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跨平台Web自动化神器： Playwright

- 最新版本： v1.0
- 更新时间： 20210702

简介

介绍支持多个平台的Web自动化神器， playwright。

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Gitbook源码

- [crifan/web_automation_tool_playwright](#): 跨平台Web自动化神器： Playwright

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详见：[crifan/gitbook_template: demo how to use crifan gitbook template and demo](#)

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- 跨平台Web自动化神器： [Playwright book.crifan.com](#)
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鸣谢

感谢我的老婆陈雪的包容理解和悉心照料，才使得我 crifan 有更多精力去专注技术专研和整理归纳出这些电子书和技术教程，特此鸣谢。

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Playwright概览

- Playwright
 - 一句话简介
 - 中文：微软开源的 Python 自动化神器 Playwright
 - 英文：Node.js library to automate Chromium, Firefox and WebKit with a single API
 - 特点
 - 绿色环保ever-green
 - 能力强capable
 - 可靠性高reliable
 - 速度快fast
 - 跨平台==支持多个系统 + 支持多种浏览器（内核）
- | | Linux | macOS | Windows |
|----------------------|-------|-------|---------|
| Chromium 90.0.4430.0 | ✓ | ✓ | ✓ |
| WebKit 14.2 | ✓ | ✓ | ✓ |
| Firefox 87.0b10 | ✓ | ✓ | ✓ |
- 跨平台
 - Windows
 - MacOS
 - Linux
 - 支持多种浏览器（内核）
 - Chromium
 - Firefox
 - WebKit
- 说明
 - 微软新出的 Python 库，仅用一个API即可自动执行 Chromium 、 Firefox 、 WebKit 等主流浏览器自动化操作
 - 微软公司2020年初发布的新一代自动化测试工具，相较于目前最常用的Selenium，它仅用一个API即可自动执行 Chromium、Firefox、WebKit等主流浏览器自动化操作。作为针对Python语言纯自动化的工具，在回归测试中可更快的实现自动化。

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初始化环境

初始化Playwright开发环境

Mac

安装playwright

```
pip install playwright
```

初始化安装web的driver

```
playwright install
```

或: `python -m playwright install`

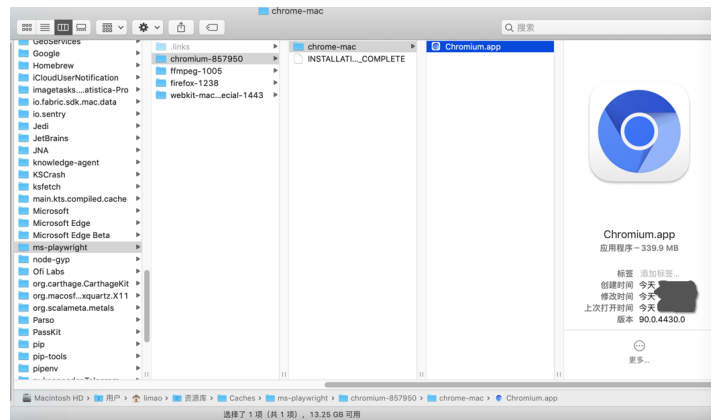
注: 安装浏览器驱动文件 (安装过程稍微有点慢)

详细日志

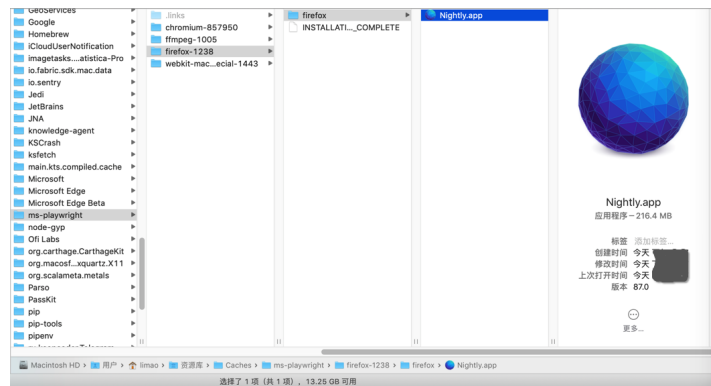
```
❏ playwright install
Downloading chromium v857950 - 113.9 Mb [=====]
chromium v857950 downloaded to /Users/limao/Library/Caches/
Downloading firefox v1238 - 75 Mb [=====] 100%
firefox v1238 downloaded to /Users/limao/Library/Caches/ms-
Downloading webkit v1443 - 52 Mb [=====] 100%
webkit v1443 downloaded to /Users/limao/Library/Caches/ms-
Downloading ffmpeg v1005 - 1.3 Mb [=====] 100%
ffmpeg v1005 downloaded to /Users/limao/Library/Caches/ms-
```

此处下载安装了:

