

2018 Spring TSINGHUA & NUS Joint Studio

Data Augmented Design for Future Cities

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School of Architecture, Tsinghua

January 10th, 2018

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Evolution of data environment

The previous era - 2010

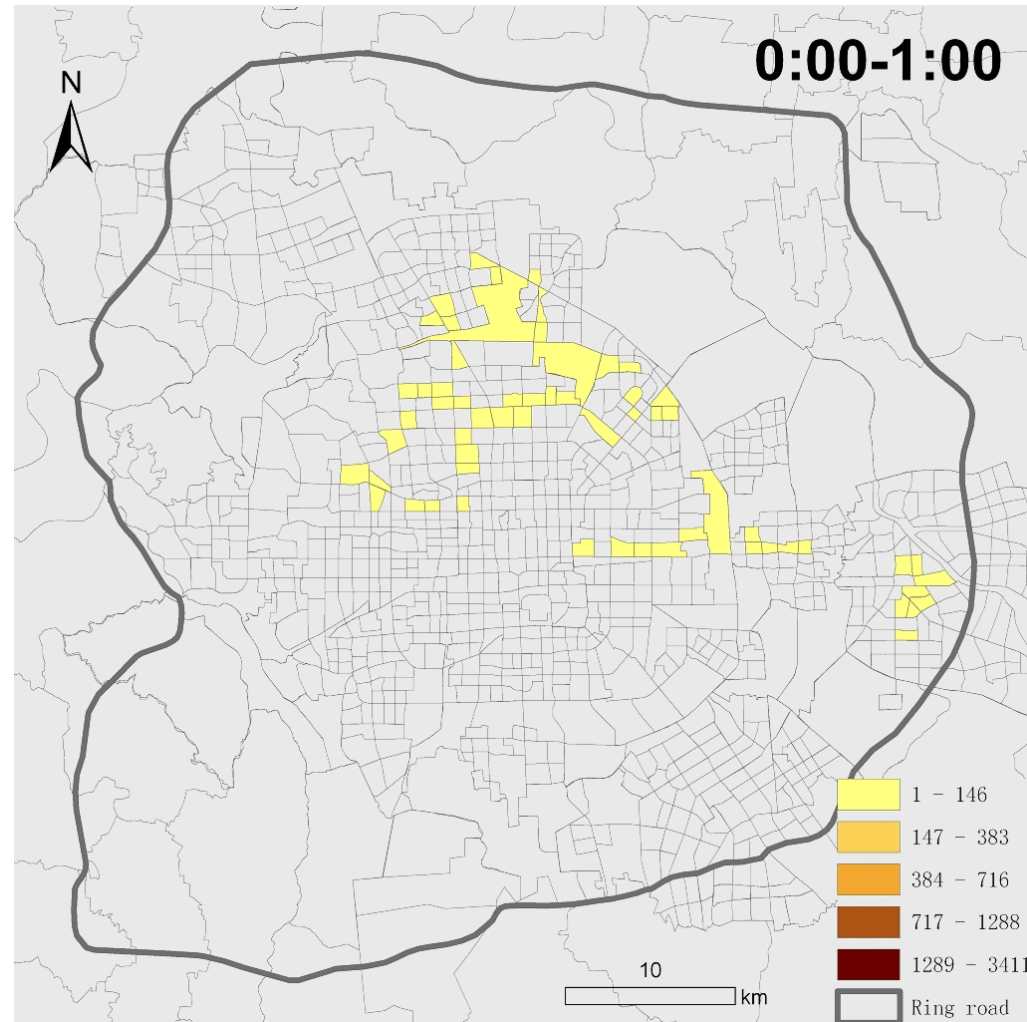
The new data environment, since 2010

Understanding and governing cities mainly rely on official yearbooks



The new data environment, since 2010

Count of bus ridings for each TAZ



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Open data: (1) Commercial websites / social media

Not big all the time

社交网络

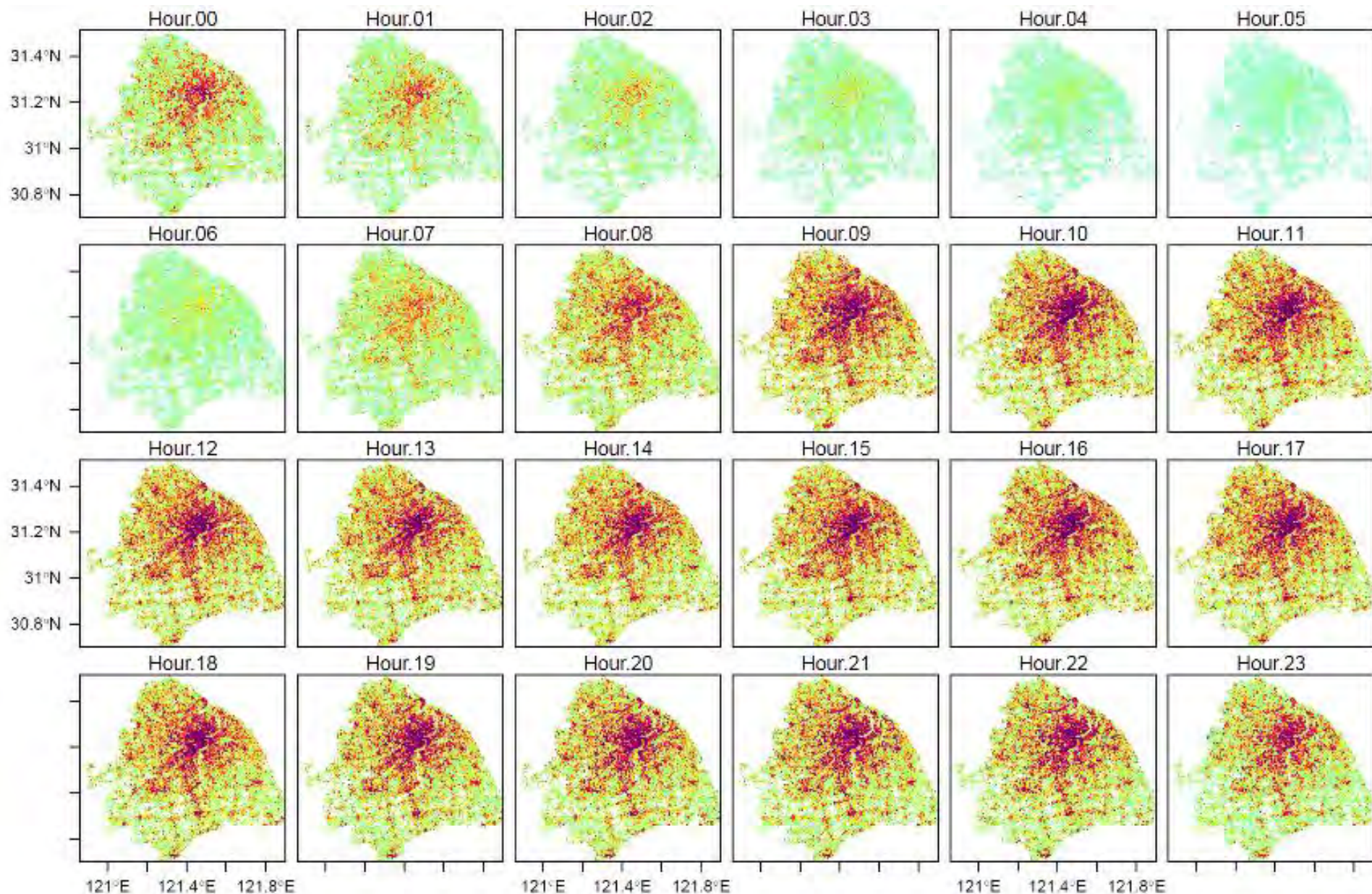


专业网站



- Online Users of Tencent QQ

Source: Wang Jianguo





National data 国家数据

中华人民共和国国家统计局
National Bureau of Statistics of China

首页 | 月度数据 | 季度数据 | 年度数据 | 普查数据 | 地区数据 | 部门数据 | 国际数据 | 可视化产品 | 出版物 | 帮助

查数 CHASHU

如: 2012年北京 GDP



搜索

统计热词

gdp cpi 人口 出口 总人口 房价
社会消费品零售总额 固定资产 ppi 货币

为用户提供更好的服务

经济学家曾这样预言：“新时代最重要的趋势是将世界上的信息组织起来，让每个角落的人都能够找到最有价值的信息。”为此，国家统计局创新升级了“涵盖内容更加全面、使用体验更加快捷”的新版数据库，这就是“国家统计数据库”。

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1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

用户中心

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自动登录 忘记密码

登录



快速查询 (专题统计报表)

月度 季度 年度

工业增加值增速
主要工业产品产量
各地区工业增加值增长速度
分行业主要工业企业经济指标
固定资产投资 (不含农户)
各地区固定资产投资 (不含农户)
各行业固定资产投资 (不含农户)

房地产开发投资
各地区商品房销售面积
各地区房地产开发、竣工面积
社会消费品零售总额
限额以上企业商品零售类值表
居民消费价格分类指数
商品零售价格分类指数

各地区居民消费价格分类指数
工业生产者价格指数
各地区工业生产者价格指数
七十个大中城市住宅销售价格指数
全社会客货运输量
邮电业务完成量
国际比较

2013年统计公报

热点问题解读

统计指标解释

发布日程

2014年 4月						
日	一	二	三	四	五	六
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

今日发布: 工业生产者价格指数月度报告
明日发布: 明日无发布内容

可视化图表

数据更新

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在线服务 >> 审批结果 >> 建设用地规划许可证

在线服务

- 办事指南 >>
- 表格下载
- 网上咨询
- 状态查询

审批结果 >>

建设项目选址意见书

建设用地规划许可证

建设工程规划许可证

规划核验(验收)

建筑名称核准

建设单位办理项目

在线申报 >>

在线服务 Online Services

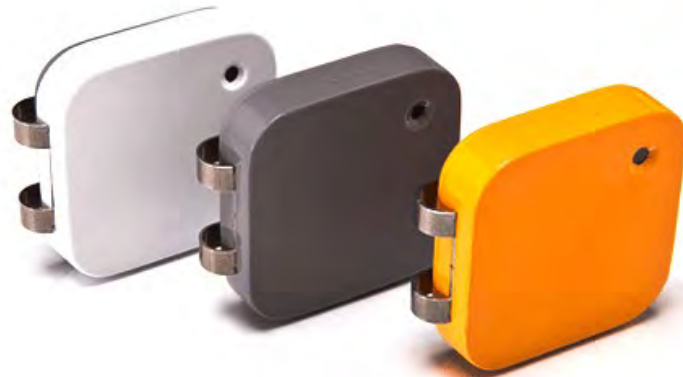
建设用地规划许可证

共有 9377 个用地许可证 共 626 页

项目搜索

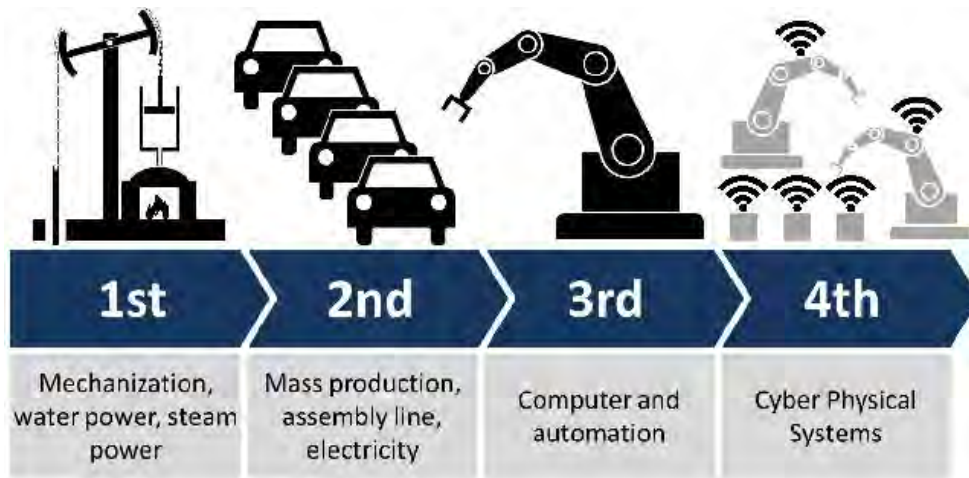
搜索

证书编号	建设单位	项目名称	建设位置	核发日期	查看
2014规(怀)地字0011号	北京东方美都农业科技有限公司	北京东方美都农业科.....	怀柔区北房镇黄吉营村32号	2014-06-12	查看
2014规(密)地字0012号	北京古北水镇房地产开发有限公司	密云县古北水镇国际.....	密云县古北口司马台	2014-06-06	查看
2014规(大)地字0025号	北京鸿坤伟业房地产开发有限公司	西红门0801-0.....	大兴区西红门镇	2014-06-06	查看
2014规(房)地字0028号	北京京投阳光房地产开发有限公司	房山区长阳镇长阳西.....	房山区长阳镇篱笆房村	2014-06-05	查看
2014规(房)地字0027号	中石化催化剂(北京)有限公司	6000立方米/年.....	房山区房山区城关街道办事处前、后朱各庄村	2014-06-05	查看
2014规(房)地字0026号	中国核电工程有限公司	中国核电工程有限公.....	房山区长阳镇水碾屯村	2014-06-03	查看



Life Logging

Internet of Things

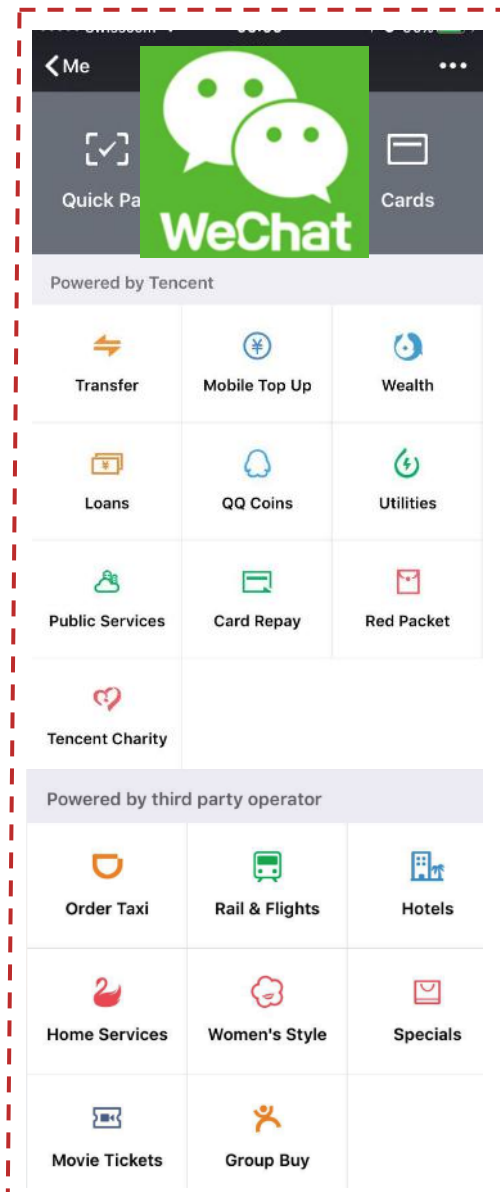


Changing urban space and daily life in China

Shaped by ICTs

Emerging issues

E-life in Chinese cities



排名	昵称	步数
1	星星	26147
2	糖糖	24339
3	叶秋	20694
4	何晓	20299
5	陈杨-Juliet-THU	19380
6	赵艳	18975
7	张天怡-复旦...	18572
8	陆浩-东大大学...	18527

