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北京城市实验室（BCL）第三届年会
新数据环境下的城市：品质、活力与设计

2016·清华同衡

How **API** | 如何变革城市研究
is changing urban studies

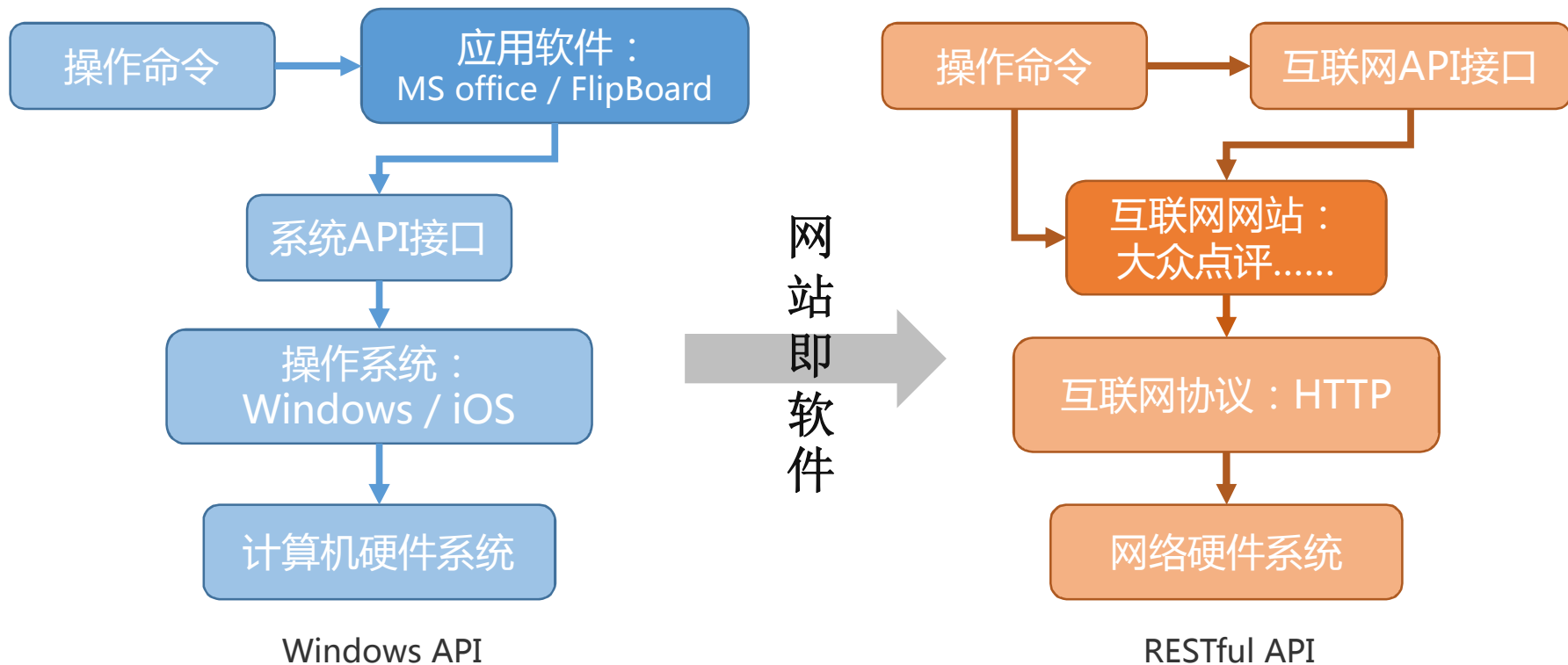
李栋 博士

北京清华同衡规划设计研究院 技术创新中心副主任

2016年6月

API是什么

Application Programming Interface , 应用编程接口



API是什么

Application Programming Interface , 应用编程接口

资源：互联网上某项具体的信息实体，可以是一段文本、一张图片、一首歌曲、一种服务。通过一个URI（统一资源定位符）来定位，每种资源对应一个特定的URI，访问该URI就可以获取该资源。

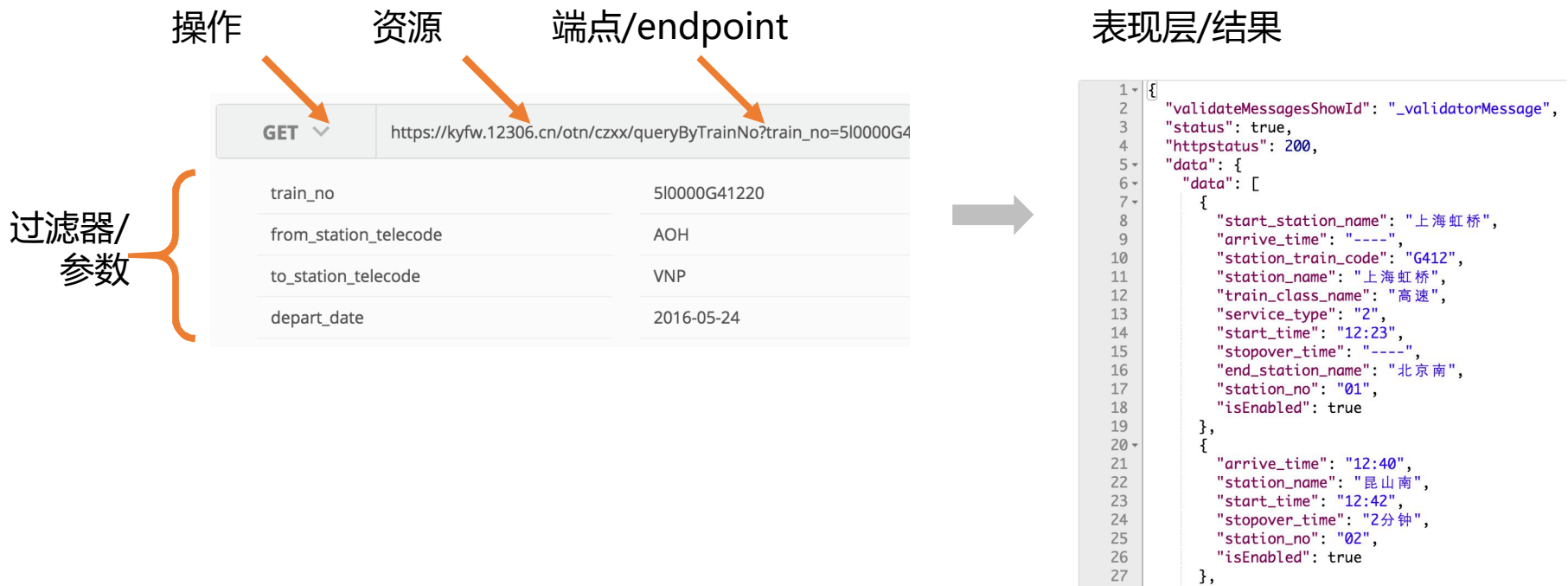
过滤器：如果记录数量很多，服务器不可能都将它们返回给用户。API可提供筛选参数，过滤返回结果。

表现层：文本可以是txt格式，也可以是HTML格式、XML格式、JSON格式表现；图片可以是JPG格式，也可以是PNG格式表现.....