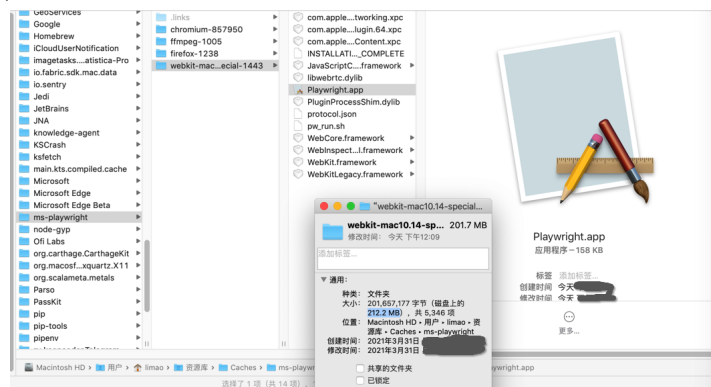
- chromium
 - 位置: `/Users/limao/Library/Caches/ms-playwright/chromium-857950`
 - 效果:



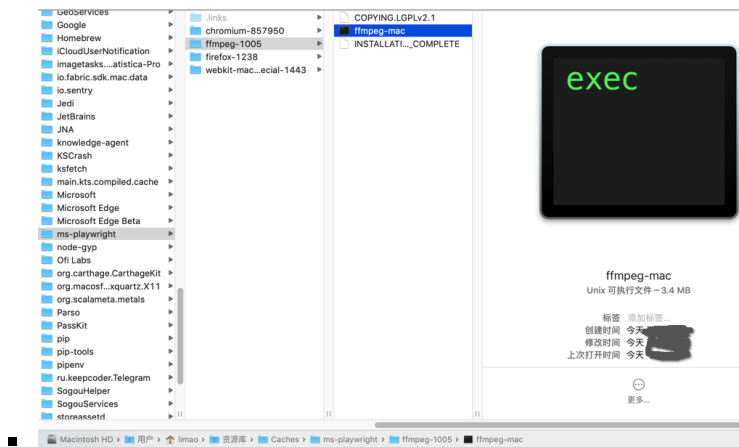
- firefox
 - 位置: `/Users/limao/Library/Caches/ms-playwright/firefox-1238`
 - 效果:



- webkit
 - 位置: `/Users/limao/Library/Caches/ms-playwright/webkit-mac10.14-special-1443`
 - 效果:



- ffmpeg
 - 位置: `/Users/limao/Library/Caches/ms-playwright/ffmpeg-1005`
 - 效果:



测试代码

```
# Function: Playwright demo baidu search
# Author: Crifan Li
# Update: 20210331

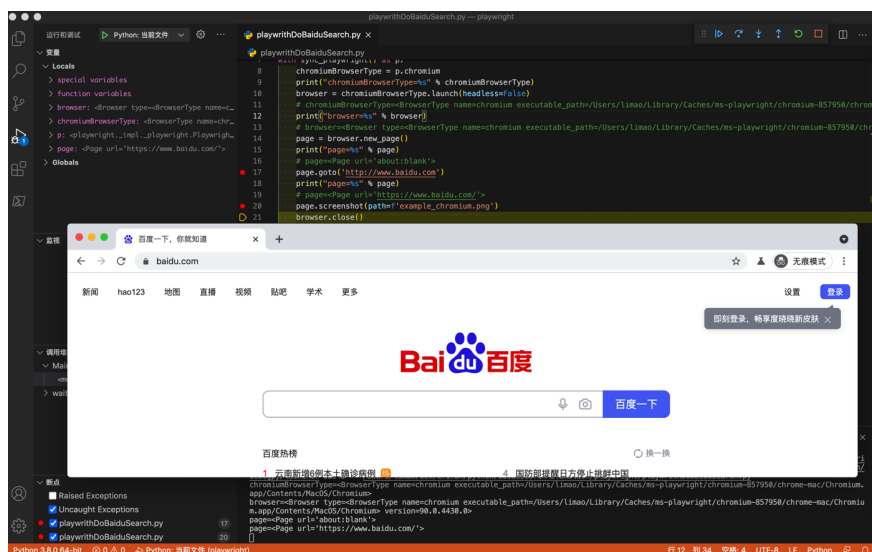
from playwright.sync_api import sync_playwright

with sync_playwright() as p:
    chromiumBrowserType = p.chromium
    print("chromiumBrowserType=%s" % chromiumBrowserType)
    browser = chromiumBrowserType.launch(headless=False)
    # chromiumBrowserType=<BrowserType name=chromium executable=...>
    print("browser=%s" % browser)
    # browser=<Browser type=<BrowserType name=chromium executable=...>
    page = browser.new_page()
    print("page=%s" % page)
    # page=<Page url='about:blank'>
    page.goto('http://www.baidu.com')
    print("page=%s" % page)
    # page=<Page url='https://www.baidu.com/'>
    page.screenshot(path=f'example_chromium.png')
    browser.close()
```

输出：

```
chromiumBrowserType=<BrowserType name=chromium executable=...>
browser=<Browser type=<BrowserType name=chromium executable=...>
page=<Page url='about:blank'>
page=<Page url='https://www.baidu.com/'>
```