Cameras everywhere



相关传感器



温度传感器



红外气体传感器



光纤传感器



二氧化碳传感器

展开

相关电器



百万高清网络摄像机



网络摄像头



h.264硬盘录像机



球机

展开

其他人还搜



汽车传感器



红外传感器



张力传感器



红外摄像头

展开

Apple Watch Series 3



新款

Apple Watch Nike+



新款

Apple Watch Hermès



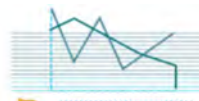
新款

Apple Watch Edition



新款

Apple Watch Series 1



车流量、车速计数



车牌识别



特定区域内人数



视频调用

清华同衡CITYGRID

VOC PM2.5 PM10 SO2 O3 CO NO2



New elements in public space



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Algorithm of internet companies control daily life

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首页 海淀区 五道口

频道: 不限 美食 电影演出赛事 休闲娱乐 酒店 丽人 K歌 运动健身 周边游
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Algorithm of internet companies control daily life

啤器精酿

手机买单 积分抵现

添加分店



101条评论

人均: 86元

口味: 9.3

环境: 9.3

服务: 9.3



地址: 五道口华清商务会馆907c

电话: 18501378892

更多信息



写点评



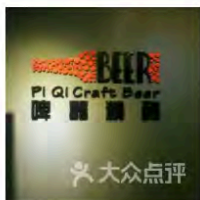
wxy624 VIP



口味: 4 环境: 4 服务: 4

位置有点不好找, 但里面环境不错, 老板非常热情, 会根据个人喜好推荐酒, 我们去的时候老板推荐了两款精酿, 分别盛了一点让我们喝完再选, 服务超级好。最后选的几瓶, 除了一个巧克力还是咖啡的不好喝, 其他的都很不错。

环境



09-08 啤器精酿

赞 (1) 回应 收藏 举报

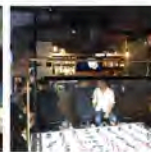


奔跑的大肥驴 VIP



口味: 4 环境: 3 服务: 4

位于宇宙中心五道口一栋商务楼内, 围着楼下找了一会, 后来电话老板才走上正道。地方不大, 就是一套3室的住住房改的, 装修简易, 不过有点味道。重点说说酒, 啤酒, 感觉很棒, 各种类型啤酒陈列展览在冰箱中, 自助取酒, 如果有需要, 服务小哥会给予热情的介绍。整体价格实惠, 推荐附近的朋友可以来喝一杯。



Algorithm of internet companies control daily life

稻城全部景点 + 推荐新的景点

全部景点

亚丁必游TOP8

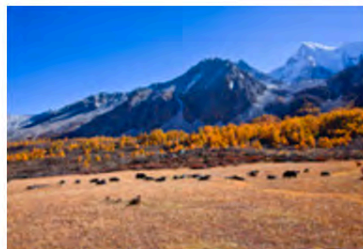
游古寺



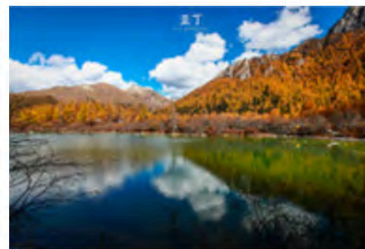
亚丁风景区



牛奶海(俄绒措)



洛绒牛场



珍珠海



仙乃日



五色海



海子山



央迈勇



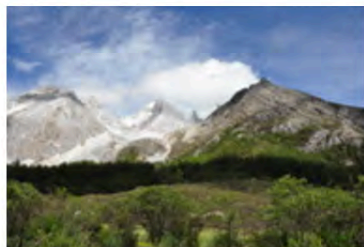
冲古寺



红草地



稻城白塔



夏诺多吉



三神山(三圣山)



亚丁村



傍河与色拉

Algorithm of internet companies control daily life



推荐	方案2
15分钟	15分钟
3.2公里	3.2公里

红绿灯5个
出租车14元 网约车最低13元 >

开始导航



推荐方案	步行最少
50分钟	49分钟
3.5公里	3.4公里

途经5个十字路口 **燃烧173kcal能量**
查看您附近的共享单车 >

开始导航

Bikes are back / sharing economy / use rather than own



Re-imagining Streetlight Infrastructure as a Digital Urban Platform

Ricardo Álvarez^a, Fábio Duarte^{a,b}, Alaa AlRadwan^a, Michelle Sit^a and Carlo Ratti^a

^aSenseable City Lab, Massachusetts Institute of Technology, Cambridge, USA, ^bPontifícia Universidade Católica do Paraná, Curitiba, Brazil

ABSTRACT

Urban infrastructures have traditionally been mono-functional: water, sewage, and electricity are notable examples. Embedded with digital technologies, urban infrastructures have the potential to communicate with one another and become multi-functional platforms that integrate data gathering and actuation cycles. In this paper, we focus on public lighting infrastructures. Despite the technological development of lights, including LED technology, streetlights have been primarily treated as a mono-functional infrastructure. Based on case studies, we discuss the potential of reimagining streetlight infrastructure, and advance some initial proposals that focus on sensing and actuation cycles, which could transform this pervasive infrastructure into a digital urban platform.

KEYWORDS

Streetlight; smart-lighting; urban infrastructure; digital technologies; internet of things

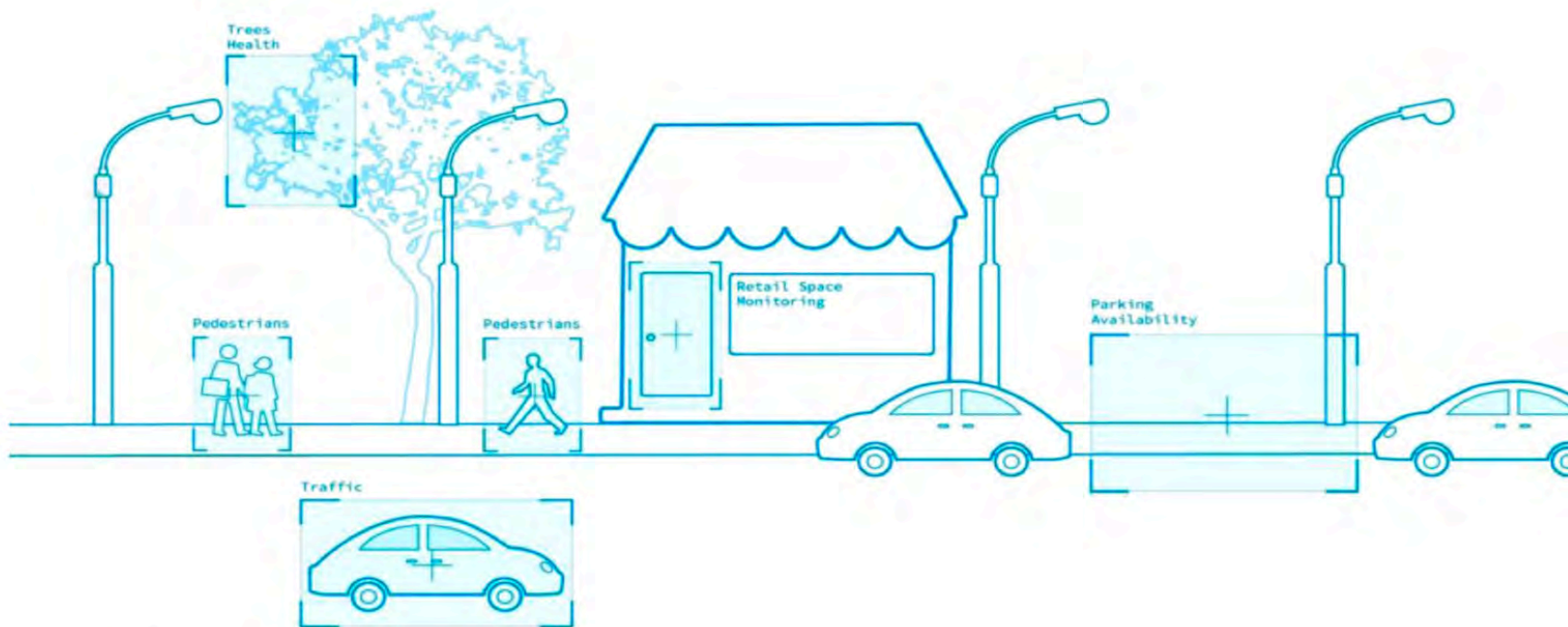


Figure 2. Single sensor, multi uses

http://senseable.mit.edu/papers/pdf/20170410_Alvarez_RimaginingStreelight_JUT.pdf



Data Augmented Design (CAD→DAD)

Computer vs Data

Aided vs Augmented

A planner worked in Tencent (one of the largest Internet companies in the world) for preparing the recent Spatial Plan of China

Source: Wechat



Data Augmented Design (DAD)

■ Definition:

Empowered by emerging big and open urban data, together with **quantitative spatial analysis** and statistical approaches and cutting edge techniques like artificial intelligence, **DAD provides a supporting platform for the whole planning and design process**, ranging from field investigation, existing condition analysis, future forecasting, scheme design, operation evaluation and feedback. It is hoped that the application of DAD in planning and design practice could **improve the scientific level of planning and design**, and **inspire the creativity of planners and designers** (Long and Shen, 2015).

■ Position:

DAD belongs to **a new planning and design support form** after CAD (Computer Aided Design), **DSS** (Decision Support System), **GIS** (Geographical Information System) and **PSS** (Planning Support System). (CAD->GIS->DSS->PSS->DAD)

数据增强设计*

——新数据环境下的规划设计回应与改变

Data Augmented Design: Urban Planning and Design in the New Data Environment

龙 瀛 沈 尧

文章编号1673-8985 (2015) 02-0081-07 中图分类号TU981 文献标识码A, B

摘 要 由大数据和开放数据构成的新数据环境,对城市的物理空间和社会空间进行了更为精细和深入的刻画。新数据环境下所开展的定量研究较多,但多为针对城市系统的现状评价和问题识别,少有面向未来的规划和设计的研究与应用。提出了数据增强设计 (DAD) 这一规划设计新方法,它以定量城市分析为驱动,通过数据分析、建模、预测等手段,为规划设计的全过程提供调研、分析、方案设计、评价、追踪等支持工具,以数据实证提高设计的科学性,并激发规划设计人员的创造力。从数据增强设计的定义、理论和实践的维度、内涵、设计流程、特点与概念辨析、常用方法与工具,以及应用场景等角度,阐述了对DAD的认识;最后给出了关于DAD的研究案例和设计案例。

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Data Augmented Design (DAD)

■ Connotations

- A large coverage, fine-grained and complex epitaxy, trying to cover all related phenomena.
- The self completion of structure, through empirical data support combined with its own semantic construction system, helps to increase the scientific and empirical persuasion.
- The generality of application attaches great importance to concept generation and support.

■ Goal orientation

- provide the required functions; adapt to the trend of urban development and change; plan and design for the agent, taking account of the stakeholders; meet the aesthetic needs;
- The standard of evaluation is more objective and qualitative.

■ Object elements

- All the elements involved in the design and the spatial effects of various social, economic and environmental conditions.

■ Basic methods

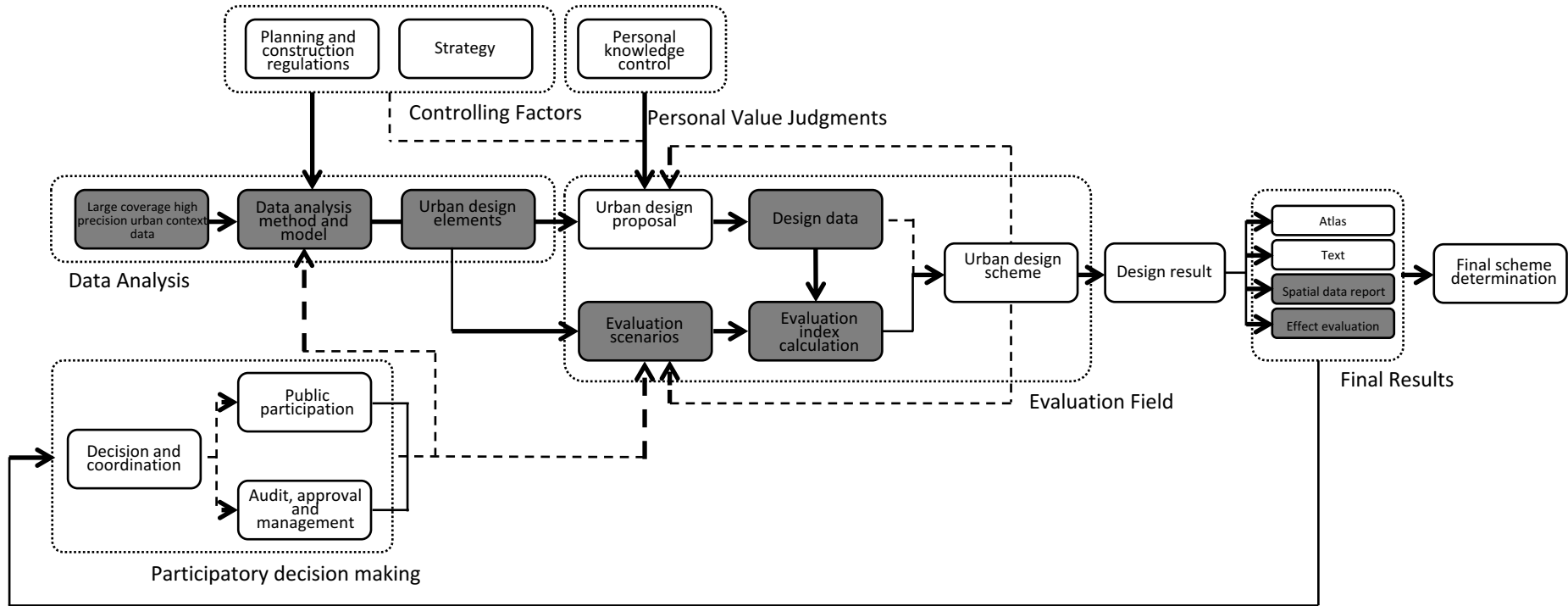
- Spatial analysis, abstraction of elements, big models, data processing, and so on

■ Design process

- Design from quantitative analysis to specific plans with empirical basis, supplemented by quantitative decision-making and public participation, and finally get the outcome of planning and design.