API是什么

Application Programming Interface , 应用编程接口

https://kyfw.12306.cn/otn/czxx/queryByTrainNo?train_no=510000G41220&from_station_telecode=AOH&to_station_telecode=VNP&depart_date=2016-05-24



API是什么

Application Programming Interface , 应用编程接口

微博



高德地图



百度地图

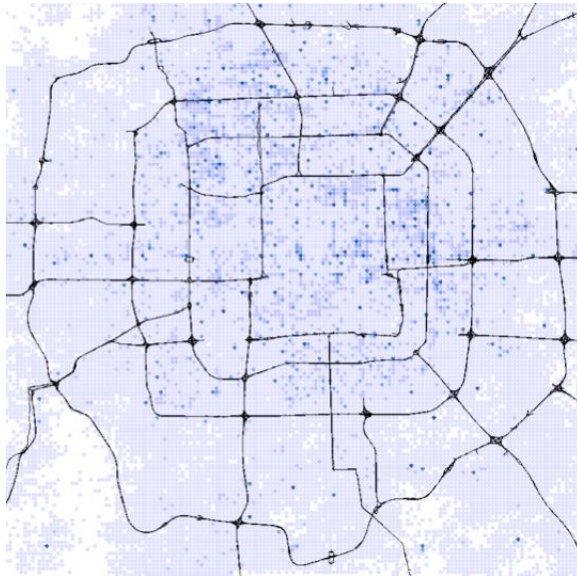


分析型API：一个案例

城市人群文本情绪的定量计算与空间分布格局

数据：微博语义

微博API



分析：自然语言处理

分词API、情感分析API



分词&命名实体API

提供智能分词（基本词和短语）、词性标注、命名实体识别功能。专业的团队对数据、模型、程序进行迭代更新以保证效果的不断提升。用户只需简单的调用相关API接口即可获得所需结果，无需担心诸如新词发现、歧义消除、调用性能等词法分析难题。词法分析已经



