller communicates via serial to the host, and is responsible for reading the load cell and controlling the stepper motor.

4. API

4.1 API

In this section you will be able to finde every **API call** available.

These `calls` are exposed to the **front-end** via the `eel` object, giving it access to the **data base**, **systems** and **hardware**. This solutions makes use of the eel library to realize the communication between the front-end and back-end;

This API reference will show the methods being called by the front-end in JavaScript, and every call should be made **asynchronously**.

4.1.1 How to create and expose functions to the backend

React

```
function myJsFunction(message){
    console.log(`Got this from the back end ${message}`)
}

// This line exposes the function to the back end, note the second argument, it is the name
that the back end needs to call
window.eel.expose(myJsFunction, "myJsFunction");
```

Python

```
try:
    eel.myJsFunction("IT'S WORKING")
except:
    pass
```

4.2 Front end API

This page gathers all the API calls that can be used by the backend.

Backend -> Front end

> **_Warning_**
>
> The functions can only be called if they are available on the `web/build` directory, therefore if you make a change using `npm run serve` won't show it, you will need to rebuild the front end with `npm run buildWeb` or by using `npm run start`.

> **Note**
>
> These functions can only be called after eel is initiated with `eel.init()`.

4.2.1 Core API

Collection of all functions/API calls available to the backend. You can find them in the `bolinho_api/ core.py` file.

The JavaScript file can be found in the api folder.

---

ping()

> **ping()**
>
> Tries to ping the bolinho front-end, returns 1 if it worked
>
> **Python usage example**
> ```python
> from bolinho_api.core import core_api
>
> while True:
>     try:
>         if core_api.ping():
>             print("got a ping!")
>             break
>         pass
>     except:
>         eel.sleep(1)
> ```

get_config_params()

> **get_config_params()**
>
> Tries to ping the bolinho front-end, returns 1 if it worked
>
> **Python usage example**
> ```python
> from bolinho_api.core import core_api
>
> config = core_api.get_config_params()
> current_save_version = config["configVersion"]
> print(current_save_version)
> ```
>
> This function is located at `src/web/src/App.js`

go_to_experiment_page()

> **go_to_experiment_page()**
>
> Asks the front end to go to the experiment page.
>
> Returns 1 if succeeded.
>
> **Python usage example**
> ```python
> from bolinho_api.core import core_api
>
> change_pages = True
> if change_pages:
>     core_api.go_to_experiment_page()
> ```

go_to_home_page()

> **go_to_home_page()**
>
> Asks the front end to go to the home page.
>
> Returns 1 if succeeded.
>
> **Python usage example**
> ```python
> from bolinho_api.core import core_api
>
> change_pages = True
> if change_pages:
>     core_api.go_to_home_page()
> ```

show_connect_prompt()

> **show_connect_prompt()**
>
> > **Warning**
> >
> > DEPRECATED
>
> Asks the front end to show the connection prompt.
>
> The connection prompt is used to select the serial port.
>
> Returns 1 if succeeded.
>
> **Python usage example**
> ```python
> from bolinho_api.core import core_api
>
> config = core_api.get_config_params()
> device_port = config["port"]
>
> while not device_port:
>     core_api.show_connect_prompt()
>     device_port = config["port"]
> ```

set_is_connected()

> **set_is_connected()**
>
> Sets the variable "isConnected" on the front-end.
>
> **Python usage example**
> ```python
> from bolinho_api.core import core_api
>
> core_api.set_is_connected(True)
> ```

refresh_data()

> **refresh_data()**
>
> Sets the variable "isConnected" on the front-end.
>
> **Python usage example**
> ```python
> from bolinho_api.core import core_api
>
> add_material_to_db() #Arbitrary function that adds a material to the DB
>
> core_api.refresh_data()
> ```

4.2.2 UI API

Collection of all functions/API calls available to the backend for UI in general. You can find them in the `bolinho_api/ui.py` file.