Data Augmented Design (DAD)

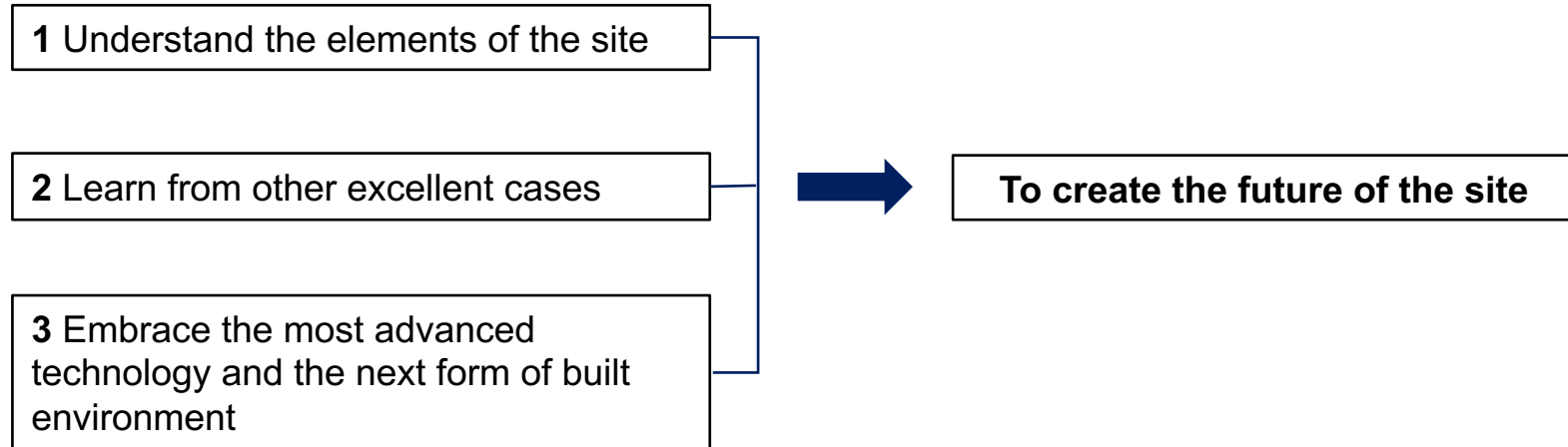
■ Process of DAD:



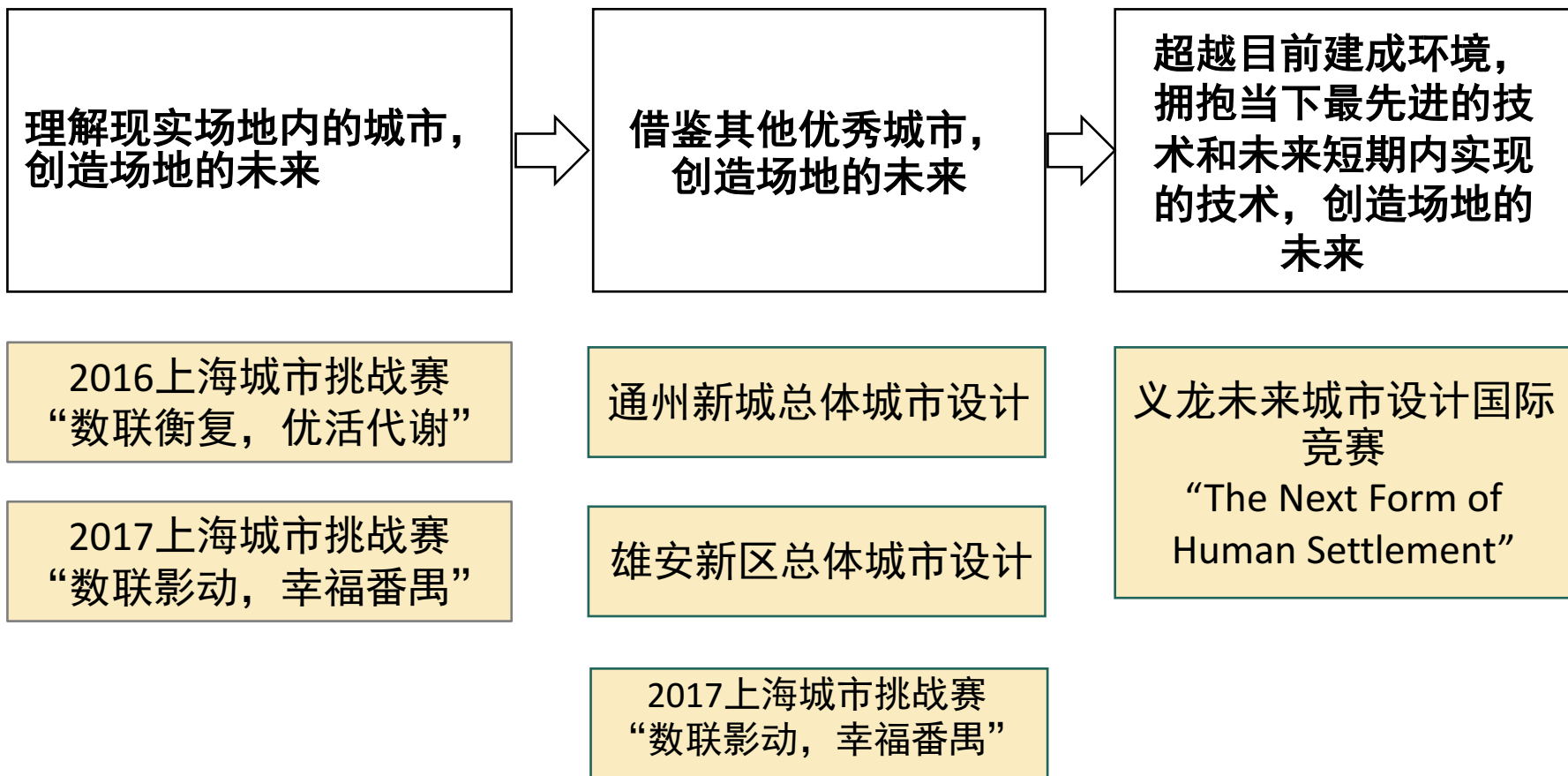
Data augments the whole process of design, including existing condition analysis, evaluation, outcome and participatory decision-making.

Data Augmented Design (DAD)

■ Existing Applications (details in the following slides):



三方面的实践应用

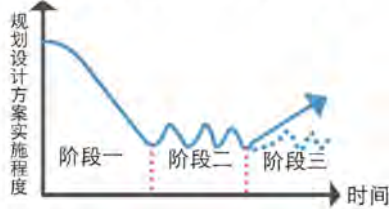


2016 Shanghai Urban Design Challenge

Understand the elements of the site from various dimensions to create the future of the site
 _Urban Redevelopment Oriented Design

Collaborators: Zhejing Cao, Xiyu Liu, Zhaoqi, Liu, and so on, school of architecture, Tsinghua University

- 阶段一：精英式蓝图规划设计
- 阶段二：半公众参与时代规划设计
- 阶段三：数据自适应时代规划设计

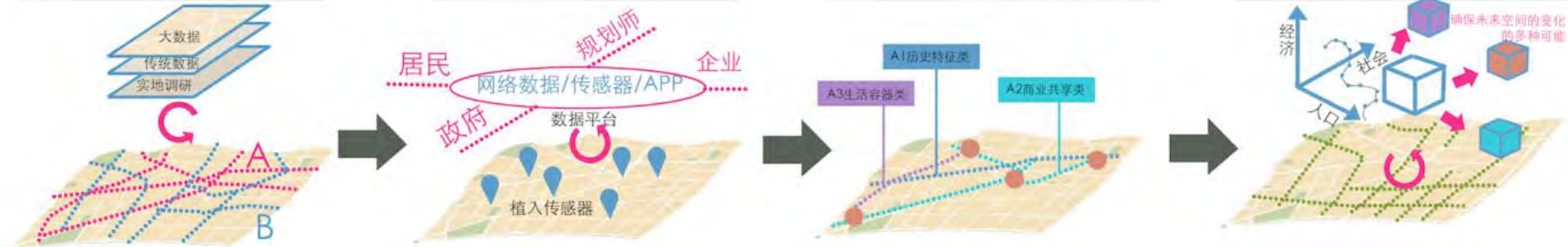


Divide the streets into A/B based on data

Set up a space measurement platform to promote public participation

Optimize A streets (better ones)

Design B streets (dynamic change ones)

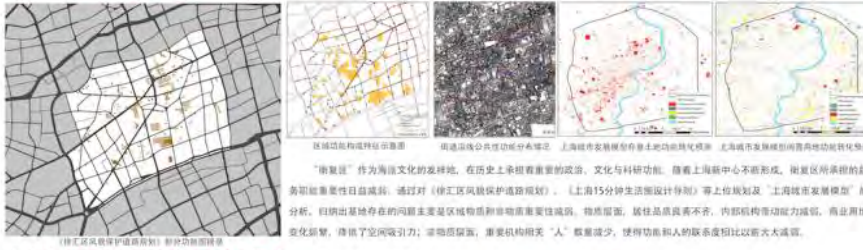


1. 现状研究	2. 现状问题挖掘	3. 规划引导	4. 街道慢行指数评分	5. 街道类别划分及引导	6. 街道空间类型分析	7. A/B类街道空间数据测度指标检测和动态反馈	8. A/B类街道针对性设计导则	9. 慢行交通体系设计	10. A类街道首轮示范设计	11. 虚拟平台搭建
上位规划研究 总体规划 历史街区保护规划	衡复地区功能定位不明确	优化基地用地功能布局	吸引力	核心街道无剧烈变化 A类 A1-历史特征类街道 A2-商业共享街道 A3-生活容器类街道 A4-新增A类街道	A类 9种	街道空间检测指标 · 吸引力 · 安全性 · 舒适性 · 历史性	A类 9项	道路交通体系设计	历史特征类街道详细设计	人迹地图平台
城市空间数据 上海城市发展模型预测土地利用 15分钟生活圈设施分布计算	缺少触媒效应的城市功能节点	促进城市节点功能提升和辐射力	安全性	街区街道可动态调控 B类 B1-底商居住街道 B2-内向居住街道 B3-底商其他街道 B4-内向其他街道	B类 8种	网络舆情及公众参与 · 网络语料 · 交互的公众参与平台	B类 12项	慢行交通系统设计	商业共享类街道详细设计	人本观测平台
社交网络数据 微博情感地图 携程网点评评价	街道商业业态匀质扩散	调整街道商业业态准入机制	舒适性					开放空间系统设计	生活容器类街道详细设计	公共参与平台
网络出行数据 空间热力图 职住关系分析			历史性					特色旅游路线策划	创新创意节点设计	方案宣传展示平台
土地经济数据 商铺租金 二手房交易 关众点评餐饮消费										
基地现状调研 实地空间感知 居民出行问卷调查										
	居民对规划建议问卷分析			居民对慢行和开放空间环境感知问卷分析 微博重点街道典型意见和词云图 街道改造三年行动计划实施评估				居民对慢性和开放空间环境改善建议问卷分析		

Comb the problem of functional organization

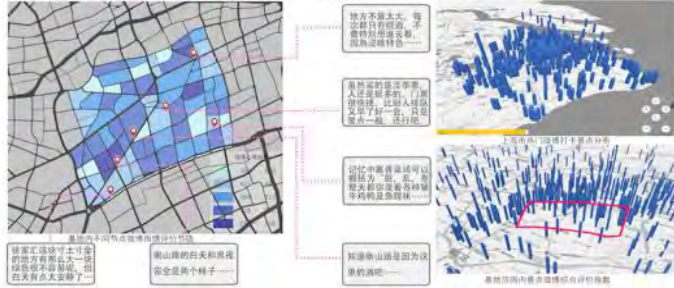
问题1: 区域功能定位不明确

线索来源: 上位研究



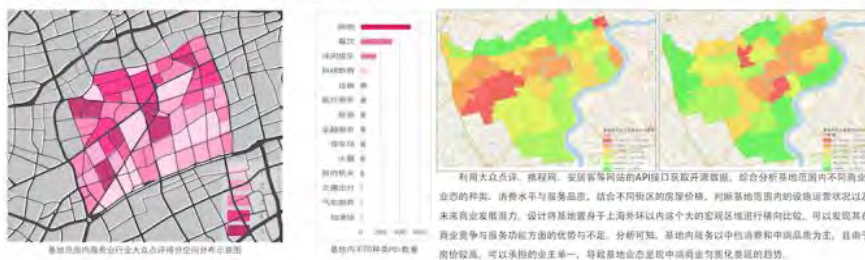
问题2: 缺少触媒效应的城市功能节点

线索来源: 微博舆情



问题3: 街道商业业态同质质扩散

线索来源: 开源数据



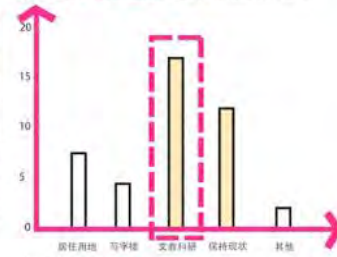
问题4: 公共服务设施使用便捷程度有待提升

线索来源: 《上海15分钟生活圈设计导则》

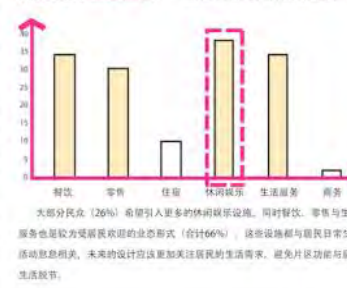


Analyze questionnaire

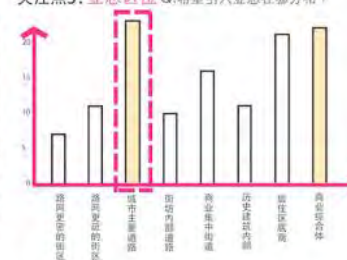
关注点1: 功能组织 Q: 希望增加何种用地?