效果：



附带

语法=帮助信息

```

❑ playwright --help
Usage: npx playwright [options] [command]

Options:
  -V, --version                output the version number
  -h, --help                  display help for command

Commands:
  open [options] [url]        open page in browser
  codegen [options] [url]     open page and generate code
  debug <app> [args...]       run command in debug mode
  install [browserType...]     ensure browsers are installed
  install-deps [browserType...] install dependencies
  cr [options] [url]           open page in Chromium
  ff [options] [url]           open page in Firefox
  wk [options] [url]           open page in WebKit
  screenshot [options] <url> <filename> capture a page screenshot
  pdf [options] <url> <filename> save page as pdf
  help [command]              display help for command

```

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基本操作

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查找元素

从页面中 寻找 = 定位 = 获取 元素的函数是：

- element_handle
 - element_handle.query_selector(selector)
 - https://playwright.dev/python/docs/api/class-elementhandle#element_handlequery_selectorselector
 - element_handle.query_selector_all(selector)
 - https://playwright.dev/python/docs/api/class-elementhandle#element_handlequery_selector_allselector
- page
 - page.query_selector(selector)
 - https://playwright.dev/python/docs/api/class-page#pagequery_selectorselector
 - page.query_selector_all(selector)
 - https://playwright.dev/python/docs/api/class-page#pagequery_selector_allselector
 - 注：返回的是 JSHandle 的 list

举例

```
resultASelector = "h3[class^='t'] a"
searchResultAList = page.query_selector_all(resultASelector)
print("searchResultAList=%s" % searchResultAList)
```

输出：

```
searchResultAList=[<JSHandle preview=JSHandle@a target="..."
```

```

47 #####
48 # Extract content
49 #####
50 resultASelector = "h3[class^='t'] a"
51 searchResultAList = page.query_selector_all(resultASelector)
52 print("searchResultAList=%s" % searchResultAList)
53 searchResultANum = len(searchResultAList)
54 print("Found %s search result:" % searchResultANum)
55 for curIdx, aElem in enumerate(searchResultAList):
56     curNum = curIdx + 1
57     print("%s [%d] %s" % ("-"*20, curNum, aElem.get_property('title')))
58     aTextJSHandle = aElem.get_property('text')
59     # print("aTextJSHandle=%s" % aTextJSHandle)
60     # type(aTextJSHandle)=<class 'JSHandle'>
61     # print("aTextJSHandle=%s" % aTextJSHandle)
62     # aTextJSHandle=ppp.pppeteer.JSHandle
63     title = aTextJSHandle.json_value('title')
64     # print("type(title)=%s" % type(title))
65     # type(title)=<class 'str'>
66     print("title=%s" % title)
67     len(): 10
68     hrefLinkUrl = aElem.get_property('href')

```

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查找并点击元素

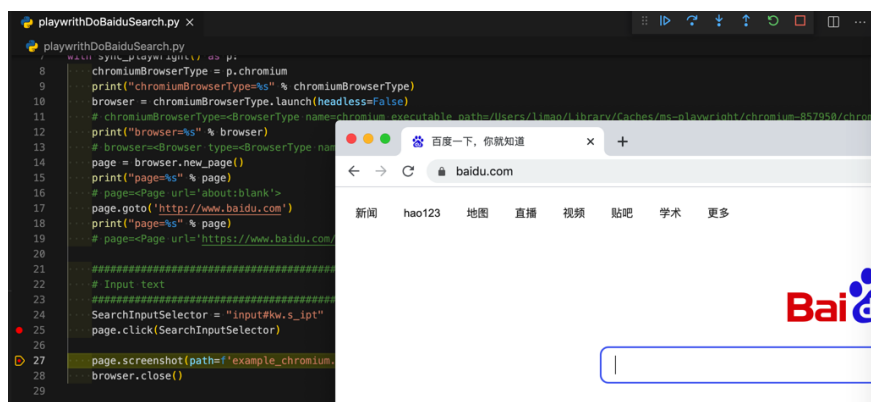
对于百度主页搜索输入框，html是：

```
<input id="kw" name="wd" class="s_ipt" value="" maxlength="
```

查找到该元素，并且点击该元素，的代码：

```
SearchInputSelector = "input#kw.s_ipt"  
page.click(SearchInputSelector)
```

