爬虫(十八)_多线程糗事百科案例

多线程糗事百科案例

案例要求参考上一个糗事百科单进程案例:http://www.cnblogs.com/miqi1992/p/8081929.html

Queue(队列对象)

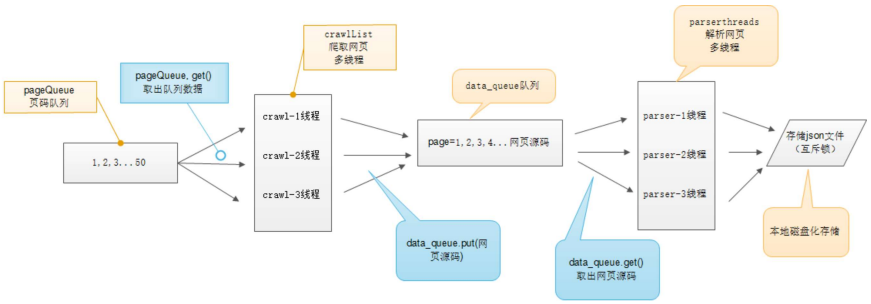
Queue是python中的标准库，可以直接 `import Queue` 引用；队列时线程间最常用的交互数据的形式。

python下多线程的思考

对于资源，加锁是个重要的环节。因为python原生的list,dict等，都是not thread safe的。而Queue,是线程安全的，因此在满足使用条件下，建议使用队列

1. 初始化：class Queue.Queue(maxsize)FIFO先进先出
2. 包中的常用方法：
   - Queue.qszie()返回队列的大小
   - Queue.empty()如果队列为空，返回True，否则返回False
   - Queue.full()如果队列满了，返回True,反之False
   - Queue.full 与 maxsize大小对应
   - Queue.get([block[, timeout]])获取队列，timeout等待事件
3. 创建一个"队列"对象
   - import Queue
   - myqueue = Queue.Queue(maxsize=10)
4. 将一个值放入队列中
   - myqueue.put(10)
5. 将一个值从队列中取出
   - myqueue.get()