关注点2: 业态植入 Q: 希望引入何种功能业态?



关注点3: 业态区位 Q: 希望引入业态在哪分布?



关注点4: 公厕分布 Q: 希望调整公厕设施的地段?



Strategies

策略1: 明确基地整体定位



策略2: 促进城市节点功能提升



策略3: 调整街道业态准入机制



策略4: 促进公共服务设施供需平衡



Comb the problem of physical space

自行车行驶空间



- 供过于求的自行车停车位占用过多人行空间
- 街道自行车停车位有进一步优化设计的潜力

城市节点空间

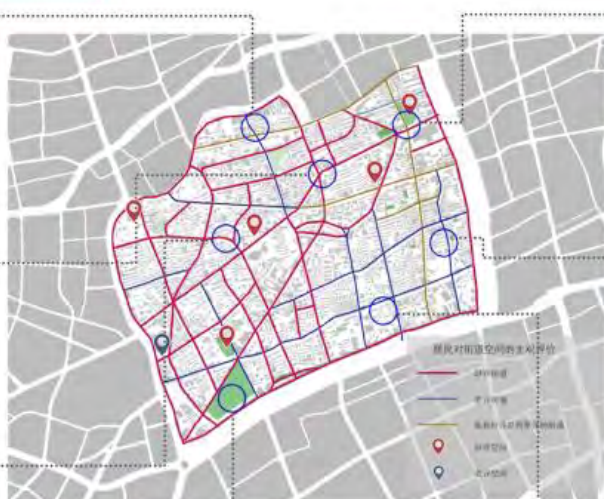


- 交叉路口与城市节点之间的关系在空间组织中未受重视

小型开放节点空间



- 空间较为消极，被停车设施占用较多
- 功能单一，退界空间与临街建筑围墙边界空间利用较少



建筑围合空间



- 围墙形式各异，部分历史建筑围墙被改，影响整体风貌

街坊内部步行空间



- 私人占用公共空间现象较为严重，入口空间识别性差

绿地空间



- 大型公园边界与城市街道呼应不足

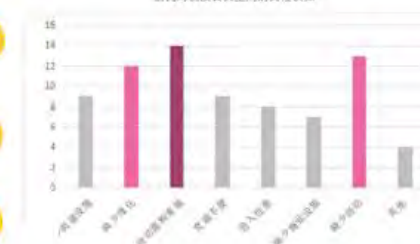
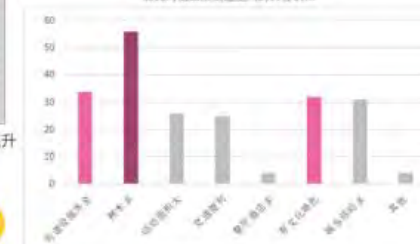
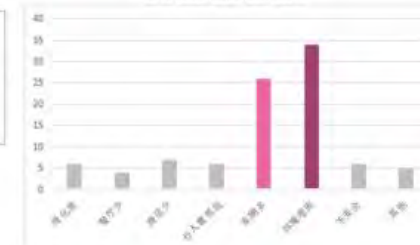
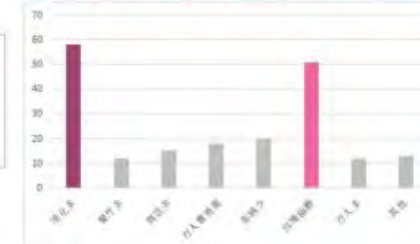
- 垂直绿化，沿围墙绿化较少

街道人行空间

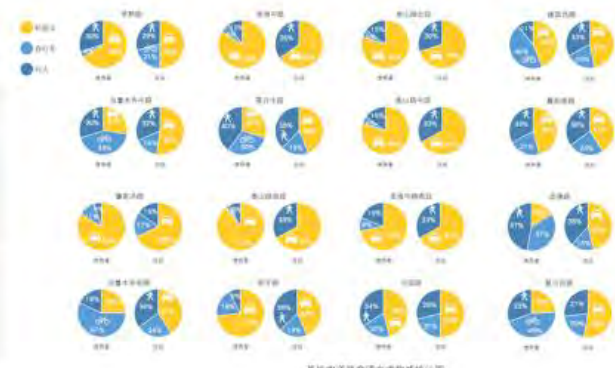


- 部分人行道过于狭窄，且连续性不足，街道设施水平有待提升

Spatial perception of residents

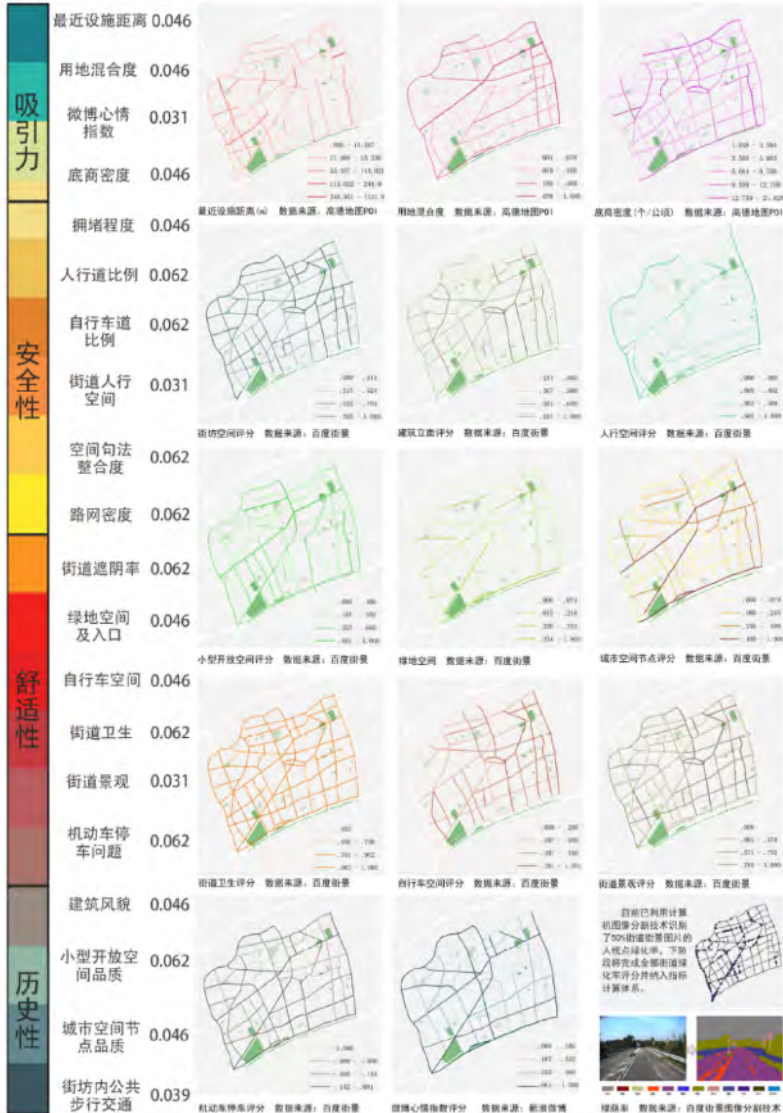


Traffic flow statistics



Score of walkability

维度 指标 权重



自前巴利计算和图像分割技术识别了90%的街道里的人视点绿化率。下一阶段将完成全部街道绿化率评分并纳入指标计算体系。

<p>A1 历史文化街道</p>	<p>街道主要特点 • 街道两侧以历史特色建筑为主</p> <p>规划目标 • 保持沿街建筑肌理进一步划分</p>	<p>天梯街</p>	<p>2-3层沿街建筑</p>	<p>4-6层办公建筑</p>
<p>A2 历史文化街道</p>	<p>街道主要特点 • 道路级别较高 • 沿街建筑多为4-10层建筑 • 沿街建筑多为不沿街向入口 • 沿街建筑多为混合用途，密度大</p> <p>规划目标 • 保持建筑商业空间和街道的关系进一步划分</p>	<p>4-6层混合用途建筑</p>	<p>4-6层混合用途建筑</p>	<p>4-6层混合用途建筑</p>
<p>A3 生活型街道</p>	<p>街道主要特点 • 道路级别较低A2级 • 沿街多为2-4层居住建筑 • 沿街建筑多为混合用途 • 沿街建筑多为混合用途，密度大</p> <p>规划目标 • 保持居住建筑和商业的肌理进一步划分</p>	<p>4-6层混合用途建筑</p>	<p>4-6层混合用途建筑</p>	<p>4-6层混合用途建筑</p>
<p>B1 商业居住街道</p>	<p>街道主要特点 • 每条街道有特定的主导商业业态 • 沿街多为2-4层住宅 • 沿街多为2-4层住宅</p> <p>规划目标 • 保持商业主导业态进一步划分</p>	<p>4-6层混合用途建筑</p>	<p>4-6层混合用途建筑</p>	<p>4-6层混合用途建筑</p>
<p>B2 内向居住街道</p>	<p>街道主要特点 • 交通类、人行空间窄 • 多为步行道、自行车道 • 自行车道和沿街停车空间充裕 • 住宅建筑密度高</p> <p>规划目标 • 保持住宅入口方式和街道的关系进一步划分</p>	<p>4-6层混合用途建筑</p>	<p>4-6层混合用途建筑</p>	<p>4-6层混合用途建筑</p>
<p>B3 教育其他街道</p>	<p>街道主要特点 • 街道存在重要行政文化建筑 • 重要功能主要是辅助重要建筑功能</p> <p>规划目标 • 保持沿街入口方式和街道的关系进一步划分</p>	<p>4-6层混合用途建筑</p>	<p>4-6层混合用途建筑</p>	<p>4-6层混合用途建筑</p>
<p>B4 内向其他街道</p>	<p>街道主要特点 • 街道以重要的行政文化建筑为主</p> <p>规划目标 • 保持沿街入口方式和街道的关系进一步划分</p>	<p>4-6层混合用途建筑</p>	<p>4-6层混合用途建筑</p>	<p>4-6层混合用途建筑</p>

街道主要测度指标

吸引力 安全性 舒适度 历史性 核心测度指标



- 步行心情指数
- 用地混合度
- 建筑风貌
- 城市开放空间品质



- 建筑密度
- 用地混合度
- 街道人行空间
- 拥挤程度



- 骑行环境
- 城市空间节点风貌
- 街道树冠率
- 机动车沿街停车



- 到最近设施距离
- 建筑密度
- 拥挤程度
- 机动车沿街停车



- 街道树冠率
- 街道景观
- 小空间开放空间品质
- 街内公共步行交通



- 建筑密度
- 街道树冠率
- 绿地交通及入口
- 机动车沿街停车



- 街道树冠率
- 街道卫生
- 街道景观
- 绿地交通及入口

街道设计导则

充分体现街区历史特色并串联起重要活动吸引点的街道



植入交互式基础设施, 反馈人们对于活动空间的感知数据

将历史建筑的元素投射到自行车道和人行道的设计上, 形成慢行主轴

增加步行道与建筑外溢功能的空间融合

城市级商业道路与历史街区融合并在特定节日作为共享街道



注重和地铁站衔接, 形成复杂的转换枢纽, 促进慢行系统与街区的衔接

特殊节假日开放部分机动车道为行人共享空间

增加建筑层数, 增加机动车和人行道隔离, 形成成人商业街道氛围

承载街区居民日常生活活动的街道; 骑行环境好, 空间富有历史性和趣味



通过实时监控根据车流量变换自行车道宽度满足慢行需求

设置自行车租赁点, 增加地上地下多种自行车停放方式

区分临街住宅入口和底商的空间关系, 保持临街住宅入口的隐秘性

街区级商业道路, 每条街按需动态评估引导主导业态并彼此联系



塑造鲜明的街道功能与特色, 并对其业态进行动态引导

对于宽度较窄且不分车道的街道, 促进停车场所复合使用

利用斜向排布的临街建筑边角线空间营造有趣的场所

品质良好促进邻里交往的生活性道路, 根据动态评估可部分转变为B1



进行分时段合理的交通引导, 减少直行穿越对居民出行的干扰

在住宅间、住宅退线处和小尺度地创造邻里交流空间

保持建筑界面的统一, 同时打破单一围合空间的单调性

沿街商业根据重要建筑核心功能做业态配套, 并依据核心建筑功能设置动态调整



根据重要建筑功能变化动态引导街业态

优化重要建筑入口处的场地处理

活化街角绿地空间促进人的停留

根据重要建筑功能变更动态更新街道环境, 动态评估其向其他B类街道转变可能性



增加重要建筑入口与街道的融合, 提升其对沿街其他业态的功能辐射

夜晚增加街道监控照明, 保障安全的慢行环境

提升围场的绿植覆盖

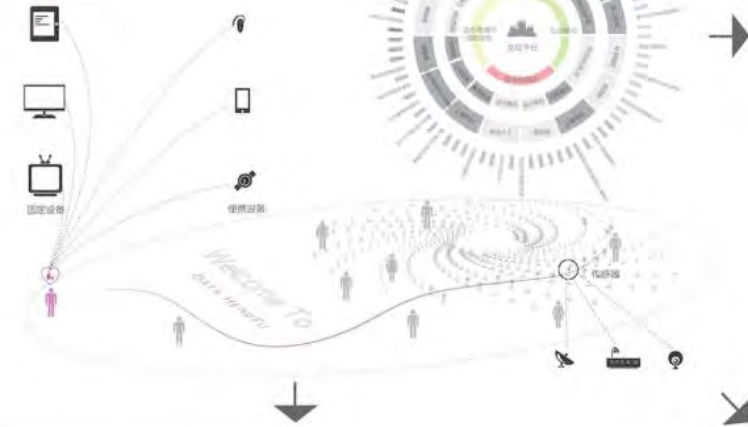
Design of information interactive platform

衡复区数据增强设计更新信息交互平台架构模式图

为了更好的规划成果呈现、规划实施跟踪、公众参与的理念，结合基地内布置的各种传感器，构建区域构建信息发布、公众参与及宣传展示三合一的交互式信息平台，为不同利益主体提供信息交流与共享的渠道。为政府管理、地区宣传和社区服务提供。实现信息的即时收集、发布与分析反馈，为规划区的规划更新创造条件。