效果：点击了百度的输入框后的效果：



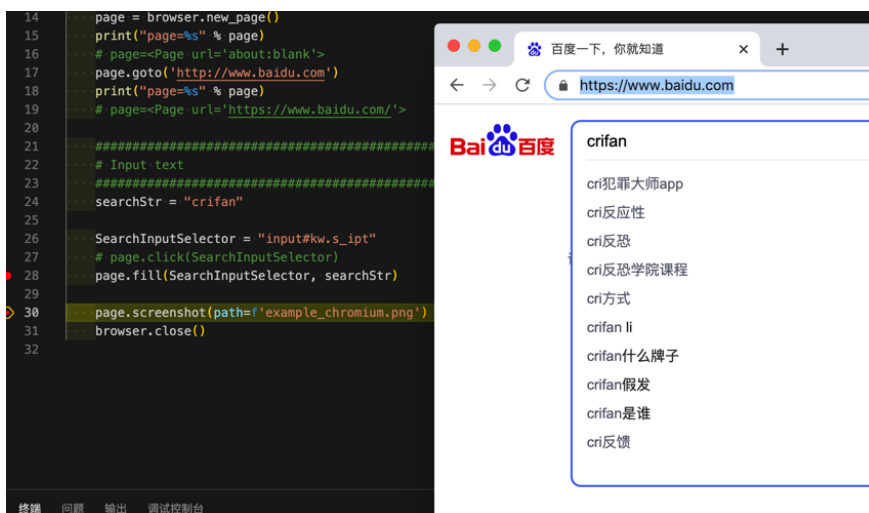
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输入文字

给百度输入框中输入文字，的代码：

```
searchStr = "crifan"
SearchInputSelector = "input#kw.s_ip"
page.fill(SearchInputSelector, searchStr)
```

效果：给百度搜索输入框中输入了文字



另：估计是先用 Selector 选择元素，再去用元素的 fill 也是可以的。

相关文档：[Text input](#)

其他几种 fill

另外还支持几种的 fill：

- `page.fill(selector, value[, options])`
 - <https://playwright.dev/docs/api/class-page#pagefillselector-value-options>
- `frame.fill(selector, value[, options])`
 - <https://playwright.dev/docs/api/class-frame#framefillselector-value-options>
- `elementHandle.fill(value[, options])`
 - <https://playwright.dev/docs/api/class-elementhandle#elementhandlefillvalue-options>

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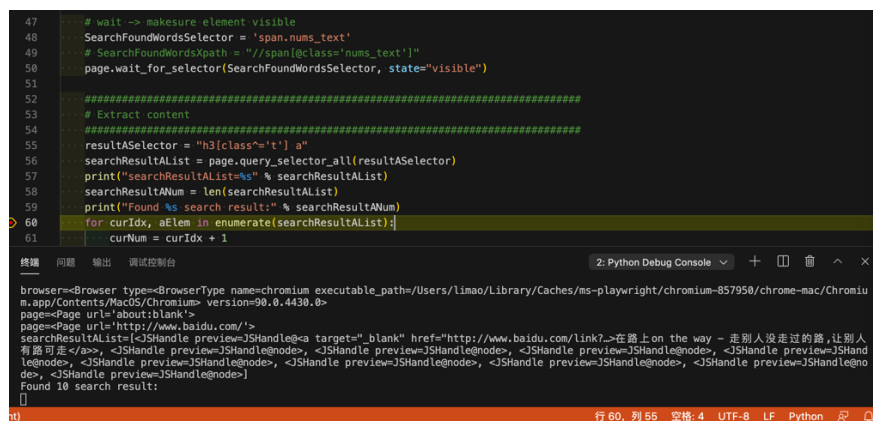
等待元素出现

用 `page` 的 `wait_for_selector`

举例：

```
SearchFoundWordsSelector = 'span.nums_text'  
page.wait_for_selector(SearchFoundWordsSelector, state=
```

效果：可以找到后续元素了



```
47 # wait -> makesure element visible  
48 SearchFoundWordsSelector = 'span.nums_text'  
49 # SearchFoundWordsXPath = "//span[@class='nums_text']"  
50 page.wait_for_selector(SearchFoundWordsSelector, state="visible")  
51  
52 #####  
53 # Extract content  
54 #####  
55 resultSelector = "h3[class='t'] a"  
56 searchResultAList = page.query_selector_all(resultSelector)  
57 print("searchResultAList=%s" % searchResultAList)  
58 searchResultANum = len(searchResultAList)  
59 print("Found %s search result:" % searchResultANum)  
60 for curIdx, aElem in enumerate(searchResultAList):  
61     curNum = curIdx + 1
```

终端 问题 输出 调试控制台 2: Python Debug Console + -

```
browser=<Browser type=chromium executable_path=/Users/limao/Library/Caches/ms-playwright/chromium-857950/chrome-mac/Chromiu  
m.app/Contents/MacOS/Chromium version=90.0.4430.0>  
page=<Page url='about:blank'>  
page=<Page url='http://www.baidu.com/'>  
searchResultAList=[<JSHandle preview=JSHandle@a target="blank" href="http://www.baidu.com/link?>在路上 on the way - 走别人没走过的路,让别人  
有路可走</a>, <JSHandle preview=JSHandle@node>, <JSHandle preview=JSHandle@node>, <JSHandle preview=JSHandle@node>, <JSHandle preview=JSHand  
le@node>, <JSHandle preview=JSHandle@node>]  
Found 10 search result:  
[]
```