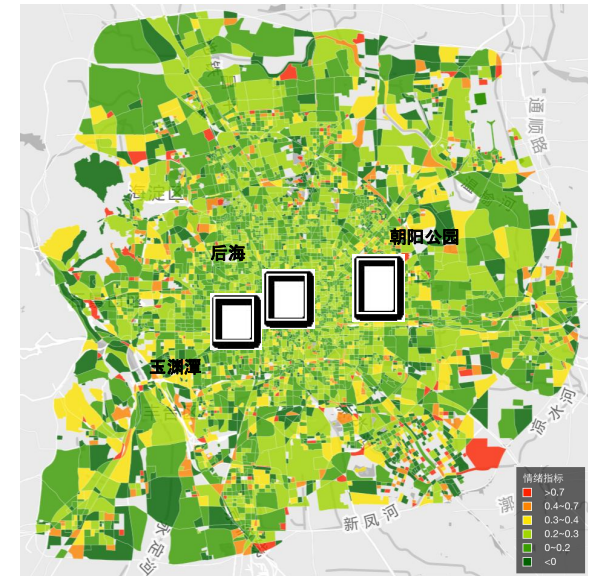
情感分析API

是为有情感分析需求的产品提供的服务。该服务能够对信息进行情感上的正向、负向及中性进行评价。在舆情监控、话题监督、口碑分析等商业分析领域有非常重要的应用价值。



展现：城市情绪地图

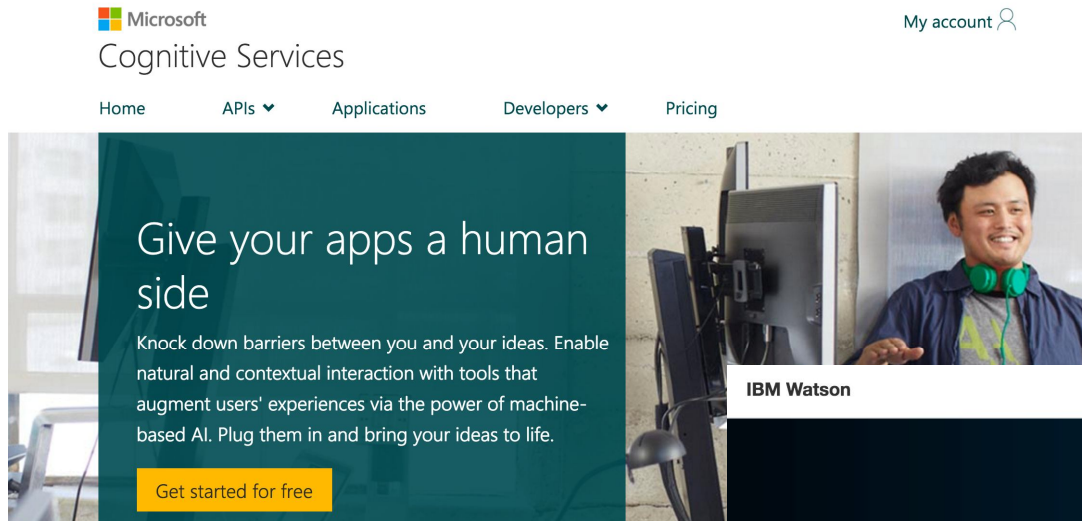
在线地图API



分析型API的进展

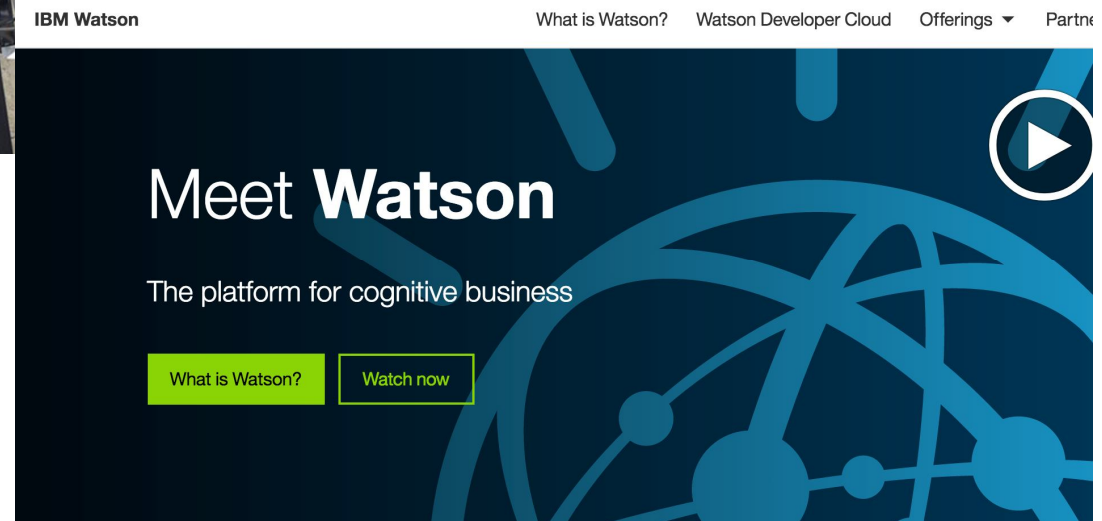
认知计算

Microsoft



The screenshot shows the Microsoft Cognitive Services website. At the top left is the Microsoft logo and the text "Cognitive Services". To the right is a "My account" link with a person icon. Below this is a navigation menu with "Home", "APIs", "Applications", "Developers", and "Pricing". The main content area features a dark green banner with the headline "Give your apps a human side" and a sub-headline: "Knock down barriers between you and your ideas. Enable natural and contextual interaction with tools that augment users' experiences via the power of machine-based AI. Plug them in and bring your ideas to life." A yellow button labeled "Get started for free" is positioned at the bottom left of the banner. On the right side of the banner, there is a photograph of a smiling man wearing a blue jacket and green headphones, standing in front of computer monitors.

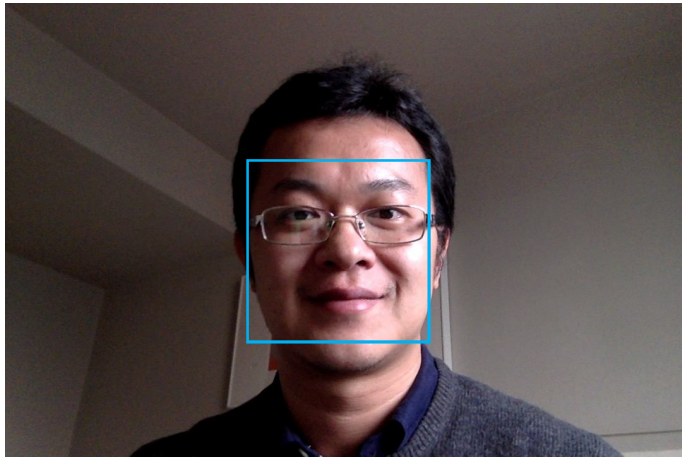
IBM



The screenshot shows the IBM Watson website. At the top left is the "IBM Watson" logo. To the right is a navigation menu with "What is Watson?", "Watson Developer Cloud", "Offerings", and "Partners". The main content area features a dark blue banner with the headline "Meet Watson" and a sub-headline: "The platform for cognitive business". A white play button icon is located in the top right corner of the banner. At the bottom of the banner, there are two yellow buttons: "What is Watson?" and "Watch now". The background of the banner features a stylized blue globe with network lines.

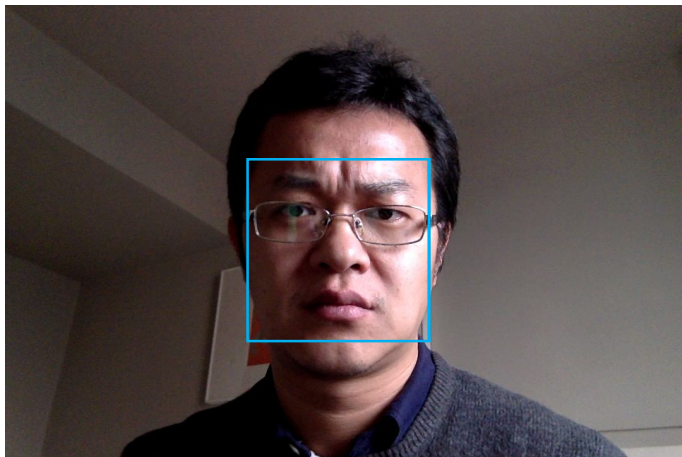
分析型API的进展

认知计算：图像分析、人脸识别



```
1  [{"  
2    "faceAttributes": {  
3      "age": 37.5,  
4      "gender": "male",  
5      "headPose": {  
6        "roll": -2.7,  
7        "yaw": 2.7,  
8        "pitch": 0  
9      },  
10     "smile": 0.972,  
11     "facialHair": {  
12       "moustache": 0,  
13       "beard": 0,  
14       "sideburns": 0  
15     },  
16     "glasses": "ReadingGlasses"  
17   }  
18 }]
```

```
1  [{"  
2    "scores": {  
3      "anger": 3.53214261e-7,  
4      "contempt": 0.0000109653529,  
5      "disgust": 0.00000195432972,  
6      "fear": 1.82611348e-9,  
7      "happiness": 0.9985864,  
8      "neutral": 0.00139826327,  
9      "sadness": 0.00000122028075,  
10     "surprise": 8.246225e-7  
11   }  
12 }]  
1  {  
2    "captions": [{  
3      "text": "a man wearing glasses and a tie",  
4      "confidence": 0.4989280595896834  
5    }]  
6  }
```