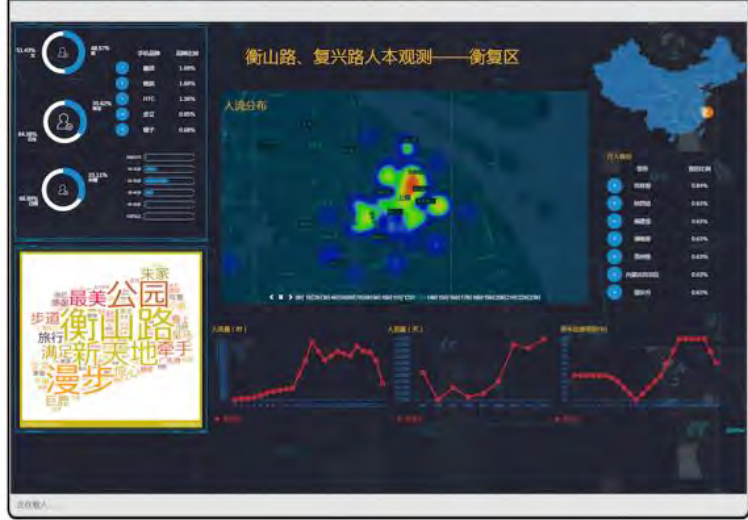


交互平台二维码



A3街道社区更新平台 <http://shanghaihengfu.comingsoon.com/>

人本观测平台 <http://datav.aliyun.com/share/#67017a29c4d434c5eee2a5a648eb4c0>



衡复规划设计方案 <http://shanghaihengfu.jimdo.com/>

2017 Shanghai Urban Design Challenge

Understand the elements of the site from various dimensions to create the future of the site
 _Urban Redevelopment Oriented Design

Collaborators: Tianyu Su, Ying Long, Hongyu Zhou, Yu Pei and so on, school of architecture, Tsinghua University

Design process and framework

1. 通过宏观尺度 (上海) 的数据研究比较和上位规划的分析总结, 确定场地在区域和城市范围的整体定位和未来发展方向。

2. 通过多数据源 (腾讯、新浪、Flickr、点评等), 大数据分析目前场地、基础设施、慢行系统、居民生活等多方面的潜力与问题。

3. 分析研究其他12个A类电影节城市的大数据, 充分量化分析、借鉴其他城市的优势, 打造面向国际的上海电影节城市空间 (2020)。

4. 研究并充分利用前沿城市技术和电影技术发展, 打造面向未来的上海电影节城市空间 (20XX)。

5. 对前沿城市设计理论和思想的研究, 确定具体空间更新策略, 充分考虑人本尺度的城市空间感受, 通过传感器和互动平台实现市民参与。

6. 以电影为主题, 曹禹路为抓手; 形成曹禹路沿线和基础设施串联的空间结构, 并借鉴技术发展趋势和空间特点进行细部设计。

街道城市主义 Street Urbanism
基础设施城市主义 Infrastructure Urbanism
图片城市主义 Picture Urbanism
人本尺度城市形态 Human-Scale Urban Fabric

高层 规划师
 政府 企业家
 网络管理/互动平台 传感器/APP

Data and planning

城市形态数据
 数据来源: GeoHey

道路节点密度
 数据来源: GeoHey

上海市城市总体规划2016-2040 (上海市城市总体规划2016-2040)

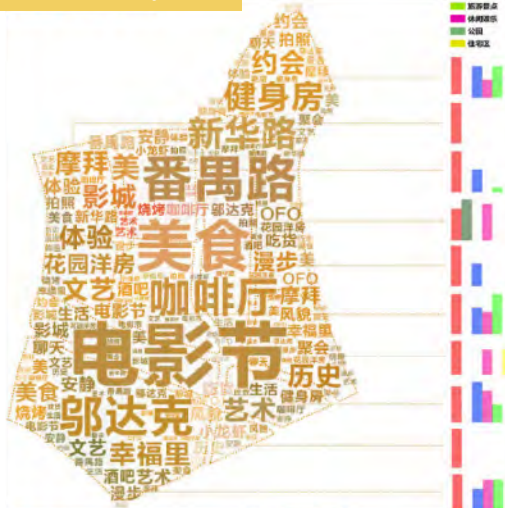
幸福、活力、有文化记忆的街区
更富魅力的幸福人文之城

在空间和功能布局上积极应对新一代信息技术的发展
 历史文化风貌区建设不忘留住市民的“烟火气”
 “互联网+养老”模式探索与智慧综合服务平台建构

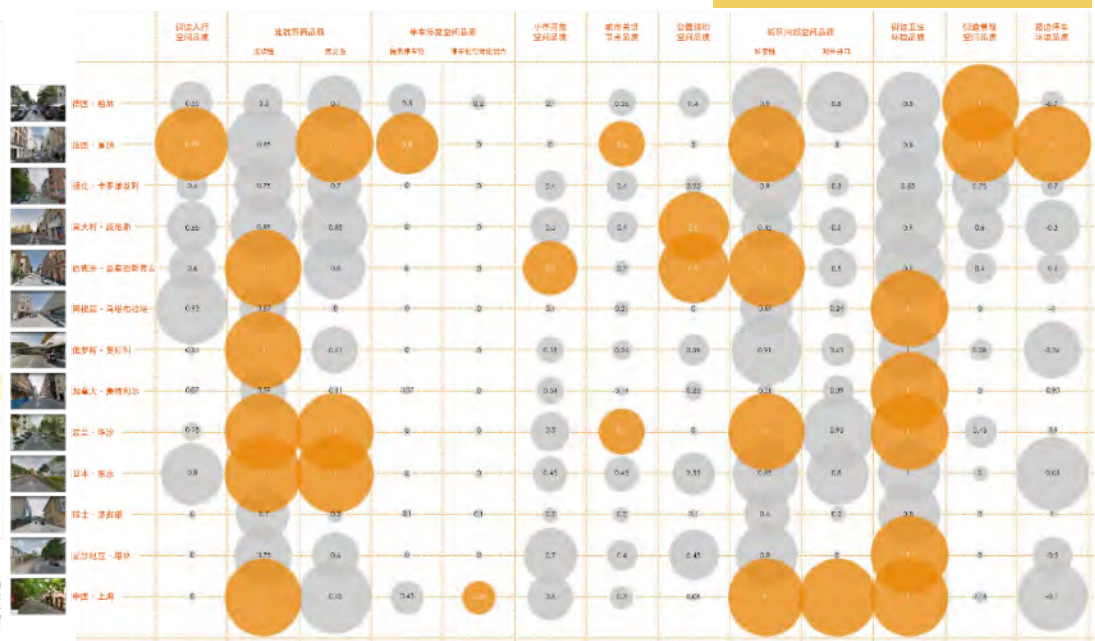
在空间和功能布局上积极应对新一代信息技术的发展
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 “互联网+养老”模式探索与智慧综合服务平台建构

Search the keyword



Compare the Street View

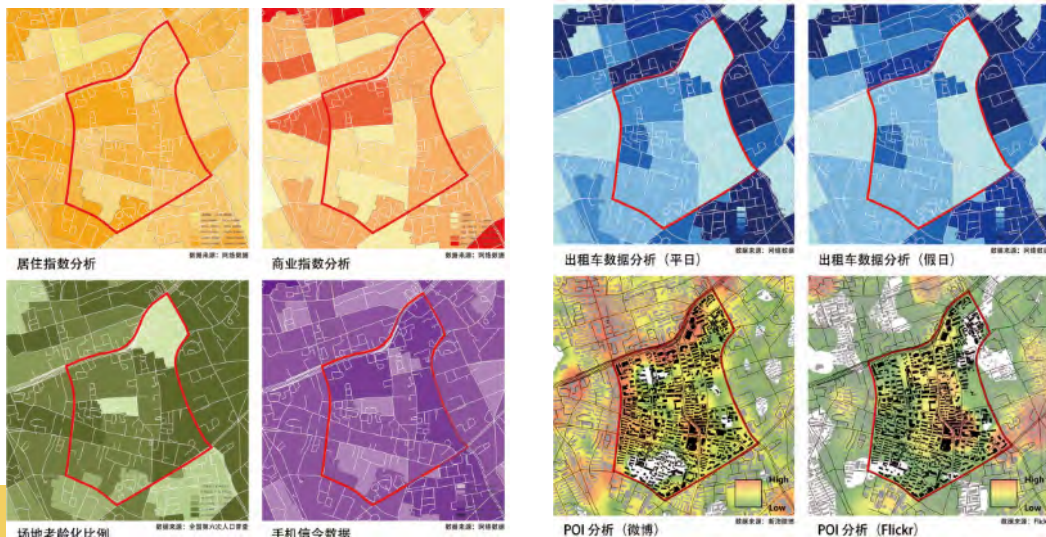


Quantitative analysis

对 13 个人类城市步行网络进行量化研究，发现步行网络密度与步行网络覆盖率、步行网络连通性、步行网络可达性之间存在正相关关系。步行网络密度越高，步行网络覆盖率、步行网络连通性、步行网络可达性越高。步行网络密度与步行网络覆盖率、步行网络连通性、步行网络可达性之间存在正相关关系。步行网络密度越高，步行网络覆盖率、步行网络连通性、步行网络可达性越高。

与其他 12 个 A 类城市对比，番禺地区步行网络密度、步行网络覆盖率、步行网络连通性、步行网络可达性均处于较低水平。步行网络密度、步行网络覆盖率、步行网络连通性、步行网络可达性均处于较低水平。步行网络密度、步行网络覆盖率、步行网络连通性、步行网络可达性均处于较低水平。





Explore the current situation

开放空间受机动车封闭



上海交通大学街心绿地



公共文化场所为围墙所隔



新华路沿线-近上海民族乐团/CHINA SHOW



重要空间节点被掩盖和占用



上海影城前广场



节点性建筑欠缺过渡型开敞空间营造



Z58创意之光 (《小时代》取景地) 周边



重要历史建筑封闭于内



邬达克故居周边

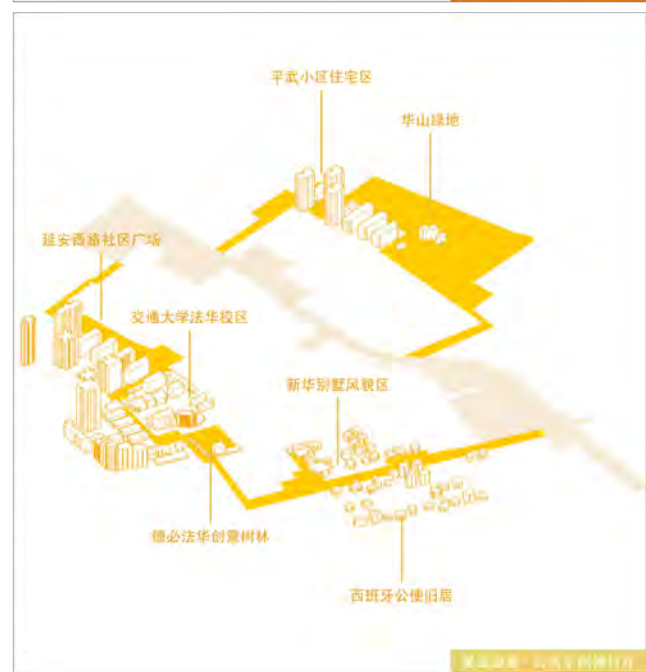
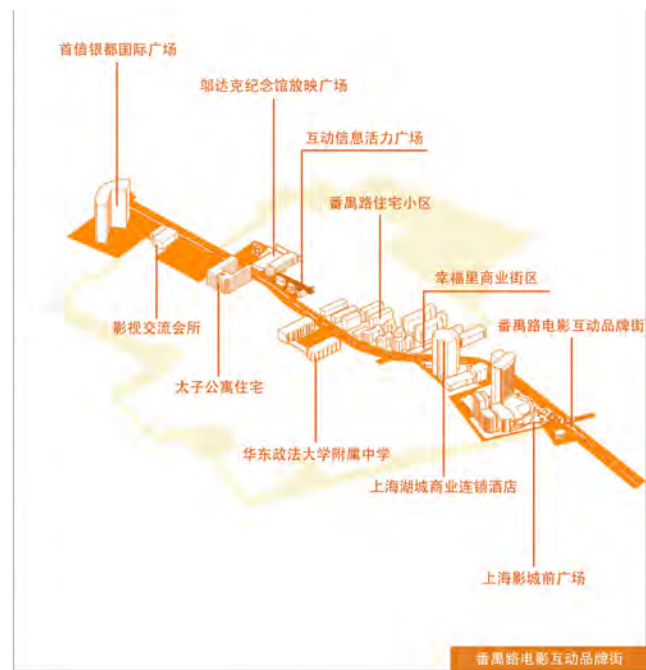