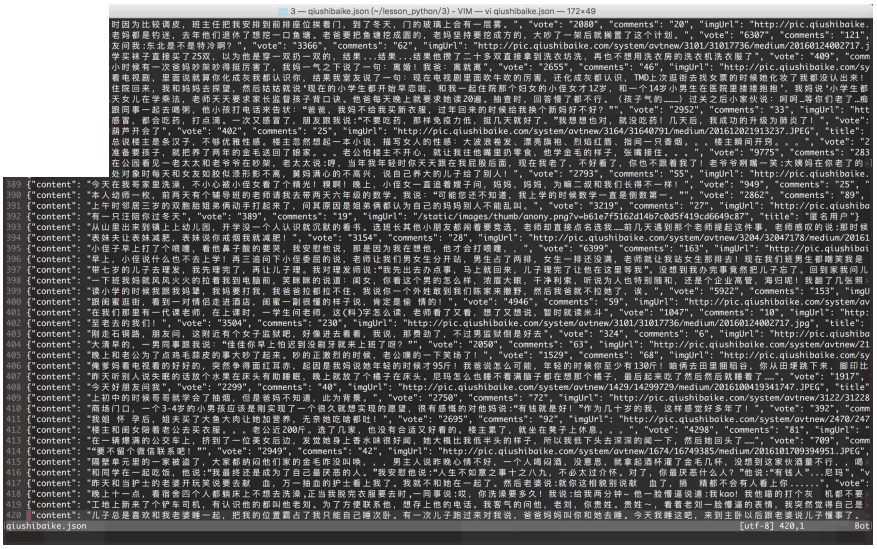
多线程示意图




```
#-*- coding:utf-8 -*-

import requests
from lxml import etree
from Queue import Queue
import threading
import time
import json

class Thread_crawl(threading.Thread):
    """
        抓取线程类
    """
    def __init__(self, threadID, q):
        threading.Thread.__init__(self)
        self.threadID = threadID
        self.q = q

    def run(self):
        print("String: "+self.threadID)
        self.qiushi_spider()
        print("Exiting: "+self.threadID)
```

```
            ushi_spider(self):
            ile True:
              if self.q.empty():
                  break
              else:
                  page = self.q.get()
                  print('qiushi_spider=', self.threadID, 'page=', str(page))
                  url = 'http://www.qiushibaike.com/8hr/page/' + str(page)+"/"
                  headers = {
                      'User-Agent':'Mozilla/5.0 (Windows NT 10.0; WOW64) AppleWebKit/537.36 (KHTML, like Gecko)
Chrome/52.0.2743.116 Safari/537.36',
                      'Accept-Language':'zh-CN,zh;q=0.8'
                  }

                  #多次尝试失败结束，防止死循环
                  timeout = 4
                  while timeout > 0:
                      timeout -= 1
                      try:
                          content = requests.get(url, headers = headers)
                          data_queue.put(content.text)
                          break
                      except Exception, e:
                          print "qiushi_spider", e
                  if timeout < 0:
                      print 'timeout', url



class Thread_Parser(threading.Thread):
    """
        页面解析类
    """
    def __init__(self, threadID, queue, lock, f):
        threading.Thread.__init__(self)
        self.threadID = threadID
        self.queue = queue
        self.lock = lock
        self.f = f

    def run(self):
        print("starting ", self.threadID)
        global total, exitFlag_Parser
        while not exitFlag_Parser:
            try:
                """
                    调用队列对象的get()方法从队头删除并返回一个项目。可选参数为block， 默认为True
                    如果队列为空且block为True，get()就使调用线程暂停，直至有项目可用
                    如果队列为空且block为False,队列将引发Empty异常
                """
                item = self.queue.get(False)
                if not item:
                    pass
                self.parse_data(item)
                self.queue.task_done()
                print("Thread_Parser=", self.threadID, 'total=', total)
            except:
                pass
        print "Exiting ", self.threadID

    def parse_data(self, item):
        """
            解析网页函数
            :param item:网页内容
            :return
        """
        global total
        try:
            html = etree.HTML(item)
            result = html.xpath('//div[contains(@id,"qiushi_tag")]')
            for site in result:
                try:
                    imgUrl = site.xpath('.//img/@src')[0]
                    title = site.xpath('.//h2')[0].text
                    content = site.xpath('.//div[@class="content"]/span')[0].text.strip()
                    vote = None
                    comments = None
                    try:
                        # 投票次数
                        vote = site.xpath('.//i')[0].text
                        # print(vote)
                        #print site.xpath('.//*[@class="number"]')[0].text
                        # 评论信息
                        comments = site.xpath('.//i')[1].text
                    except:
                        pass
                    result = {
```

```
                        'imageUrl' : imgUrl,
                        'title' : title,
                        'content' : content,
                        'vote' : vote,
                        'comments' : comments

                    }

                    with self.lock:
                        self.f.write(json.dumps(result, ensure_ascii=False).encode('utf-8') + '\n')
                except Exception, e:
                    print("site in result ", e)
            except Exception, e:
                print("parse_data", e)
            with self.lock:
                total += 1


data_queue = Queue()
exitFlag_Parser = False
lock = threading.Lock()
total = 0

def main():
    output = open('qiushibaike.json', 'a')
    #初始化网页页码page从1-10个页面
    pageQueue = Queue(10)
    for page in range(1, 11):
        pageQueue.put(page)

    #初始化采集线程
    crawlthreads = []
    crawllist = ["crawl-1", "crawl-2", "crawl-3"]

    for threadID in crawllist:
        thread = Thread_crawl(threadID, pageQueue)
        thread.start()
        crawlthreads.append(thread)

    # #初始化解析线程parseList
    parserthreads = []
    parserList = ["parser-1", "parser-2", "parser-3"]

    #分别启动parserList
    for threadID in parserList:
        thread = Thread_Parser(threadID, data_queue, lock, output)
        thread.start()
        parserthreads.append(thread)

    # 等待队列情况
    while not pageQueue.empty():
        pass

    #等待所有线程完成
    for t in crawlthreads:
        t.join()
    while not data_queue.empty():
        pass

    #通知线程退出
    global exitFlag_Parser
    exitFlag_Parser = True

    for t in parserthreads:
        t.join()
    print 'Exiting Main Thread'
    with lock:
        output.close()

if __name__ == '__main__':
    main()
```



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