The JavaScript file can be found in the api folder.

success_alert(text)

> **success_alert(text)**
>
> Uses React-Toastify to create an success alert.
>
> **Python usage example**
> ```python
> from bolinho_api.ui import ui_api
>
> ui_api.success_alert("Success!")
> ```

error_alert(text)

> **error_alert(text)**
>
> Uses React-Toastify to create an error alert.
>
> **Python usage example**
> ```python
> from bolinho_api.ui import ui_api
>
> ui_api.error_alert("Error!")
> ```

prompt_user(description, options, callback_func)

> **prompt_user(description, options, `callback_func`)**
>
> Prompts the user with a 'description', and shows the 'options' to the user.
>
> The result is passed to the callback_function
>
> **Python usage example**
>
> ```python
> from bolinho_api.ui import ui_api
>
> def get_result(result):
>     if result == "yes":
>         print("The user chose yes")
>     print("The user chose no")
>
> ui_api.prompt_user(
>     description="Do you want to pay 1000?",
>     options=["yes", "no"],
>     callback_func= get_result,
>     )
> ```

set_focus(focus_element: str)

> **error_alert(focus_element: str)**
>
> Focus in an specific element on the frontend.
>
> WARNING Pay attention to the name of the element you are trying to focus
>
> You can find them at https://github.com/HefestusTec/bolinho/blob/main/src/web/src/api/apiTypes.ts
>
> **Python usage example**
>
> ```python
> from bolinho_api.ui import ui_api
>
> ui_api.set_focus("connection-component")
> ```

4.2.3 Experiment page API

Collection of all functions/API calls available to the backend for the **experiment** routine. You can find them in the `bolinho_api/experiment.py` file.

The JavaScript file can be found at `web/src/api/contexts/ExperimentPageContext.tsx` .

get_load_percentage()

get_load_percentage()

Asks the front for the current load percentage.

This variable is shown to the user in a progress bar. And is usually between 0-100.

Returns the load percentage value

Python usage example

```python
from bolinho_api.experiment import experiment_api

print(experiment_api.get_load_percentage())
```

set_load_percentage(newValue)

set_load_percentage(newValue)

Sets the current load percentage.

This variable is shown to the user in a progress bar. And is usually between 0-100.

Python usage example

```python
from bolinho_api.experiment import experiment_api

for number in range(100):
    experiment_api.set_load_percentage(number)
    eel.sleep(0.1)
```

get_time_percentage()

get_time_percentage()

Asks the front for the current time percentage.

This variable is shown to the user in a progress bar. And is usually between 0-100.

Returns the load percentage value

Python usage example

```python
from bolinho_api.experiment import experiment_api

print(experiment_api.get_time_percentage())
```

set_time_percentage(newValue)

set_time_percentage(newValue)

Sets the current time percentage.

This variable is shown to the user in a progress bar. And is usually between 0-100.

Python usage example

```python
from bolinho_api.experiment import experiment_api

experiment_api.set_time_percentage(22)
```

get_distance_percentage()

get_distance_percentage()

Asks the front for the current distance percentage.

This variable is shown to the user in a progress bar. And is usually between 0-100.

Returns the load percentage value

Python usage example

```python
from bolinho_api.experiment import experiment_api

print(experiment_api.get_distance_percentage())
```

set_distance_percentage(newValue)

set_distance_percentage(newValue)

Sets the current distance percentage.

This variable is shown to the user in a progress bar. And is usually between 0-100.

Python usage example

```python
from bolinho_api.experiment import experiment_api

experiment_api.set_distance_percentage(22)
```

get_delta_load_percentage()

> **get_delta_load_percentage()**
>
> Asks the front for the current delta load percentage.
>
> This variable is shown to the user in a progress bar. And is usually between 0-100.
>
> Returns the load percentage value
>
> **Python usage example**
>
> ```python
> from bolinho_api.experiment import experiment_api
>
> print(experiment_api.get_delta_load_percentage())
> ```

set_delta_load_percentage(newValue)

> **set_delta_load_percentage(newValue)**
>
> Sets the current delta load percentage.
>
> This variable is shown to the user in a progress bar. And is usually between 0-100.
>
> **Python usage example**
>
> ```python
> from bolinho_api.experiment import experiment_api
>
> experiment_api.set_delta_load_percentage(22)
> ```

get_experiment_parameters()

> **get_experiment_parameters()**
>
> Asks the front for the current experiment parameters.
>
> Returns a formatted string
>
> **Python usage example**
>
> ```python
> from bolinho_api.experiment import experiment_api
>
> print(experiment_api.get_experiment_parameters())
> ```

set_experiment_parameters(newValue)

set_experiment_parameters(newValue)

Sets the current experiment parameters.