公园绿地与周边街区缺乏衔接

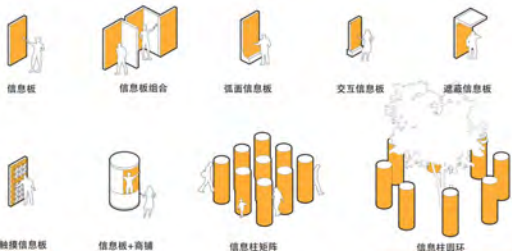


华山绿地西南入口交叉口

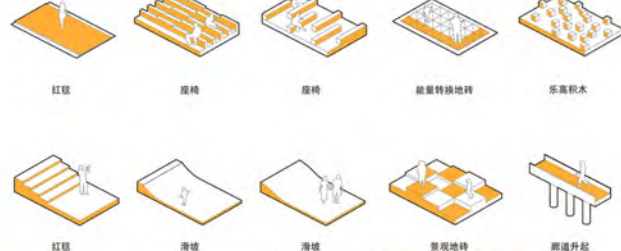




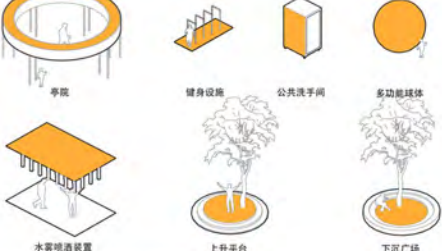
信息板类



地面装置类



附属装置类



一般道路剖面



上海影城南道路剖面



邻达克故居前道路剖面



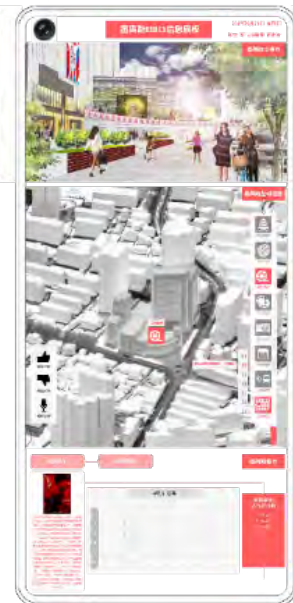
邻达克故居前道路剖面



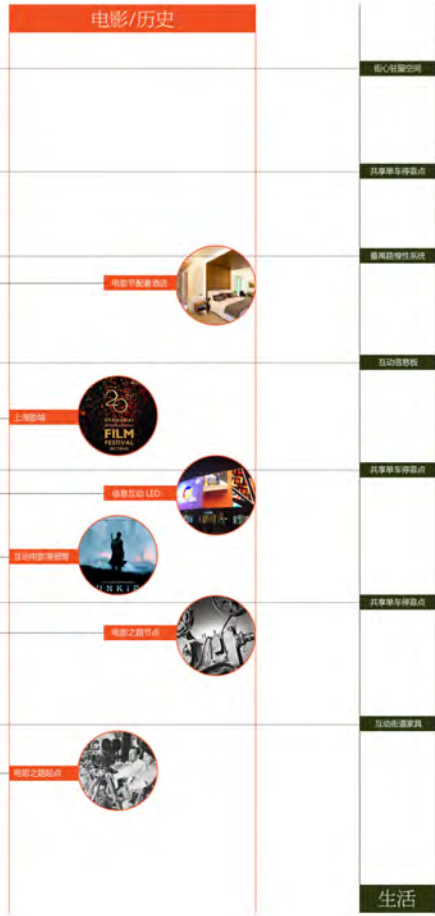
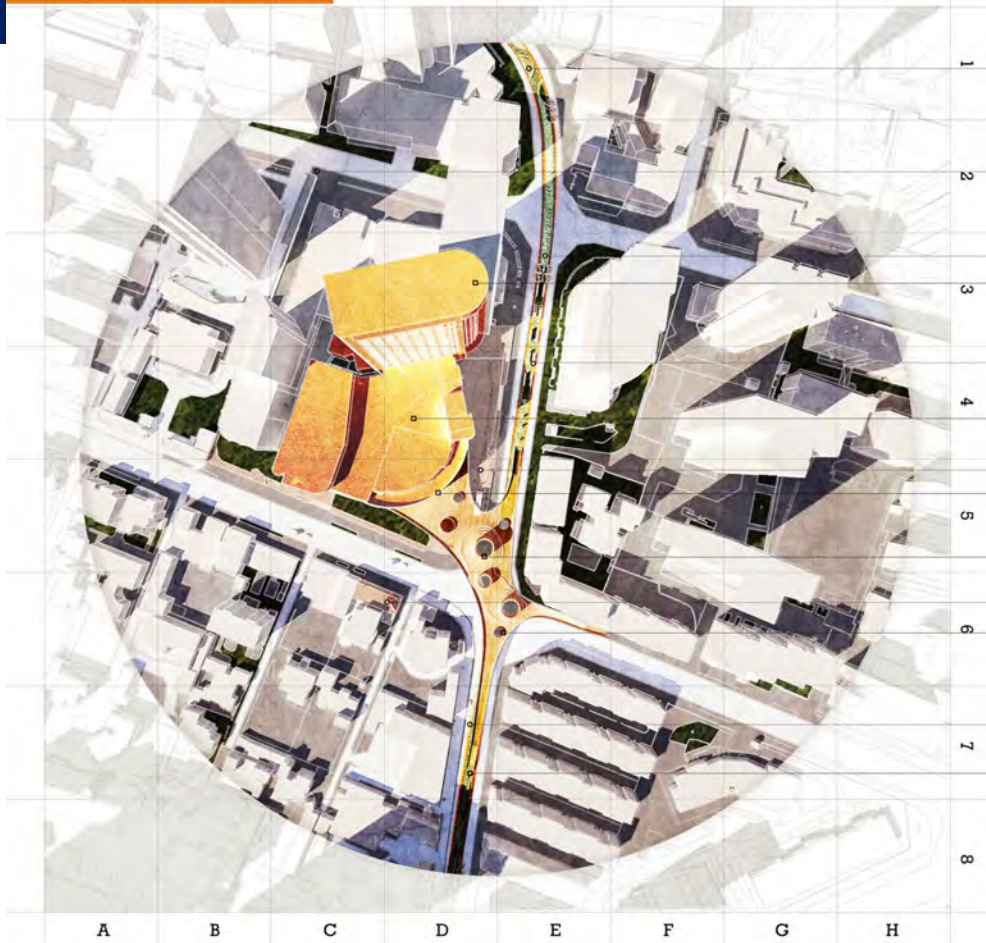
普通道路剖面将被整合，将原有的位于道路两侧的非机动车道空间归整到道路中部，在道路中部创造“人行+骑行”空间，植入多种功能的装置，营造普通道路的公共活动中心。

上海影城前，中心道路将升起为步行平台，直通上海影城二楼，并植入电影宣传功能。邻达克故居前，地面下沉为电影广场，方便居民、游客进行公共观影及其他户外活动。





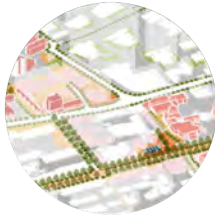
interactive information board for street data acquisition



上海影城前广场



新华别墅风貌区



德必华创意树林



交通大学法华校区



延安西路社区广场





首信银都国际广场



鄂达克纪念馆放映广场



华东政法大学附属中学广场



华山绿地住宅小区



幸福里商业街区



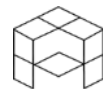
数联影动 幸福番禺

PANYU JOY: A Remix
of Data-based Smart
Community and Film-
Oriented Brand Planning



<http://sudc.qxqy.sh.cn/achievement>

清华大学

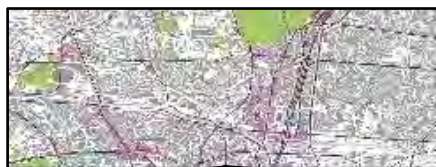


Urban design for the sub-center of Beijing (TONGZHOU)

The basic idea of case study

Learn from other excellent cases to create the future of the site
 _Urban Expansion Oriented Design

1. Get the data of case city from openstreetmap



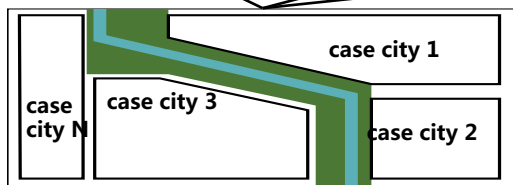
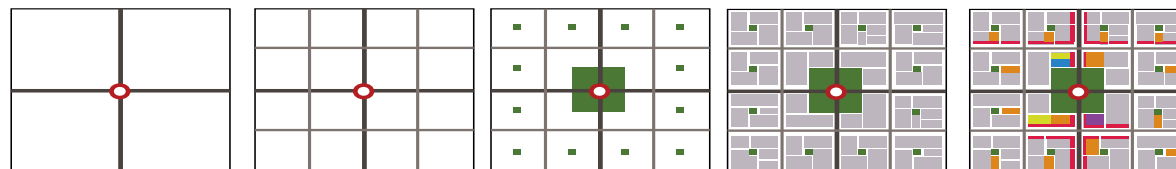
2. Extract the gene (qualitatively)



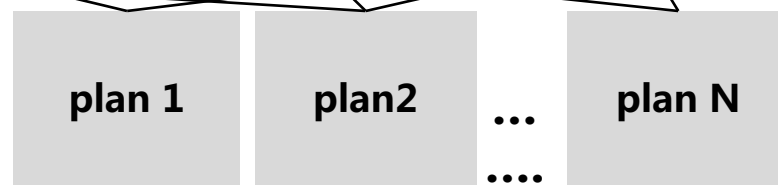
3. Calculate (quantitatively)

traffic organization	network characteristics	open space	building texture	function layout
Density of public transport network (km/ km ²) Density of station	Density of road network (km/ km ²) Plot scale (ha)	Proportion of open space (%)	Plot scale (ha) Building density (%) plot ratio	Mixedness of urban function Density of urban function

4. Extract the pattern (level of city and plot)



scene 1



scene 2

scene 3

scene N

Feature summary and pattern extraction (qualitative + quantitative)