行 60, 列 65 空格: 4 UTF-8 LF Python

官网资料

- 相关资料
 - [page.wait_for_event\(event, **kwargs\)](#)
 - [page.wait_for_function\(expression, **kwargs\)](#)
 - [page.wait_for_load_state\(**kwargs\)](#)
 - [page.wait_for_selector\(selector, **kwargs\)](#)
 - [page.wait_for_timeout\(timeout\)](#)

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模拟按键

举例：进入百度主页，已输入了文字，想要触发搜索，有2种方式：

- 全局直接输入 回车键

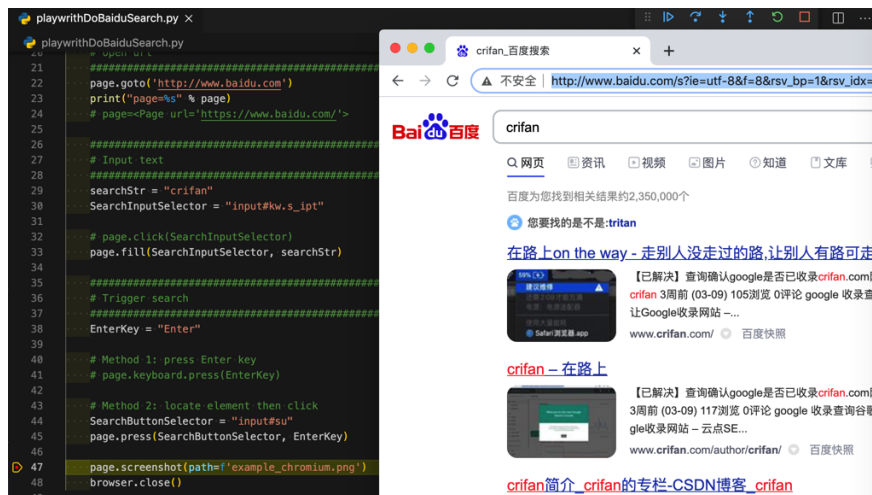
```
EnterKey = "Enter"
# Method 1: press Enter key
page.keyboard.press(EnterKey)
```

- 定位到 百度一下 按钮，再按 回车键

```
EnterKey = "Enter"
# Method 2: locate element then click
SearchButtonSelector = "input#su"
page.press(SearchButtonSelector, EnterKey)
```

注：估计定位到按钮后，再click点击，也是可以的。有空再深究。

效果：触发了百度搜索后，显示出搜索结果



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获取元素属性值

在找到元素后，获取属性值，可以用：

- `text_content()`：获取文本值
 - 文档：`element_handle.text_content()`
- `get_attribute("attribute_name")`：获取属性值
 - 文档：`element_handle.get_attribute(name)`
 - 举例：
 - `get_attribute("href")`
- `inner_html()`：获取html值
 - 文档：`element_handle.inner_html()`
- `inner_text()`：获取内部文本值
 - 文档：`element_handle.inner_text()`

举例

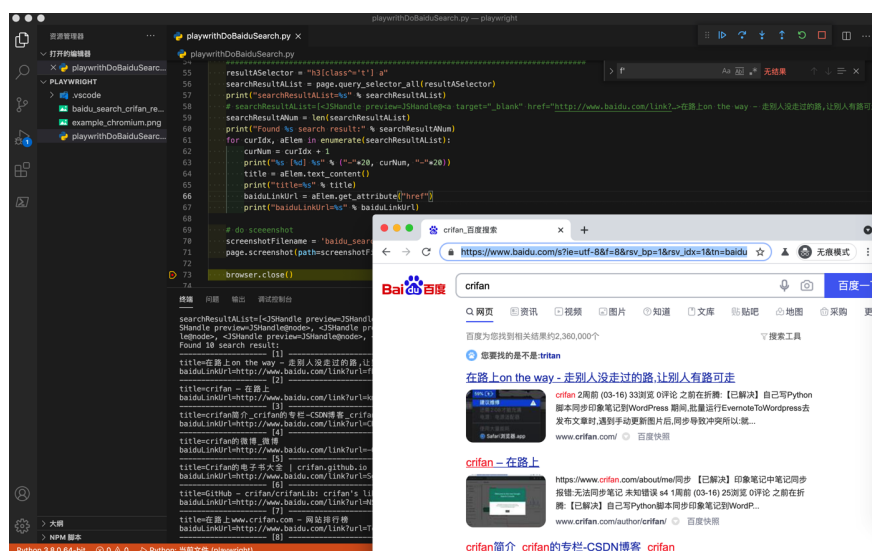
从百度搜索后的结果，解析提取每个结果的标题和链接的代码如下：

```
#####
# Extract content
#####
resultASelector = "h3[class^='t'] a"
searchResultAList = page.query_selector_all(resultASelector)
print("searchResultAList=%s" % searchResultAList)
# searchResultAList=[<JSHandle preview=JSHandle@a target=
searchResultANum = len(searchResultAList)
print("Found %s search result:" % searchResultANum)
for curIdx, aElem in enumerate(searchResultAList):
    curNum = curIdx + 1
    print("%s [%d] %s" % ("-"*20, curNum, "-"*20))
    title = aElem.text_content()
    print("title=%s" % title)
    baiduLinkUrl = aElem.get_attribute("href")
    print("baiduLinkUrl=%s" % baiduLinkUrl)
```