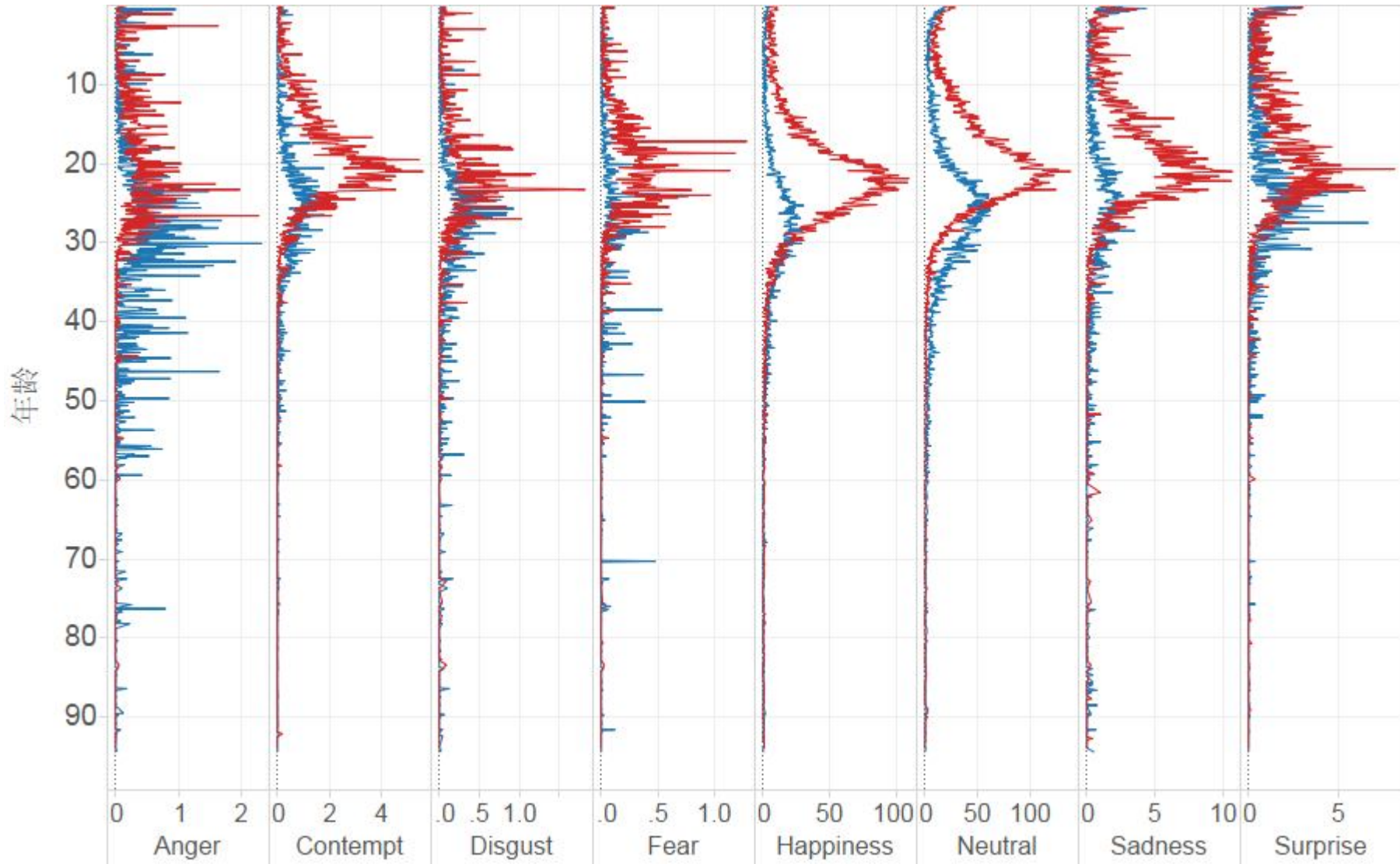
```
1  [{"  
2    "faceAttributes": {  
3      "age": 41.4,  
4      "gender": "male",  
5      "headPose": {  
6        "roll": 0.8,  
7        "yaw": -1.3,  
8        "pitch": 0  
9      },  
10     "smile": 0.001,  
11     "facialHair": {  
12       "moustache": 0.1,  
13       "beard": 0.1,  
14       "sideburns": 0  
15     },  
16     "glasses": "ReadingGlasses"  
17   }  
18 }  
19 }]
```

```
1  [{"  
2    "scores": {  
3      "anger": 0.0427270271,  
4      "contempt": 0.019723108,  
5      "disgust": 0.0272794235,  
6      "fear": 0.000435756,  
7      "happiness": 0.000370726717,  
8      "neutral": 0.82290554,  
9      "sadness": 0.0840005,  
10     "surprise": 0.00255793612  
11   }  
12 }]
```