Yokohama



Aerlemei



Marne-la-Vallée



Traffic organization

Street boundary

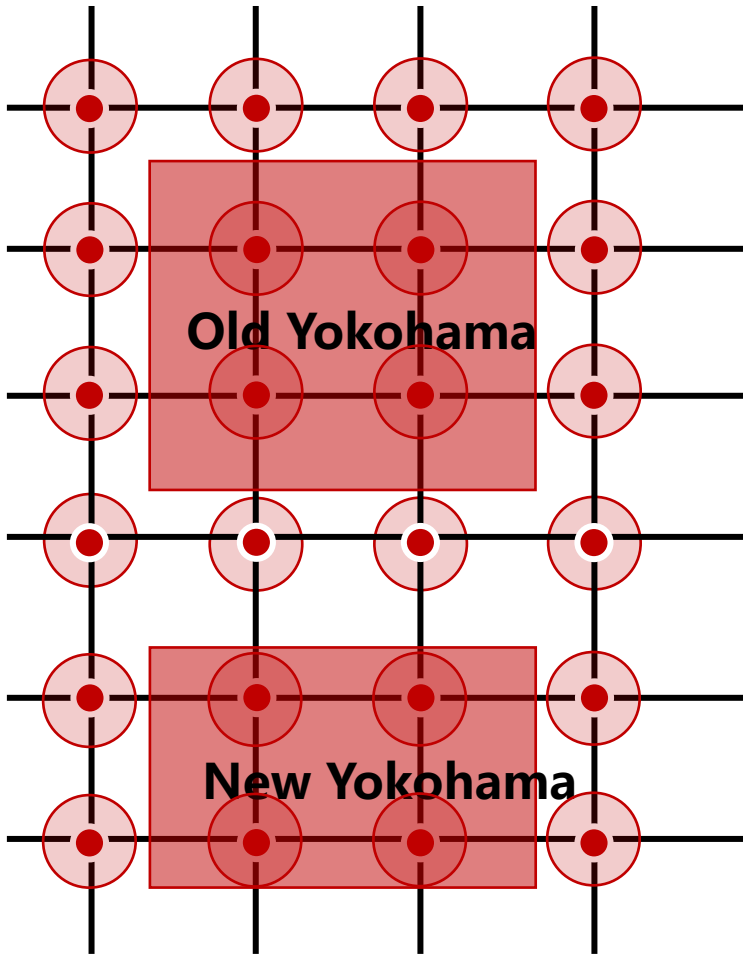
Open space

Construction density
and shape

Density of
urban function

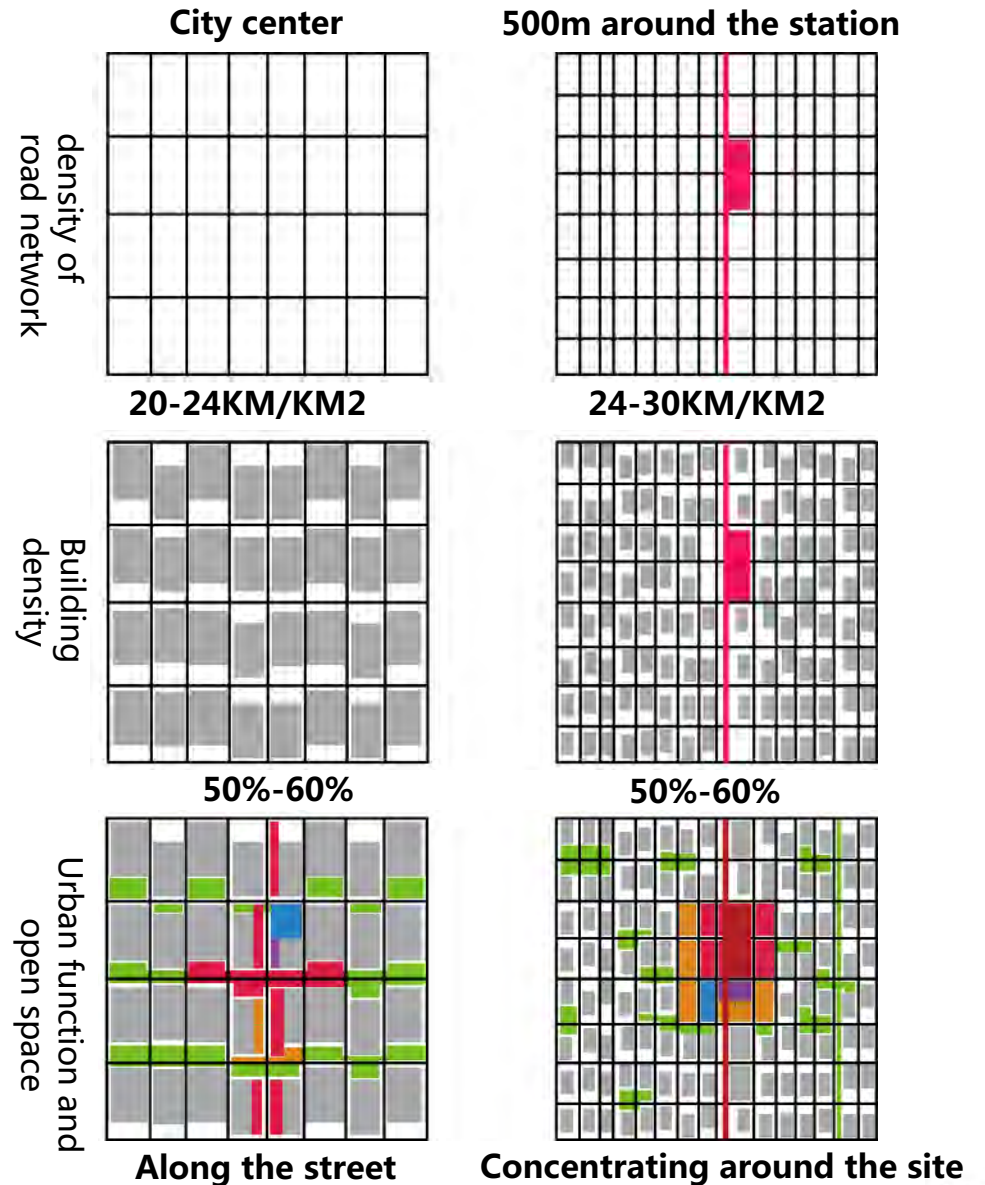
Extract the pattern

Extraction of urban structure pattern

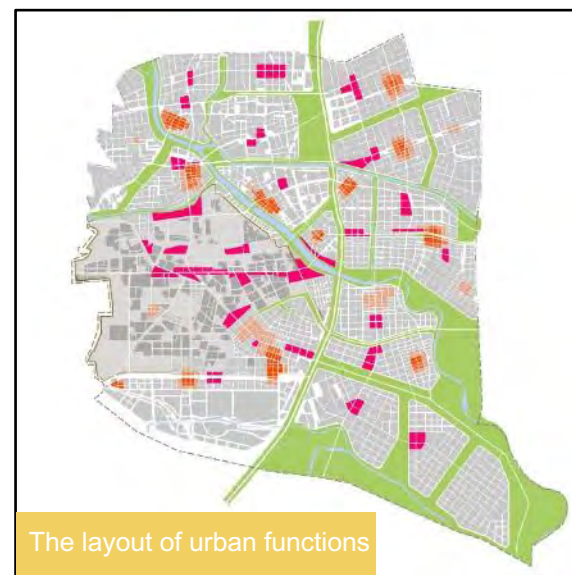
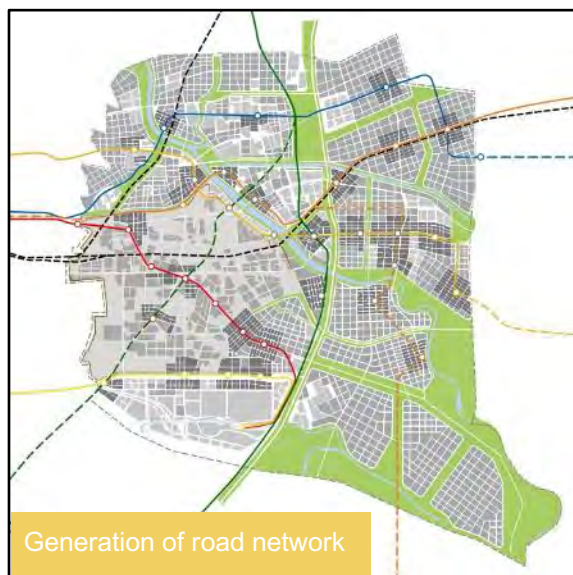
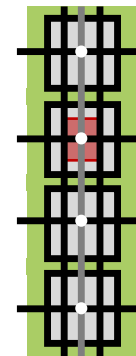
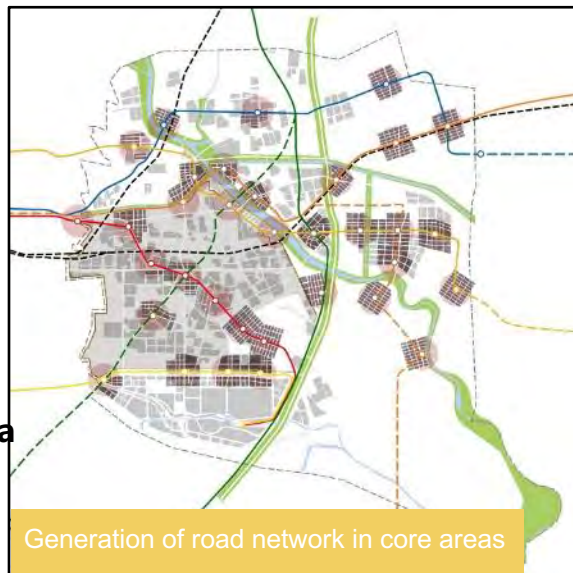
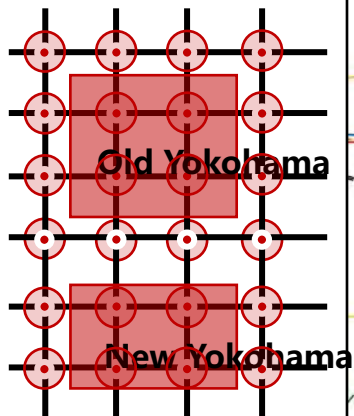




Feature summary and pattern extraction

Extraction of urban morphological patterns



Scheme generation



-  urban public service facilities
-  CBD areas

Urban design for Xiong'an New District

Learn from other excellent cases to create
the future of the site
_Urban Expansion Oriented Design

International Cities

Chinese Cities



Singapore



London



Paris



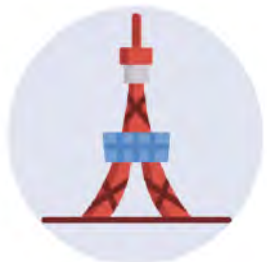
Beijing



Shanghai



Guangzhou



Tokyo



Berlin



San Francisco



Shenzhen



Chengdu



Hangzhou

Analysis of typical urban areas in different countries



Waitan, Shanghai



French concession, Shanghai



Futian CBD, Shen zhen



Old city, Beijing



Old city, Chendu



Old city, Hnagzhou



Potsdam square, Germany



Seashore Bay, Singapore



SOHO areas, London



Knightsbridge, London



Covent Garden, London



St. James, London



Milbank, London



Hamburg Port new town, Germany



Friedrich, Berlin



Atlanta, USA



Saint Louis, USA

Yilong Futuristic City International Design Competition

Embrace the most advanced technology and the next form of built environment
_ "The Next Form of Human Settlement"

NEXT FORM OF HUMAN SETTLEMENT
#END

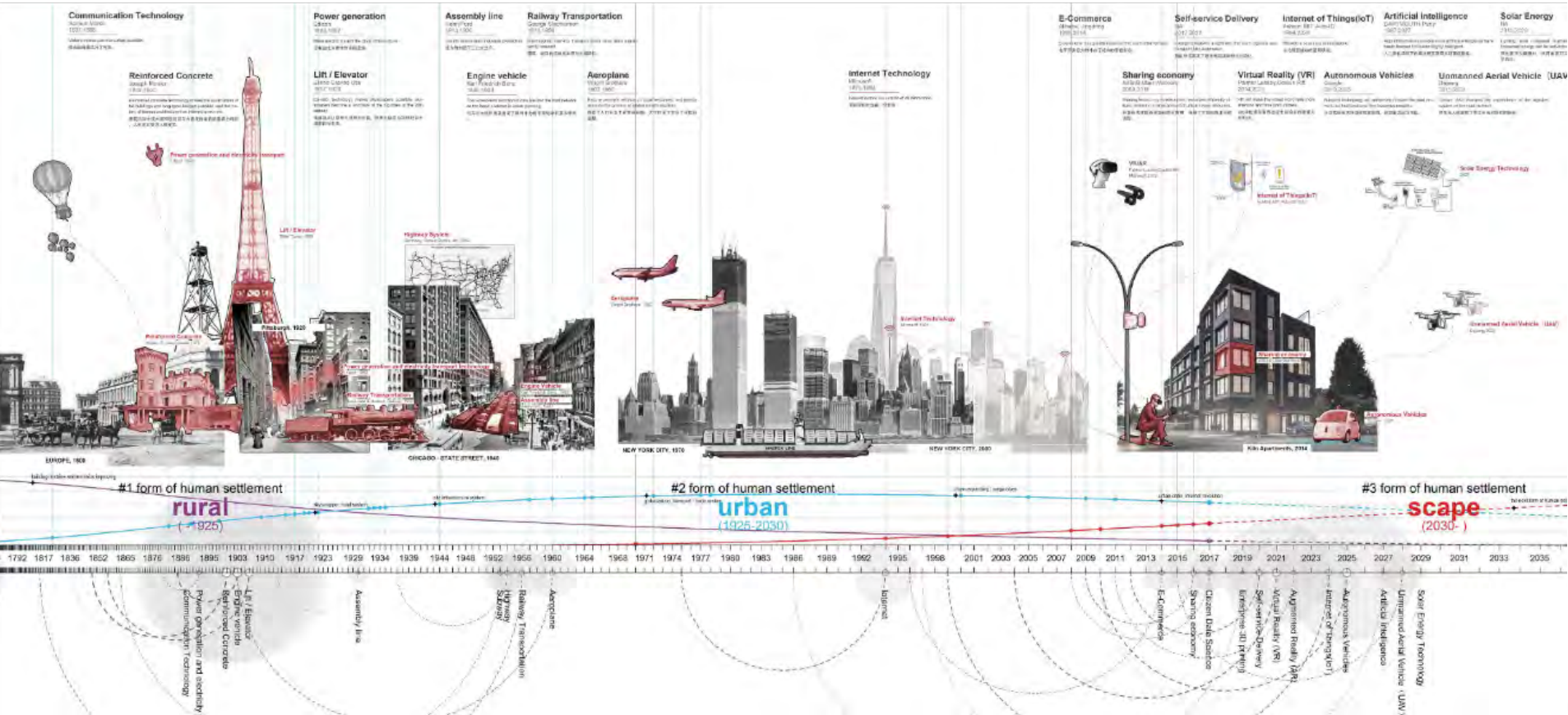
THE NEXT FORM OF HUMAN SETTLEMENT

Technology's eye

with living form's evolution

We have sorted out all the technical inventions that have made a significant impact on human settlement since 1700s and observed the evolution of human settlement for these three centuries. We came to the conclusion that human beings have so far undergone two typical types of human settlement, respectively, rural and urban. The typical difference between the two states is the maturity of the construction technology, the use of concrete, the emergence of elevators, such as the popularity of vehicles makes the road network system, the height of the building become a major urban skeleton and urban elements. And we can foresee a series of new technologies such as autonomous vehicle, smart logistics, VR, UAVs, artificial intelligence, sharing technology and so on, which have a tremendous impact on the form of human settlement, are rapidly maturing, which has accelerated our historical progress towards the next human settlement.

我们整理出了所有 1700 年以后对人居形态影响显著的技术发明，并观察了这三百年来的 人居形态的演变过程，得出了这样的结论：人类迄今经历了两种典型的人居形态，分别是农业人居 (rural) 和城市人居 (urban)，两种状态的典型区别是建造技术的成熟、混凝土的使用、电梯的出现、汽车的普及等使得路网、高度的建筑成为了主要城市骨架和城市元素。而我们能预见无人驾驶、智能物流、VR、无人机、人工智能等一系列对城市形态产生巨大影响的新技术正在迅速成熟起来，这加速了我们迈进下一个人居形态的历史进程。



Technology MAP

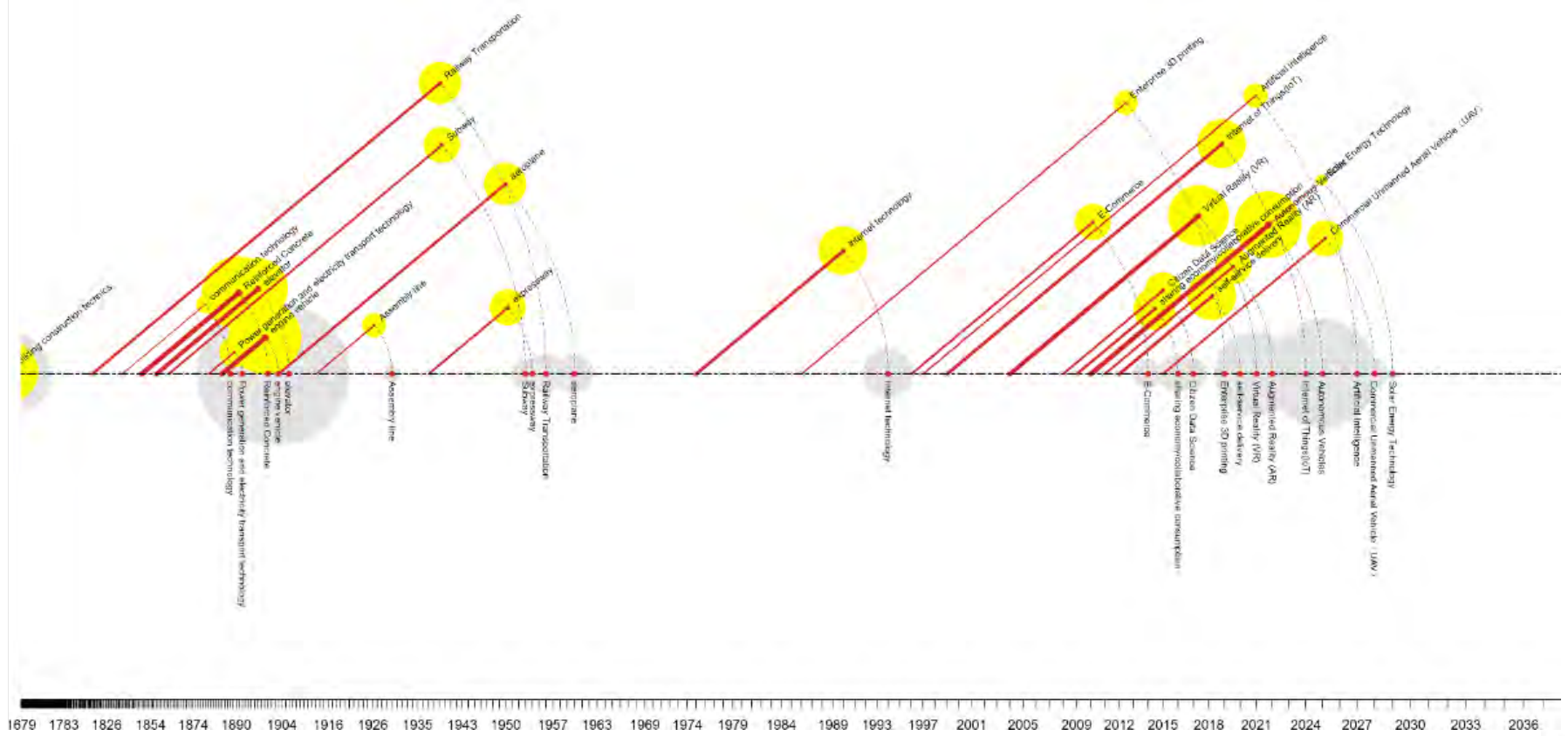
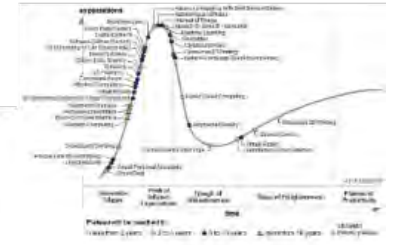
which influences form of human settlement

Technical MAP affecting human settlement

According to the Gartner growth curve, technology will go through four stages, media exposure, citing bottleneck, popularization of technology. We have arranged the invention which deeply influence the morphology of the habitat for 300 years, and mark their invention time and mature period of popularization, making this piece of "living form the technology of map".