输出结果：

```
searchResultAList=[<JSHandle preview=JSHandle@<a target="_
Found 10 search result:
----- [1] -----
title=在路上on the way - 走别人没走过的路,让别人有路可走
baiduLinkUrl=http://www.baidu.com/link?url=fB3F0xZmwig9r2M_
----- [2] -----
title=crifan - 在路上
baiduLinkUrl=http://www.baidu.com/link?url=kmvgD1PraoULnnjl
----- [3] -----
title=crifan简介_crifan的专栏-CSDN博客_crifan
baiduLinkUrl=http://www.baidu.com/link?url=CHLWAQKOMgb23Gm:
----- [4] -----
title=crifan的微博_微博
baiduLinkUrl=http://www.baidu.com/link?url=-QwLZ5SEmZD1R2Qc
----- [5] -----
title=Crifan的电子书大全 | crifan.github.io
baiduLinkUrl=http://www.baidu.com/link?url=Sgrbyd_pBsm-BTAN
----- [6] -----
title=GitHub - crifan/crifanLib: crifan's library
baiduLinkUrl=http://www.baidu.com/link?url=NSZ5IzQ2Qag3CpGI
----- [7] -----
title=在路上www.crifan.com - 网站排行榜
baiduLinkUrl=http://www.baidu.com/link?url=Tc4cbETNkpQXj-k)
----- [8] -----
title=crifan的专栏_crifan_CSDN博客-crifan领域博主
baiduLinkUrl=http://www.baidu.com/link?url=0LkrWu8q9SRZuBN-
----- [9] -----
title=User crifan - Stack Overflow
baiduLinkUrl=http://www.baidu.com/link?url=t1rc0EGg33A-uJU:
----- [10] -----
title=crifan - Bing 词典
baiduLinkUrl=http://www.baidu.com/link?url=8z-3hYeLAQ8T4efC
```