Receives a formatted string.

Python usage example

```python
from bolinho_api.experiment import experiment_api

experiment_api.set_experiment_parameters("Experiment 202 <br/> Load cell: lxi92")
```

get_readings()

get_readings()

Asks the front for the current Readings.

Returns an object of type Readings, this object gathers all the current readings of the machine. Such as Current z axis position, current load, and status

Python usage example

```python
from bolinho_api.experiment import experiment_api

reading_obj = experiment_api.get_readings()

print(reading_obj.status)
```

set_readings(newValue)

set_readings(newValue)

Sets the current Readings.

Receives an object of type Readings, this object gathers all the current readings of the machine. Such as Current z axis position, current load, and status.

This function dumps the object to a JSON and sends it to the front end

Python usage example

```python
from bolinho_api.experiment import experiment_api
from bolinho_api.classes import Readings

new_machine_readings = Readings(299, 87, 300, "not good")

experiment_api.set_readings(new_machine_readings)
```

get_description()

get_description()

Asks the front for the current description.

Returns a formatted string

Python usage example

```python
from bolinho_api.experiment import experiment_api

print(experiment_api.get_description())
```

set_description(newValue)

set_description(newValue)

Sets the current description.

Receives a formatted string.

Python usage example

```python
from bolinho_api.experiment import experiment_api

experiment_api.set_description("New Experiment description")
```

get_material()

> **get_material()**
>
> Asks the front for the current Material.
>
> Returns an object of type Material.
>
> **Python usage example**
> ```python
> from bolinho_api.experiment import experiment_api
>
> material_obj = experiment_api.get_material()
>
> print(material_obj.name)
> ```

set_material(newValue)

> **set_material(newValue)**
>
> Sets the current Material.
>
> Receives an object of type Material
>
> This function dumps the object to a JSON and sends it to the front end
>
> **Python usage example**
> ```python
> from bolinho_api.experiment import experiment_api
> from bolinho_api.classes import Material
>
> current_material = Material(
>     id=23,
>     name="aço 22",
>     batch="1",
>     experimentArray=[1, 3, 2],
>     supplier="Metalúrgica JOSÉ",
>     extraInfo="Cilindro",
> )
>
> experiment_api.set_material(current_material)
> ```

4.3 Backend API

This page gathers all the API calls that can be used by the front end.

Front end -> Backend

4.3.1 Global configuration

Collection of all functions/API calls available to the front end that handles the global variables.

saveConfigParams(configParams)

saveConfigParams(configParams)

Saves the config parameters to the persistent file

React usage example

```
import { saveConfigParams } from "./api/backend-api";

saveConfigParams(globalConfig);
```

loadConfigParams()

loadConfigParams()

Loads the config parameters from the persistent file

React usage example

```
import { loadConfigParams } from "./api/backend-api";

globalConfig = loadConfigParams();
```

4.3.2 Data base

Collection of all functions/API calls available to the front end that handles the communication with the data base, such as fetching and storing data.

getMaterialList()

> **getMaterialList()**
>
> **TODO**
>
> **React usage example**
> ```
> import { getMaterialList } from "./api/backend-api";
>
> globalConfig = getMaterialList();
> ```

getMaterialAt(index)

> **getMaterialAt(index)**
>
> Returns the material at an `index` from the database.
>
> **React usage example**
> ```
> import { getMaterialAt } from "./api/backend-api";
>
> const elem21 = getMaterialAt(21);
> ```

getExperimentAt(index)

> **getExperimentAt(index)**
>
> Returns the experiment at an `index` from the database.
>
> **React usage example**
> ```
> import { getExperimentAt } from "./api/backend-api";
>
> const elem21 = getExperimentAt(21);
> ```

getDataPointArrayAt(index)

getDataPointArrayAt(index)

Returns an array of `DataPoint` at an `index` from the database.