分析型API：另一个案例

城市人群图像情绪

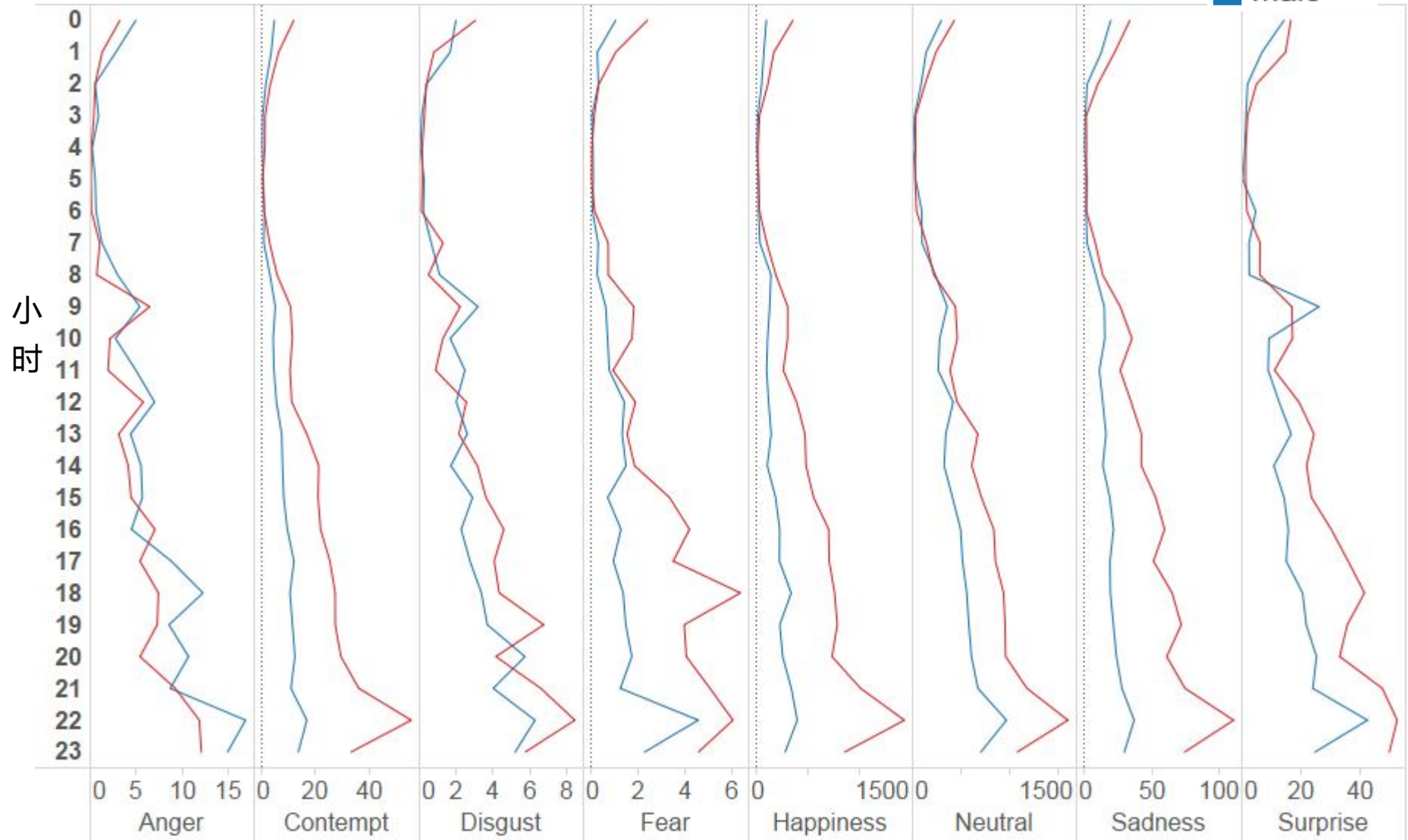
female
male



分析型API：另一个案例

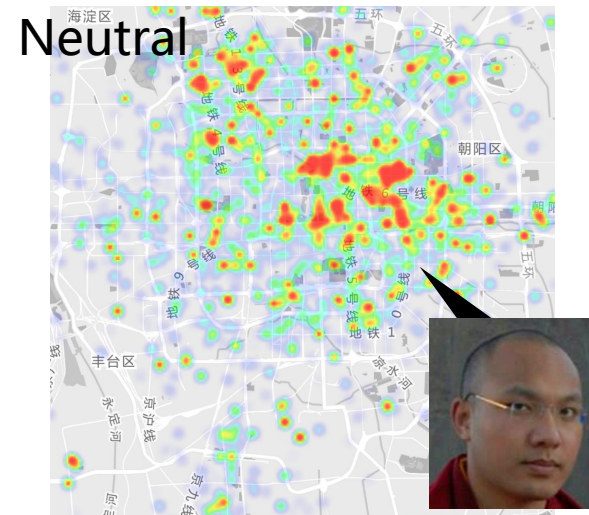
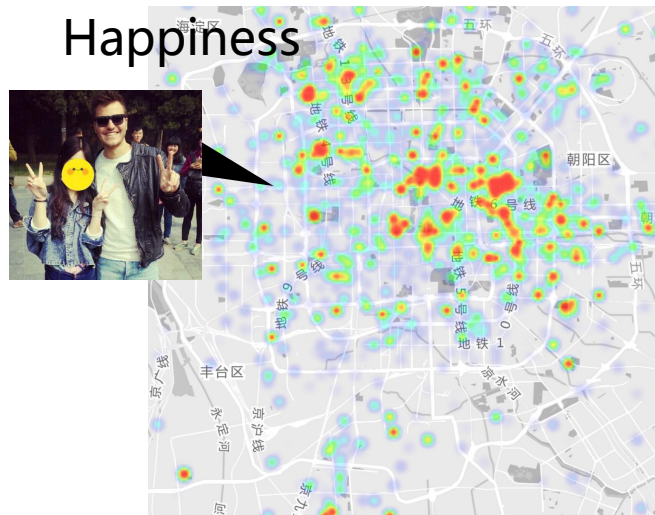
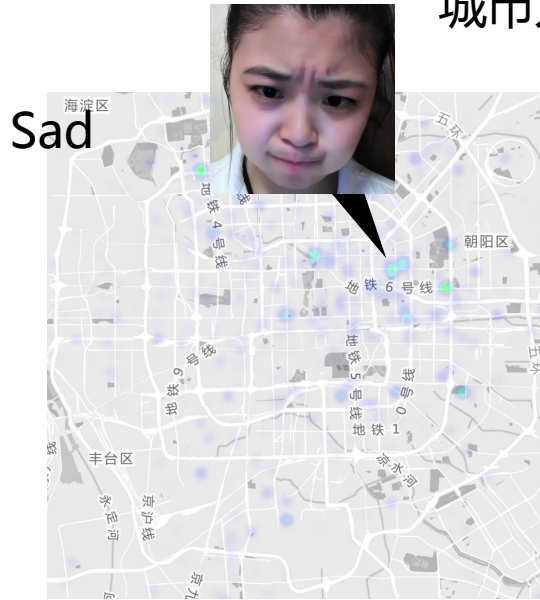
城市人群图像情绪