效果：



查找元素

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举例

下面给出具体的playwright的实例案例供参考。

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百度搜索自动化

此处给出用 playwright 模拟百度搜索，即百度搜索自动化的完整例子。

代码

- 文件下载：[playwrithDemoBaiduSearch.py](#)
- 贴出代码

```

# Function: Playwright demo baidu search
# Author: Crifan Li
# Update: 20210331

from playwright.sync_api import sync_playwright

# here use sync mode
with sync_playwright() as p:
    chromiumBrowserType = p.chromium
    print("chromiumBrowserType=%s" % chromiumBrowserType)
    browser = chromiumBrowserType.launch(headless=False)
    # chromiumBrowserType=<BrowserType name=chromium execut
    print("browser=%s" % browser)
    # browser=<Browser type=<BrowserType name=chromium execu
    page = browser.new_page()
    print("page=%s" % page)
    # page=<Page url='about:blank'>

#####
# Open url
#####
page.goto('http://www.baidu.com')
print("page=%s" % page)
# page=<Page url='https://www.baidu.com/'>

#####
# Input text
#####
searchStr = "crifan"
SearchInputSelector = "input#kw.s_ipst"

# page.click(SearchInputSelector)
page.fill(SearchInputSelector, searchStr)

#####
# Trigger search
#####
EnterKey = "Enter"

# Method 1: press Enter key
# page.keyboard.press(EnterKey)

# Method 2: locate element then click
SearchButtonSelector = "input#su"
page.press(SearchButtonSelector, EnterKey)

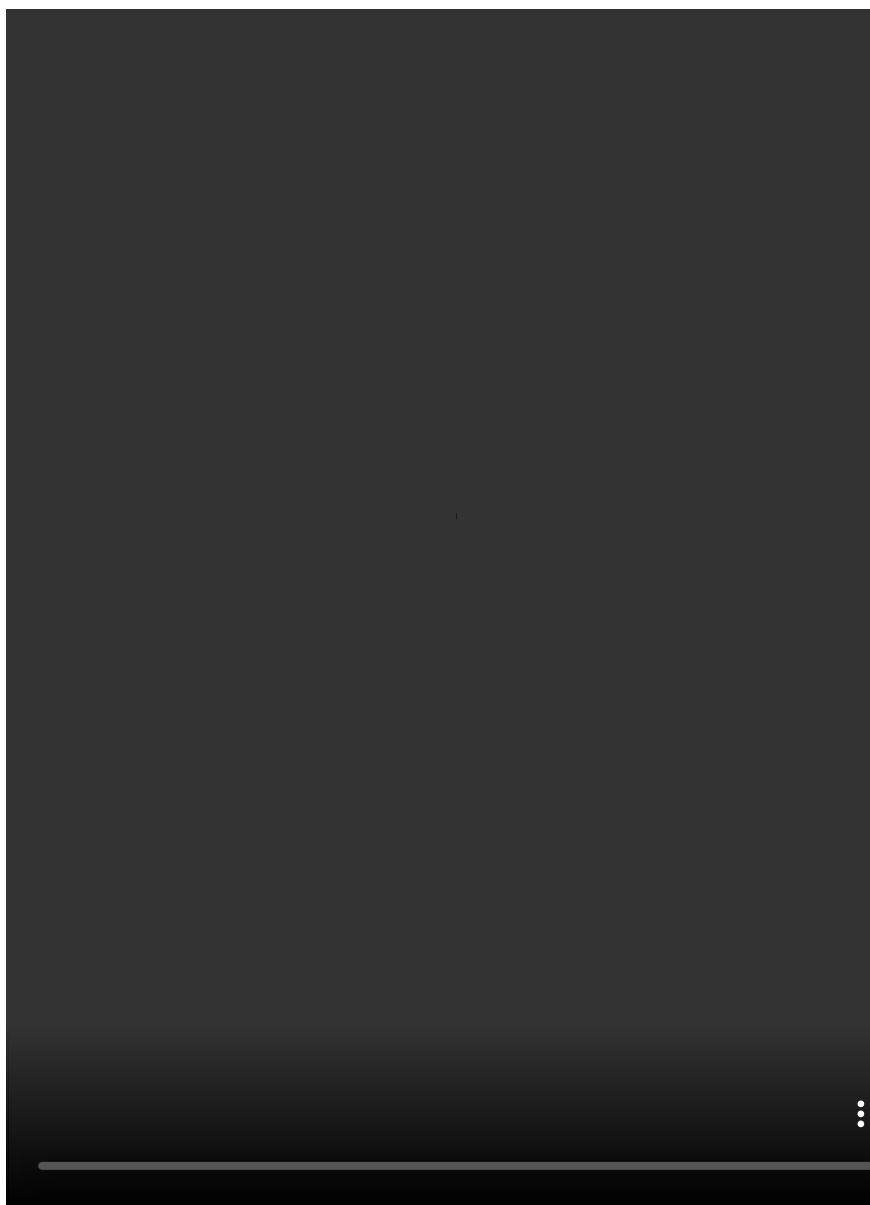
# wait -> makesure element visible
SearchFoundWordsSelector = 'span.nums_text'
# SearchFoundWordsXpath = "//span[@class='nums_text']"
page.wait_for_selector(SearchFoundWordsSelector, state=

```

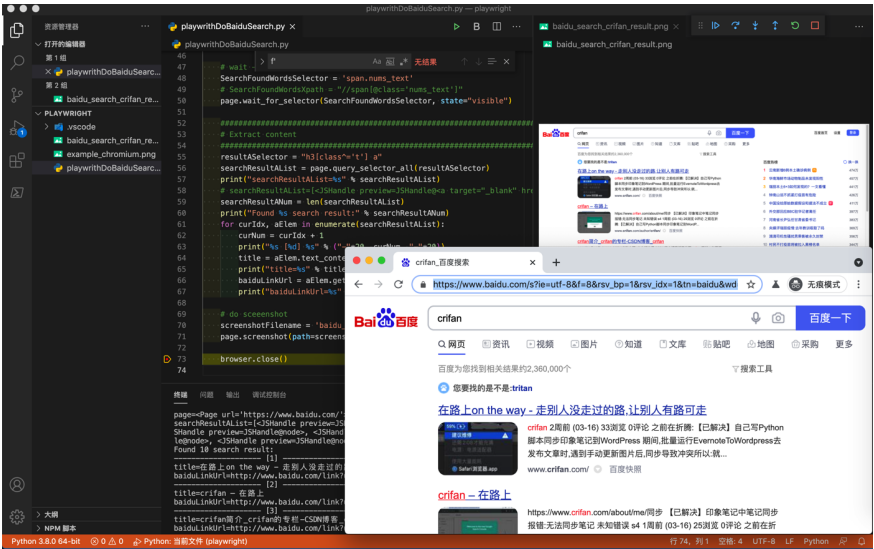
```
#####  
# Extract content  
#####  
resultASelector = "h3[class^='t'] a"  
searchResultAList = page.query_selector_all(resultASelector)  
print("searchResultAList=%s" % searchResultAList)  
# searchResultAList=[<JSHandle preview=JSHandle@<a target=blank href=#####>  
searchResultANum = len(searchResultAList)  
print("Found %s search result:" % searchResultANum)  
for curIdx, aElem in enumerate(searchResultAList):  
    curNum = curIdx + 1  
    print("%s [%d] %s" % ("-"*20, curNum, "-"*20))  
    title = aElem.text_content()  
    print("title=%s" % title)  
    # title=在路上on the way - 走别人没走过的路,让别人有路可走  
    baiduLinkUrl = aElem.get_attribute("href")  
    print("baiduLinkUrl=%s" % baiduLinkUrl)  
    # baiduLinkUrl=http://www.baidu.com/link?url=fB3F0x#####</a>  
  
# do screenshot  
screenshotFilename = 'baidu_search_%s_result.png' % searchResultANum  
page.screenshot(path=screenshotFilename)  
  
browser.close()
```