React usage example

```
import { getDataPointArrayAt } from "./api/backend-api";
import { DataPointType } from "types/DataPointTypes";

const dataPointArrya: DataPointType[] = getDataPointArrayAt(21);
```

postMaterialJS(material)

postMaterialJS(material)

Posts a new material to the Data base

React usage example

```
import { postMaterialJS } from "./api/backend-api";

postMaterialJS({
    //...
})
```

patchMaterialByIdJS(patchMaterial)

patchMaterialByIdJS(patchMaterial)

Patches an existing material in the Data base

React usage example

```
import { patchMaterialByIdJS } from "./api/backend-api";

patchMaterialByIdJS({
    id: 2,
    supplier_name: "Meu novo fornecedor",
    supplier_contact_info: "(12) 9 9123-0192",
    extra_info: "Hehe muito legal",
})
```

deleteMaterialByIdJS(id)

> **deleteMaterialByIdJS(id)**
>
> Deletes an existing material in the Data base.
>
> **React usage example**
>
> ```
> import { deleteMaterialByIdJS } from "./api/backend-api";
>
> deleteMaterialByIdJS(22)
> ```

postExperimentJS(experiment)

> **postExperimentJS(experiment)**
>
> Posts a new experiment to the Data base
>
> **React usage example**
>
> ```
> import { postExperimentJS } from "./api/backend-api";
>
> postExperimentJS({
>     // ...
> })
> ```

patchExperimentByIdJS(patchExperiment)

> **patchExperimentByIdJS(patchExperiment)**
>
> Patches an existing experiment in the Data base
>
> **React usage example**
>
> ```
> import { patchExperimentByIdJS } from "./api/backend-api";
>
> patchExperimentByIdJS({
>     id: 2,
>     name: "Meu novo nome",
>     extra_info: "Hehe muito legal",
> })
> ```

deleteExperimentByIdJS(id)

> ### deleteExperimentByIdJS(id)
>
> Deletes an existing experiment in the Data base.
>
> **React usage example**
>
> ```
> import { deleteExperimentByIdJS } from "./api/backend-api";
>
> deleteExperimentByIdJS(22)
> ```

4.3.3 Core

checkCanStartExperimentJS()

> ### checkCanStartExperimentJS()
>
> This function calls the `check_can_start_experiment(experiment_id)` on the backend.
>
> The front end will call this function when the user click to start experiment.
>
> The backend **MUST** respond with a 1 if everything is ok or 0 if something is not correct.
>
> In case something is wrong the backend also displays an error to the user telling what went wrong
>
> **React usage example**
>
> ```
> import { checkCanStartExperimentJS } from "./api/backend-api";
>
> onClick(()=>{
>     checkCanStartExperimentJS(2);
> };)
> ```

startExperimentRoutineJS(experimentId)

> **startExperimentRoutineJS(experimentId)**
>
> This function calls the `start_experiment_routine(experiment_id)` on the backend.
>
> The front end will call this function after everything is correct and ready to change pages.
>
> Receives an `id` to an experiment as parameter.
>
> The backend **MUST** send a command to change to the experiment page.
>
> Returns 1 if succeeded.
>
> **React usage example**
>
> ```
> import { startExperimentRoutineJS } from "./api/backend-api";
>
> onClick(()=>{
>     startExperimentRoutineJS(2);
> };)
> ```

endExperimentRoutineJS()

> **endExperimentRoutineJS()**
>
> This function calls the `end_experiment_routine()` on the backend.
>
> Usually it should be used to handle when the user press a "end experiment" button or something similar.
>
> **React usage example**
>
> ```
> import { getMaterialList } from "./api/backend-api";
>
> onClick(()=>{
>     endExperimentRoutineJS();
> };)
> ```

setCustomMovementDistanceJS()

> ### setCustomMovementDistanceJS()
>
> > **Warning**
> >
> > DEPRECATED
>
> This function calls the `set_custom_movement_distance(new_movement_distance)` on the backend.
>
> Sets the movement distance that the z-axis moves when the user is controlling the machine manually.
>
> This distance is set in MILLIMETERS
>
> Returns 1 if succeeded.
>
> **React usage example**
>
> ```
> import { setCustomMovementDistanceJS } from "./api/backend-api";
>
> onClick(()=>{
>     // Sets the movement distance to 50 mm
>     setCustomMovementDistanceJS(50);
> };)
> ```

returnZAxisJS()