female
male



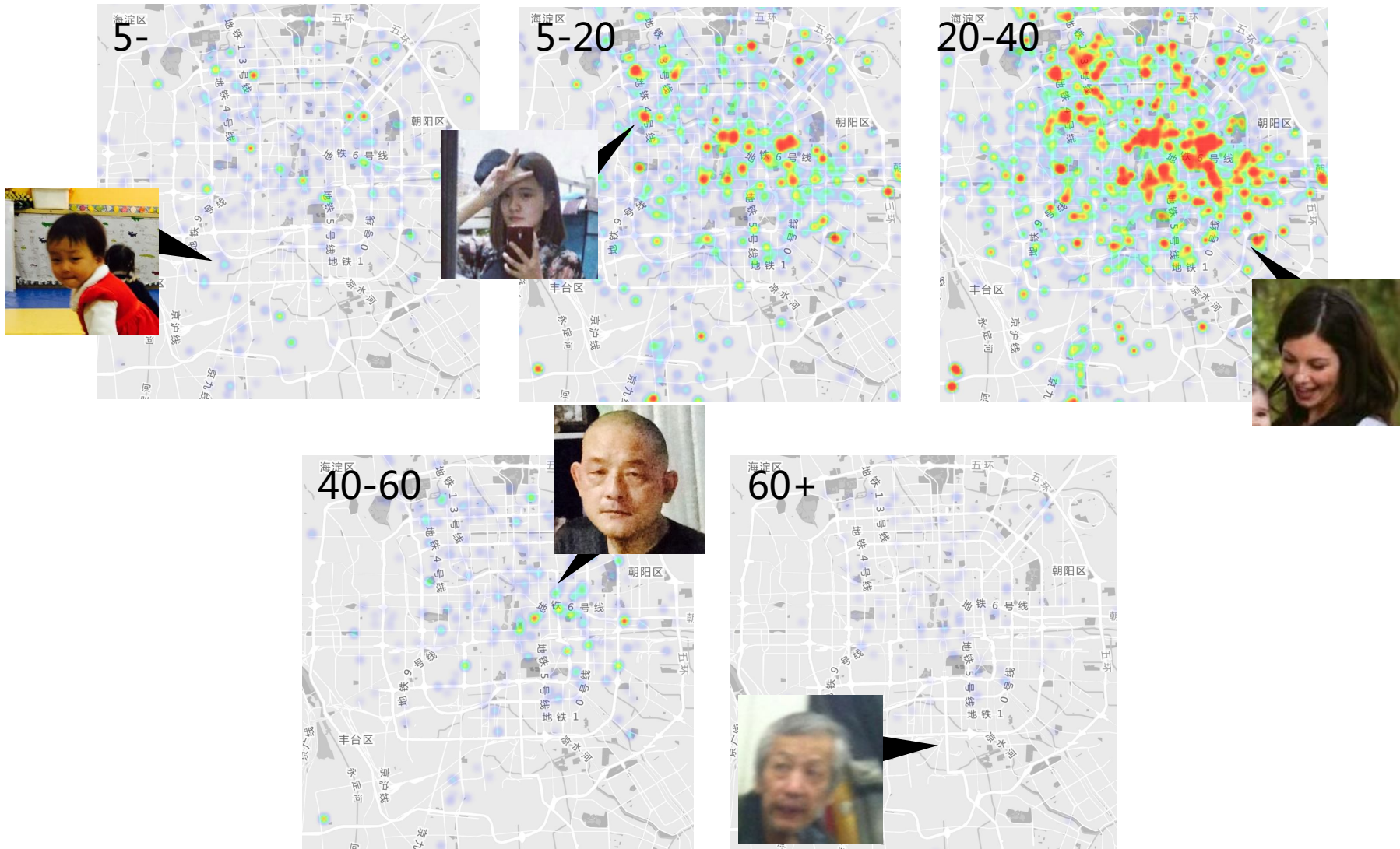
分析型API：另一个案例

城市人群图像情绪分布



分析型API：另一个案例

城市人群图像年龄分布



更多分析型API

Machine Learning as a Service (MLaaS)

Google



Machine Learning



Cloud Machine Learning Platform ALPHA
Fast, large scale and easy to use Machine Learning services

Amazon



Machine Learning



Amazon Machine Learning

Machine Learning for Developers

Microsoft

Microsoft Azure

Try Machine Learning Studio

Use Azure Machine Learning Studio to build, test, and deploy analytics models. Studio provides a library of algorithms and you started.



BigML、 PredictionIO、 Wit.ai、 AlchemyAPI、 Diffbot、 ...

其他API玩家

WrapAPI

Build an API on top of any website

Turn any website... ..into a parameterized API

Hacker News

```

{
  "success": true,
  "outputScenario": "default",
  "data": {
    "articles": [
      {
        "title": "SDM and Left-Pad: Have We Forgotten",
        "points": "173",
        "commentCount": "104",
        "submitter": "df92",
        "href": "http://www.hackernews.net/rpe-left-pad",
        "site": "hackernews.net",
        "rank": "1",
        "commentLink": "?flag?id=11348798&auth=2d197f&id": "11348798"
      }
    ]
  }
}
    
```

Build, share, and use APIs made from webpages. Use WrapAPI to scrape sites, build better UIs, and automate online tasks.

Get the Chrome plugin

How it works

1. Capture requests

Finding and saving the requests that matter for your API is a piece of cake with WrapAPI's Chrome extension.

2. Define inputs

Easily import and compare requests to see which HTTP POST and GET fields are parameterizable inputs.

3. Define outputs

Visually define API outputs by just clicking on the relevant elements, using regular expressions, and more.

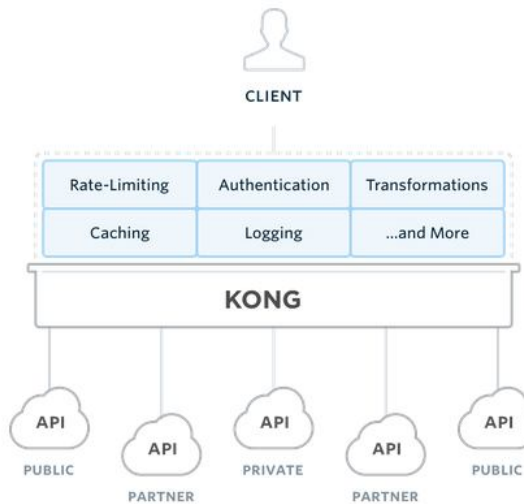
4. Publish and share

Never build the same thing twice. Share and build on top of other WrapAPI members' APIs.

KONG



KONG



Geohey / 极海

数据 公共数据 几何分析 地址匹配 导航 地图 数据可视化 地理标签

数据API 用于对用户私有数据进行维护和应用。Geohey平台支持各种类型的数据库，包括Excel、CSV、SHP、KML/KMZ、GeoJSON/TopoJSON、GPX。用户在Geohey平台上将以上任意类型的数据上传后，即可通过数据API增加、查询、编辑、删除数据记录。Geohey可以作为用户的空间数据库基础设施，提供空间数据管理能力，并保证数据安全。

API地址

http://geohey.com/s/data/{dataUId}

API地址大多用于在SDK中进行设置。由SDK帮助生成以下各种操作的请求地址并调用。Notes({dataUId})为数据的id号

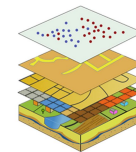
请求方法

API同时支持GET和POST方法访问，大多数情况建议使用POST方法；但是在基于浏览器直接调用的应用中，由于涉及跨域访问，所以只能采用GET方法请求。此时会受到GET请求长度的限制，在开发中需要注意。

如果开发浏览器应用时遇到GET方法不能满足要求的情况，需要在应用的同一域名下部署一个转发服务，将API的访问形式从浏览器直接调用转为服务器调用。

数据

行政区划、人口分布、收入调查、小区商圈、PM2.5...
各种公共数据比较的应用更丰富
也可随时上传自己的数据，并整理经纬度、地址、行政区划，自动处理，以备随时使用



API / SDK

数据服务、数据标注、地图服务、地址编码、几何分析...
您可选择熟悉的开发语言，在网页、服务端、APP中通过http或https请求这些功能
我们还提供移动端免费的SDK帮助方便的开发出融合地理功能的应用