效果

视频



图



输出

```

chromiumBrowserType=<BrowserType name=chromium executable_
browser=<Browser type=<BrowserType name=chromium executable_
page=<Page url='about:blank'>
page=<Page url='https://www.baidu.com/'>
searchResultAList=[<JSHandle preview=JSHandle@<a target="_
Found 10 search result:
----- [1] -----
title=在路上on the way - 走别人没走过的路,让别人有路可走
baiduLinkUrl=http://www.baidu.com/link?url=fB3F0xZmwig9r2M_
----- [2] -----
title=crifan - 在路上
baiduLinkUrl=http://www.baidu.com/link?url=kmvgD1PraoULnnjl
----- [3] -----
title=crifan简介_crifan的专栏-CSDN博客_crifan
baiduLinkUrl=http://www.baidu.com/link?url=CHLWAQK0Mgb23Gm:
----- [4] -----
title=crifan的微博_微博
baiduLinkUrl=http://www.baidu.com/link?url=-QwLZ5SEmZD1R2Qc
----- [5] -----
title=Crifan的电子书大全 | crifan.github.io
baiduLinkUrl=http://www.baidu.com/link?url=Sgrbyd_pBsm-BTAN
----- [6] -----
title=GitHub - crifan/crifanLib: crifan's library
baiduLinkUrl=http://www.baidu.com/link?url=NSZ5IzQ2Qag3CpGI
----- [7] -----
title=在路上www.crifan.com - 网站排行榜
baiduLinkUrl=http://www.baidu.com/link?url=Tc4cbETNKpQXj-k)
----- [8] -----
title=crifan的专栏_crifan_CSDN博客-crifan领域博主
baiduLinkUrl=http://www.baidu.com/link?url=0LkrWu8q9SRZuBN-
----- [9] -----
title=User crifan - Stack Overflow
baiduLinkUrl=http://www.baidu.com/link?url=t1rc0EGg33A-uJU:
----- [10] -----
title=crifan - Bing 词典
baiduLinkUrl=http://www.baidu.com/link?url=8z-3hYeLAQ8T4ef(

```

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附录

下面列出相关参考资料。

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教程和资料

- Node.JS版
 - GitHub
 - <https://github.com/microsoft/playwright>
 - 官网
 - Fast and reliable end-to-end testing for modern web apps | Playwright
 - <https://playwright.dev/>
 - 英文
 - Doc
 - Getting Started | Playwright
 - <https://playwright.dev/docs/intro>
 - Installation configuration
 - <https://playwright.dev/docs/installation>
 - API
 - Playwright | Playwright
 - <https://playwright.dev/docs/api/class-playwright>
 - Page
 - <https://playwright.dev/docs/api/class-page/>
 - Core concepts | Playwright
 - <https://playwright.dev/docs/core-concepts>
 - ElementHandle
 - <https://playwright.dev/docs/api/class-elementhandle>
 - 中文
 - Getting Started | Playwright 中文文档 | Playwright 中文网 (bootcss.com)
 - <https://playwright.bootcss.com/docs/intro>
 - Element selectors | Playwright 中文文档 | Playwright 中文网
 - <https://playwright.bootcss.com/docs/selectors>
 - Python版
 - Getting Started | Playwright
 - <https://playwright.dev/python/docs/intro/>
 - 官网
 - Fast and reliable end-to-end testing for modern web apps | Playwright
 - <https://playwright.dev/python/>
 - API
 - Playwright | Playwright

- <https://playwright.dev/python/docs/api/class-playwright>
- ElementHandle | Playwright
 - <https://playwright.dev/python/docs/api/class-elementhandle>
- Page | Playwright
 - <https://playwright.dev/python/docs/api/class-page>

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参考资料

- 【已解决】Python的Playwright用page.query_selector_all找不到元素
- 【已解决】用Python的Playwright定位并点击百度搜索输入框
- 【已解决】Mac中安装Python版Playwright和初始化开发环境
- 【已解决】用Python的Playwright给百度搜索输入框中输入文字
- 【已解决】用Python的Playwright触发百度首页的搜索
- 【已解决】Python的Playwright去解析提取百度搜索的结果
-
- [微软开源 Python 自动化神器 Playwright - 知乎](#)
- [webautomation - Using Playwright for Python, how do I select \(or find\) an element? - Stack Overflow](#)
- [element_handle.inner_html\(\)](#)
- [element_handle.inner_text\(\)](#)
- [element_handle.text_content\(\)](#)
- [element_handle.get_attribute\(name\)](#)
-

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