> ### returnZAxisJS()
>
> This function calls the `return_z_axis()` on the backend.
>
> Returns the z-axis to the origin.
>
> Returns 1 if succeeded (if the function was acknowledged).
>
> **React usage example**
>
> ```
> import { returnZAxisJS } from "./api/backend-api";
>
> onClick(()=>{
>     returnZAxisJS();
> };)
> ```

stopZAxisJS()

> **stopZAxisJS()**
>
> This function calls the `stop_z_axis()` on the backend. Stops the z-axis. Returns 1 if succeeded (if the function was acknowledged).
>
> **React usage example**
>
> ```
> import { stopZAxisJS } from "./api/backend-api";
>
> onClick(()=>{
>     stopZAxisJS();
> };)
> ```

moveZAxisMillimetersJS(distance)

> **moveZAxisMillimetersJS(distance)**
>
> This function calls the `move_z_axis_millimeters(distance)` on the backend. Moves the z-axis [distance]mm. This distance is set in MILLIMETERS Returns 1 if succeeded (if the function was acknowledged).
>
> **React usage example**
>
> ```
> import { moveZAxisMillimetersJS } from "./api/backend-api";
>
> onClick(()=>{
>     moveZAxisMillimetersJS(10);
> };)
> ```

getAvailablePortsListJS()

getAvailablePortsListJS()

This function calls the `get_available_ports_list()` on the backend. Returns a JSON object containing the available COM ports:

JSON

```json
{
    "port": x,
    "desc": y,
}
```

React usage example

```javascript
import { getAvailablePortsListJS } from "./api/backend-api";

onClick(()=>{
    getAvailablePortsListJS().then((availablePorts)=>{
        if(availablePorts) console.log(availablePorts);
    });
};)
```

connectToPortJS()

connectToPortJS()

This function calls the `connect_to_port()` on the backend. Connects to a port. The port argument is a string like `COM4`

Returns 1 connection was successful

React usage example

```javascript
import { connectToPortJS } from "./api/backend-api";

onClick(()=>{
    connectToPortJS("COM3");
};)
```

disconnectGranuladoJS()

!!! quote "### disconnectGranuladoJS() ()" This function calls the `disconnect_granulado()` on the backend.

Text Only

```
Returns 1 connection was successful
```

```javaScript title="React usage example"
import { disconnectGranuladoJS } from "./api/backend-api";

onClick(()=>{
    disconnectGranuladoJS("COM3");
};)
```

tareLoadJS()

> **tareLoadJS()**
>
> This function calls the `tare_load()` on the backend. Tares the load cell Returns 1 if succeeded (if the function was acknowledged).
>
> **React usage example**
> ```
> import { tareLoadJS } from "./api/backend-api";
>
> onClick(()=>{
>     tareLoadJS();
> };)
> ```

calibrateKnownWeightJS()

> **calibrateKnownWeightJS()**
>
> This function calls the `calibrate_known_weight()` on the backend. Calibrates the load cell to the known weight Returns 1 if succeeded (if the function was acknowledged).
>
> **React usage example**
> ```
> import { calibrateKnownWeightJS } from "./api/backend-api";
>
> onClick(()=>{
>     calibrateKnownWeightJS();
> };)
> ```

calibrateZAxisJS()

> **calibrateZAxisJS()**
>
> This function calls the `calibrate_z_axis()` on the backend. Calibrates z axis of the machine Returns 1 if succeeded (if the function was acknowledged).
>
> **React usage example**
>
> ```
> import { calibrateZAxisJS } from "./api/backend-api";
>
> onClick(()=>{
>     calibrateZAxisJS();
> };)
> ```

4.4 Data types

All different data types will be shown in this page

> **ATTENTION**
>
> To see a more up to date version of the different data types pleas see `src/bolinho_api/classes.py` !