CSV / SHP



RESTful API / JSON

更多API玩家

百度 APIStore



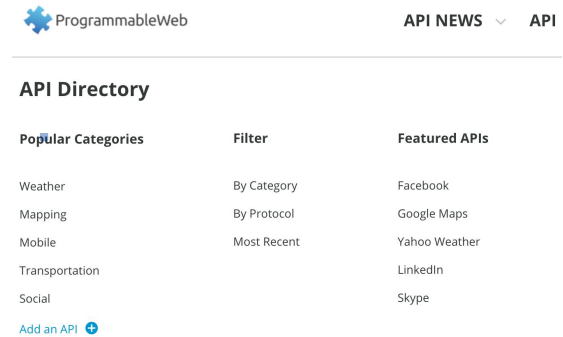
聚合数据



京东云 万象



ProgrammableWeb

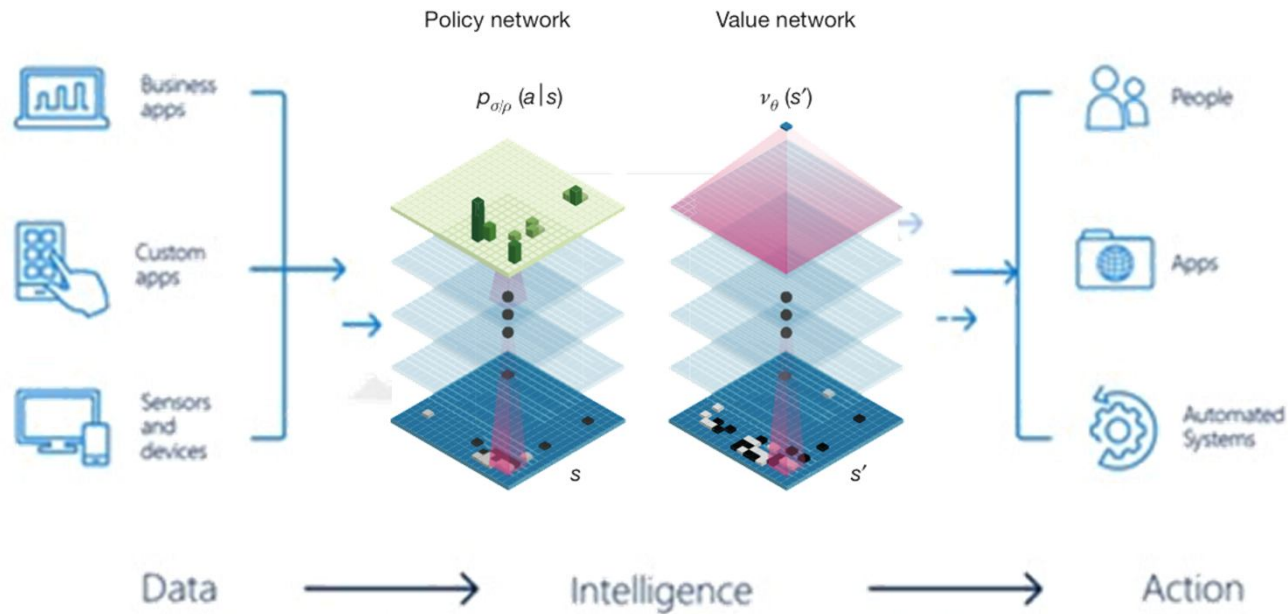


API的意义：轻量级模式、重量级功能

一种简明的、标准化的服务封装方式

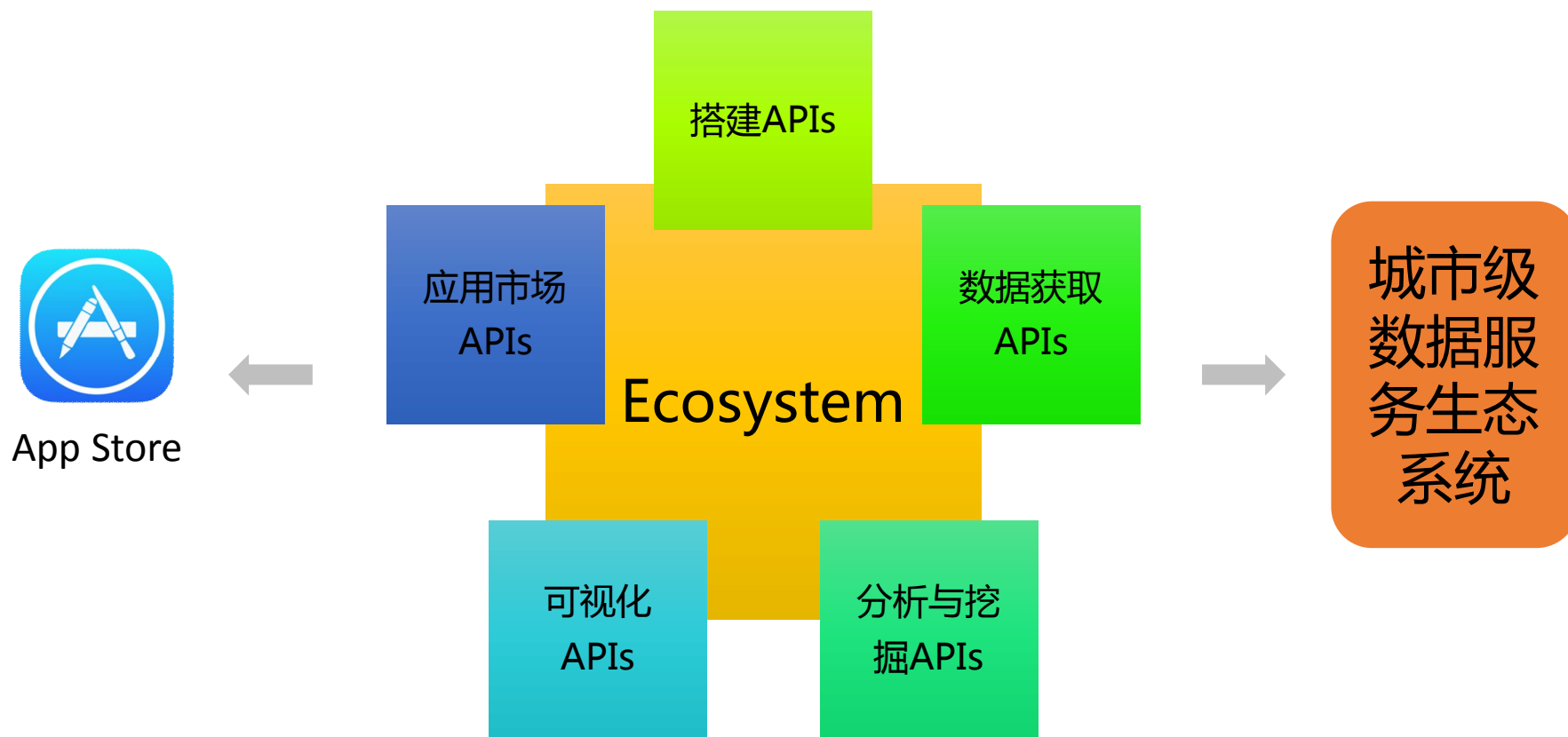
API是一些预先定义的函数，目的是提供使用者基于后方软硬件系统得以访问一组服务的能力，无需了解源码、或理解内部工作机制的细节。

API for AlphaGo?



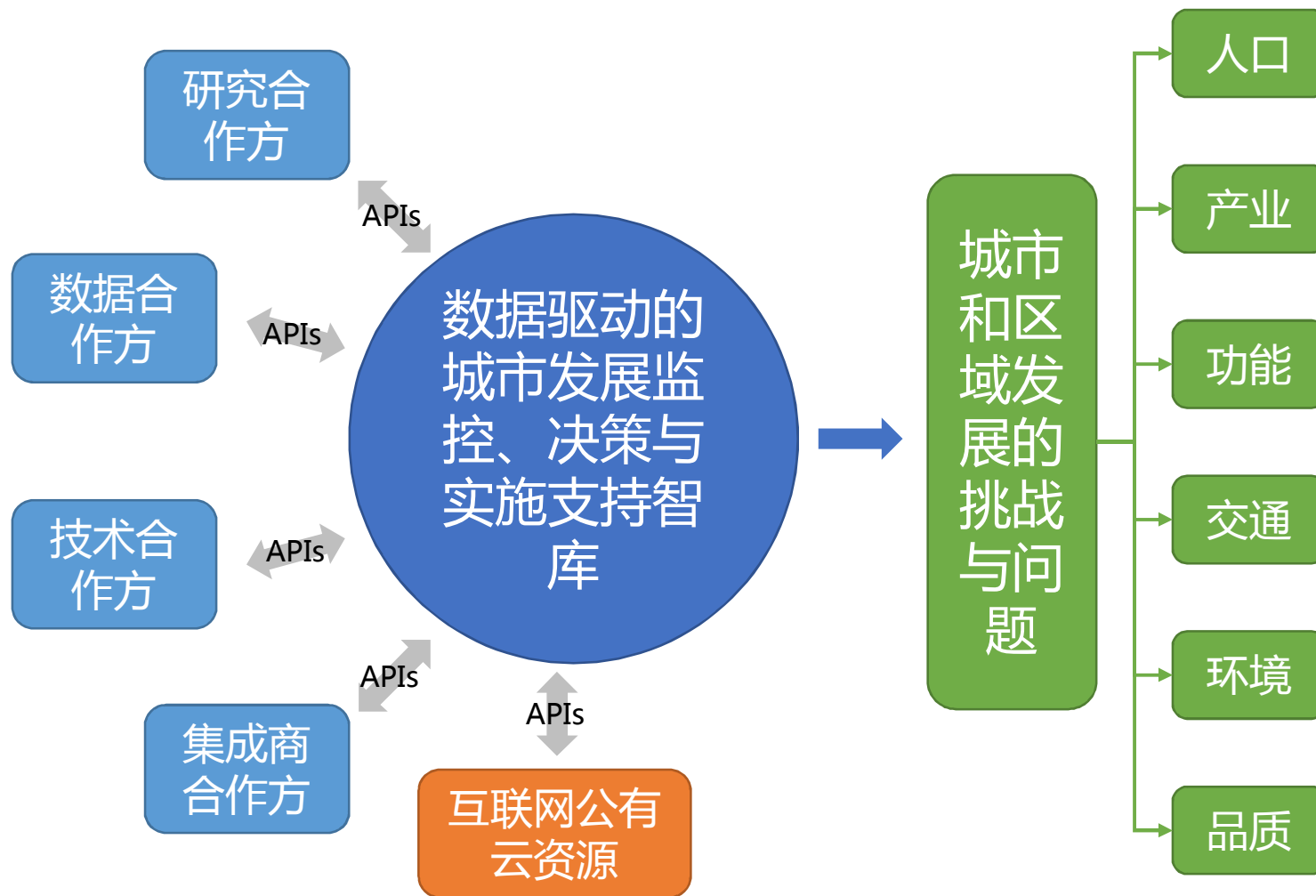
混聚：Mash-up

城市研究的新模式



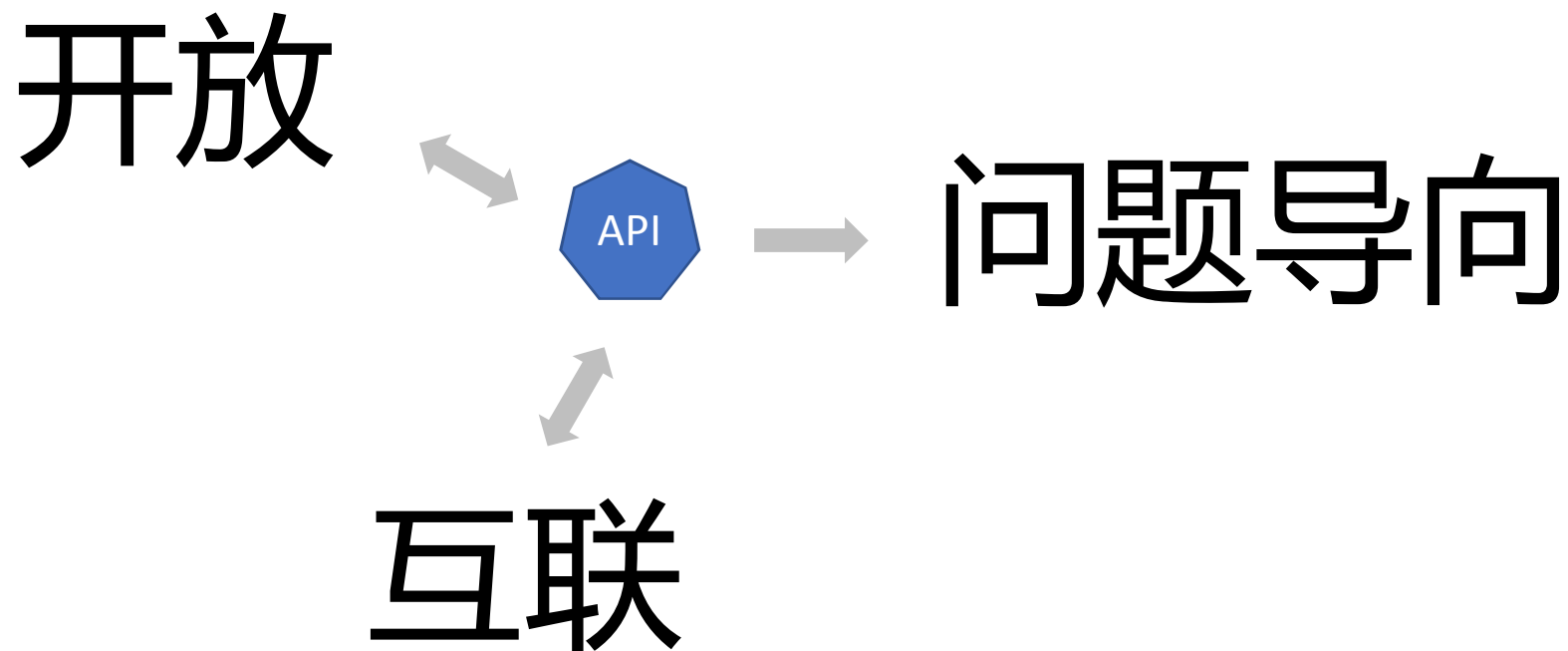
城市级数据服务生态系统：基于应用接口的互通网络

数据 → 挖掘 → 应用



Google、Microsoft、IBM、
百度、阿里巴巴、腾讯...

城市级数据服务生态系统



城市级数据服务生态系统

欢迎来到城市研究的新纪元