4.4.1 DataPoint

Python

```python
class DataPoint:
    def __init__(self, x=0, y=0):
        self.x = x
        self.y = y
```

- `x` : Position at the mesure moment
- type: `float`
- Unity: `mm`
- `y` : Force at the mesure moment
- Type: `float`
- Unity: `N`

4.4.2 Material

```python
class Material:
    def __init__(
        self,
        id=0,
        name="NONE",
        batch="",
        supplier_name="",
        supplier_contact_info="",
        extra_info="",
    ):
        self.id = id
        self.name = name
        self.batch = batch
        self.supplier_name = supplier_name
        self.supplier_contact_info = supplier_contact_info
        self.extra_info = extra_info
```

- `id` :
- type: `int`
- Unity: N/A
- `name` :
- type: `string`
- Unity: N/A
- `batch` :
- type: `string`
- Unity: N/A
- `supplier_name` :
- type: `string`
- Unity: N/A
- `supplier_contact_info` :
- type: `string`
- Unity: N/A
- `extra_info` :
- type: `string`
- Unity: N/A

4.4.3 Body

```python
class Body:
    def __init__(
        self,
        id=0,
        type=1,
        material=Material(
            id=0,
            name="Base Material",
            batch="",
            supplier_name="",
            supplier_contact_info="",
            extra_info="",
        ),
        param_a=0,
        param_b=0,
        height=0,
        extra_info="",
    ):
        self.id = id
        self.type = type
        self.material = material
        self.param_a = param_a
        self.param_b = param_b
```

```
            self.height = height
            self.extra_info = extra_info
```

- `id` :
- Type: `int`
- Unity: N/A
- `type` : Body format * 1 = Rectangle * 2 = Cylinder * 3 = Tube * 4 = Other * Type: `int` * Unity: N/A
- `material` :
- Type: `Material`
- Unity: N/A
- `param_a` : Param 'a' of the body
- Rectangle = length
- Cylinder = External diameter
- Tube = External diameter
- Type: `float`
- Unity: `mm`
- `param_b` : Param 'b' of the body
- Rectangle = depth
- Cylinder = NULL
- Tube = Internal diameter
- Type: `float`
- Unity: `mm`
- `height` : Height of the test body
- Type: `float`
- Unity: `mm`
- `extra_info` :
- type: `string`
- Unity: N/A

4.4.4 Experiment

```python
class Experiment:
    def __init__(
        self,
        id=0,
        name="None",
        body: Body = Body(
            id=0,
            type=1,
            material=Material(
                name="Material",
                batch="Batch",
                supplier_name="",
                supplier_contact_info="",
                extra_info="",
            ),
            param_a=0,
            param_b=0,
            height=0,
            extra_info="",
        ),
        date_time=0,
        load_loss_limit=0,
        max_load=0,
        max_travel=0,
        max_time=0,
        z_axis_speed=0,
        compress=False,
        extra_info="",
        plot_color="#ffffff",
    ):
        self.id = id
        self.name = name
        self.body = body
        self.date_time = date_time
        self.load_loss_limit = load_loss_limit
        self.max_load = max_load
        self.max_travel = max_travel
        self.max_time = max_time
        self.z_axis_speed = z_axis_speed
        self.compress = compress
```

```
            self.extra_info = extra_info
            self.plot_color = plot_color
```

- `id` :
- Type: `int`
- Unity: N/A
- `name` :
- type: `string`
- Unity: N/A
- `body` :
- Type: `Body`
- Unity: N/A
- `date_time` : Date and time formatted as `dd/mm/yyyy`
- Type: `string`
- Unity: N/A
- `load_loss_limit` : Max load loss to trigger auto-stop.
- Type: `float`
- Unity: `N/s`
- `max_load` : Max load limit to trigger auto-stop.
- Type: `float`
- Unity: `N`
- `max_travel` : Max distance the experiment head can travel during the experiment.
- Type: `float`
- Unity: `mm`
- `max_time` : Experiment time limit.
- Type: `float`
- Unity: `s`
- `z_axis_speed` :
- Type: `float`
- Unity: `mm/s`
- `compress` : Is the experiment type of compression? `false` implies expansion.
- Type: `bool`
- Unity: N/A
- `extra_info` :
- type: `string`
- Unity: N/A
- `plot_color` : System parameter
- type: `string`
- Unity: N/A

5. About

5.1 About

This page will present extra info about the project.

5.1.1 Licenses

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```
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```

Included third-party projects

- Python Eel - see license
- MkDocs - see license
- Material for MkDocs - see license
- MkDocs With PDF - see license
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Agradecemos do fundo do coração todos os autores dos diferentes projetos utilizados, **software livre** é liberdade, muito obrigado a todos.