影响人居形态的技术地图

根据 Gartner 的技术生长曲线, 技术会经历技术发明、媒体过分曝光、引用遇到瓶颈、技术成熟应用普及四个阶段。我们整理了三百年以来深刻影响人居形态的技术发明, 并标记了他们的发明时间和成熟普及时间, 制作成了这张“影响人居形态的技术地图”。

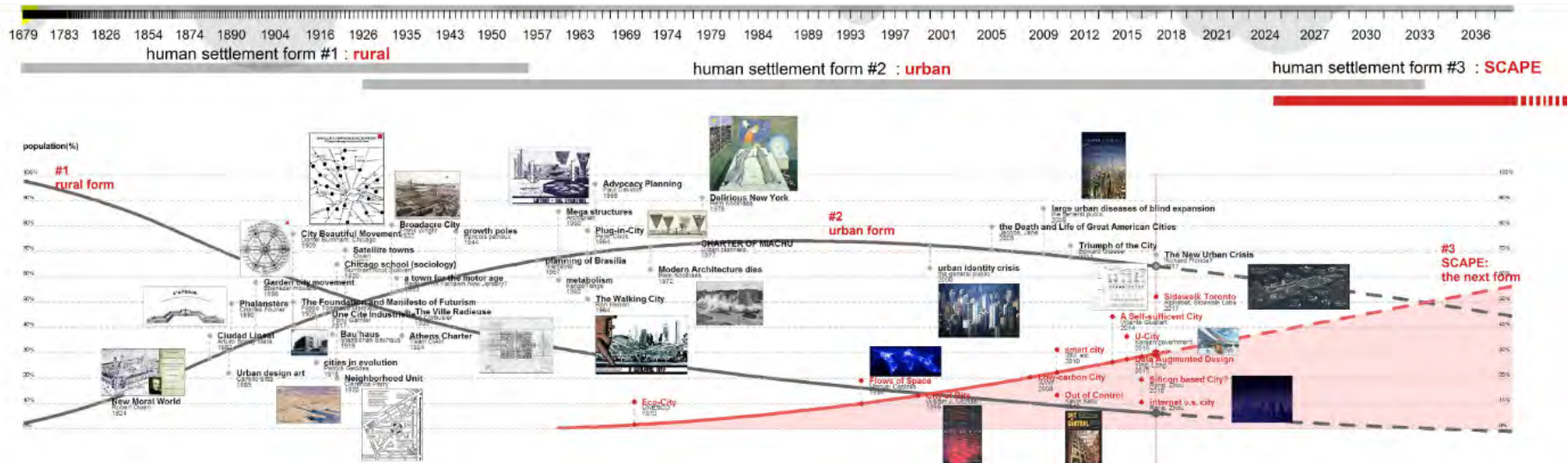


Trend of thoughts

along with different forms of human settlement

Trend of thoughts upon city has also been updated as the technology change. For example, in 1930 the city began to gather significant efficiency. In the mean time, people began to focus on the new human settlements rules (code) for the first time. Garden city, industrial city, linear city, broadacre City, gradient city are born in this era. After, in the 1950-1960s, as the basic form of human settlement is almost fixed, the trend of thoughts began to praise the victory of the city (city of victory, Edward), highly hailed skyscraper (delirious New York, Koolhaas). However, in the past few years (2010s), with the rise of the Internet revolution and the intellectual revolution, planners and citizens obviously feel that compared to the Internet, city lacks efficiency and adaptability. There began to occur negative space, retail withering, local culture civilization crisis in city. Many scholars began to focus on sustainable development, low carbon, the relationship between the city and the Internet, and even think about the future urban form—just as the theme of this competition. This somehow indicates that the urban form revolution is taking place, and the next human settlement is coming!

关于城市的思潮也一直随着技术的更新发生更替，例如在1930年城市的聚集开始表现出显著的效率，人们开始第一次关注城市这个新的人居形态的规则（code）应如何搭建，田园城市、工业城市、线性城市、广亩城市、光辉城市都是在这个时代孕育而生；在之后的1950-1960年代，城市形态基本固定，社会思潮开始出现诸如赞扬城市的胜利（城市的胜利，Edward）、为摩天楼的高度欢呼（癫狂的纽约，库哈斯）等思潮；然而到了近几年（2010年代），随着互联网革命和智能革命的兴起，规划者和市民明显感受到城市相比互联网的低效和不适应性，开始出现城市的消极空间、零售业态的凋零、城市文明危机等，更多的学者开始关注可持续发展、低碳、城市和互联网的关系等，甚至像这个竞赛主题一样的对未来城市形态的思考。这预示着，城市的形态革命正在发生，下一个人居形态即将到来！



CODE

new code of the next form of human settlement

If mountain and river is the core code of rural settlement, the road system and infrastructure system is the core code of urban settlement. The NEW CODE that the next form of human settlement will be intelligent and network. With the popularization and development of new technology, we have the following judgments on the future of human settlements:

Autonomous vehicles will evolve into the basic functional unit of future human settlements.

At first, car driver was liberated under the technology of autonomous vehicles, then people will be in the automatic vehicle using the space as conference, film-watching, entertainment, catering and other functions. Finally, these autopilot "box" will be the functional flow into your house, and even be planted into homes.

People can do most of the life-living and working within the range of 20m.

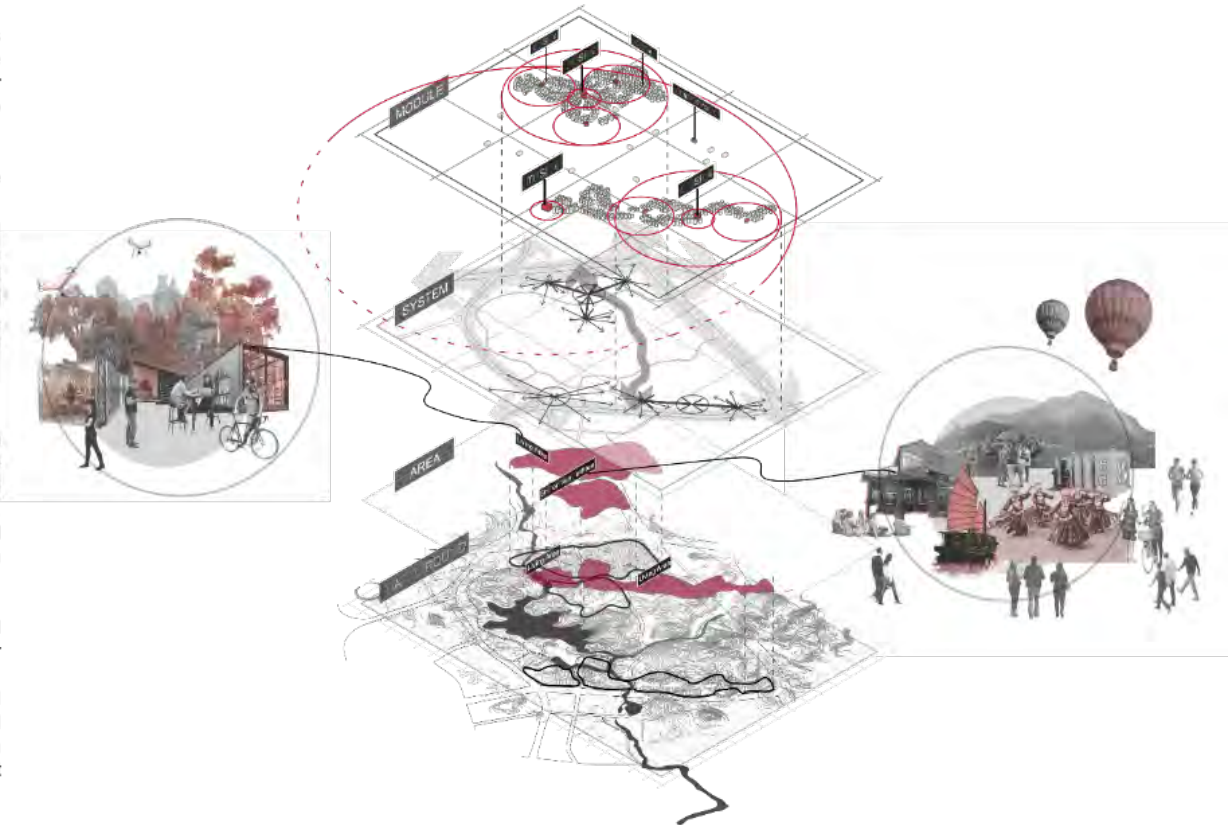
As autonomous vehicles turned into a functional stream, people can reserve functional stream (business, food, entertainment, clinics, education experts) come into their doors; plus, take into account the sophisticated logistics technology (takeaway, E-commerce express) and sophisticated VR technology Meeting, real-time interaction), most people can complete most of their living and working content in their home (that is, within 20m).

City will, as a whole, become the infrastructure.

As residential units become the smallest unit of human existence, a large amount of space is released in the entire urban system. The entire urban system will become an infrastructure that serves human beings. UAV logistics systems, distributed warehousing systems, cloud control of autonomous driving functions, the urban digital infrastructure in the cloud, and the distributed energy supply system serving as a new infrastructure system for people.

People will realize that ecosystems will never be important, and ecological experiences will become an important way of life for human beings.

People will be aware of the scarcity and importance of natural ecology. The ecosystem will infiltrate into the living space and become a new skeleton of the habitat. Fitness, bicycle, off-road, tea ceremony and outdoor festival experience will become important human leisure modes.

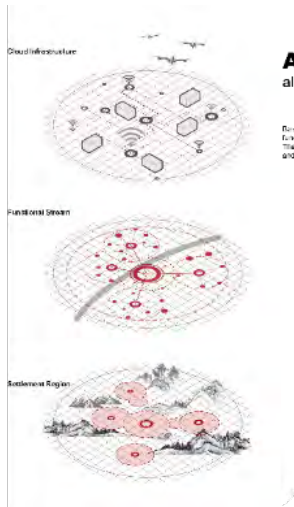


Agenda

System along with different forms of human settlement

In the new era, system is a formula for creating systems, including urban planning, infrastructure, functional systems, and settlement systems. The case study in New York City, China, and other regions, we found that the system is not only a set of rules, but also a set of values. The system is not only a set of rules, but also a set of values. The system is not only a set of rules, but also a set of values.

在新时期，系统是创造系统的公式，包括城市规划、基础设施、功能系统和居住系统。以纽约、中国和其他地区为例，我们发现系统不仅是一套规则，更是一套价值观。系统不仅是一套规则，更是一套价值观。



Area along with different forms of human settlement

Based on the background of the field, we divide the area into different types according to their functions and characteristics. For instance, using area, we can divide it into urban, rural, and suburban areas. The main goal of the area is to use the site of the module in the form of living site. For example, we can use it to create a living site.

基于背景，我们将区域划分为不同类型，根据其功能和特征。例如，使用区域，我们可以将其分为城市、农村和郊区。区域的主要目标是使用模块的形式来创造生活场所。例如，我们可以用它来创造生活场所。



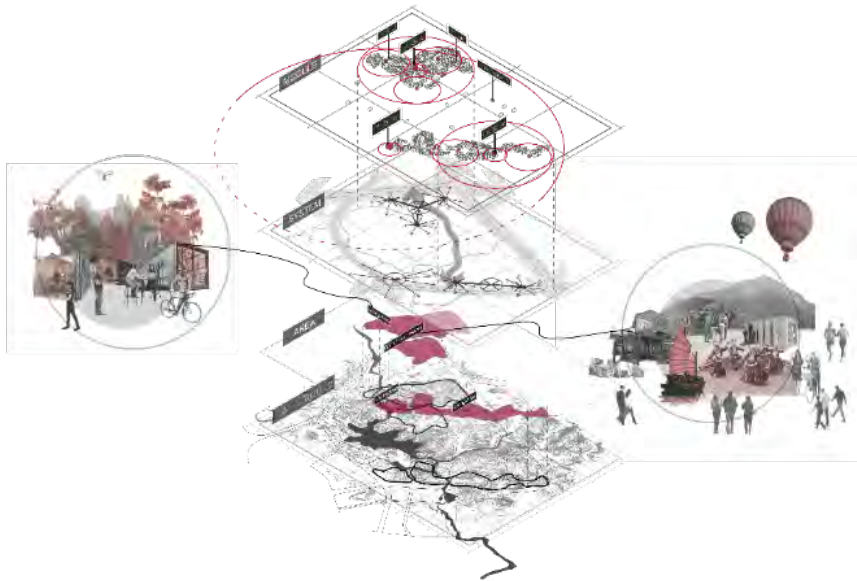
Background along with different forms of human settlement

Based on the newly found, we need to pay attention to the local ecological landscape, cultural heritage, and other factors, to ensure that there is more space to connect, preserve the unique light and environment of the site.

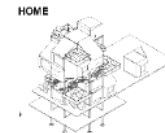
基于新发现，我们需要关注当地的生态景观、文化遗产等因素，以确保有更多的空间来连接、保留场地的独特光线和环境。



Layout along with different forms of human settlement



Module along with different forms of human settlement



HUB

Neighbor-sized
25m*25m
for 50 units



Community-sized

25m*40m
for 160 units

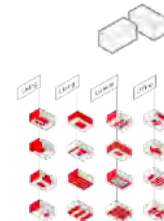


Township-sized

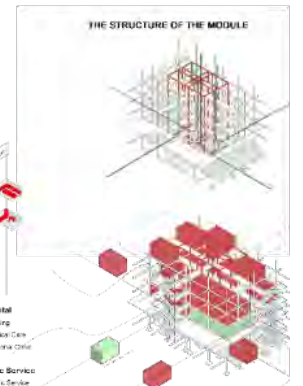
50m*40m
for 520 units

FUNCTIONAL CUBE

A Cube is 3m*3m*3m



Living	Leisure	Office	Hospital
Sedator	Mani	Office	Nursing
Bedroom	Car	Drive	Medical Care
Work Room	Library	Meeting Room	Medical Care
Dining Room	Cafe	Small Meeting	
Living Room	Bar	Large Meeting	Public Service
Bathroom	Commercial	Health Hall	Public Service



We assume that in the future, the living environment supporting by the new technology, for instance, UAV and self-driving cars, will be more flexible and humanity. People won't be able to tremendous travel or transport to the destinations anymore. Instead of using modules, most of the function would be directly transport to where people need. As a result, standardized and detachable Functional Cubes have been designed to carry various functions, while the fixed module, which is divided into two types. One is Hub which is designed to be a collection center. The other one is Home, the module where people lives in.

我们设想一种新的居住模式，在新的技术环境下，例如无人机和自动驾驶汽车，将变得更加灵活和人性化。人们将不再需要大量的旅行或运输到目的地。相反，大多数功能将直接运输到人们需要的地方。因此，我们设计了一种标准化的可拆卸的功能立方体，用于承载各种功能，而固定的模块则分为两种类型。一种是Hub，设计为集合中心。另一种是Home，是人们居住的地方。

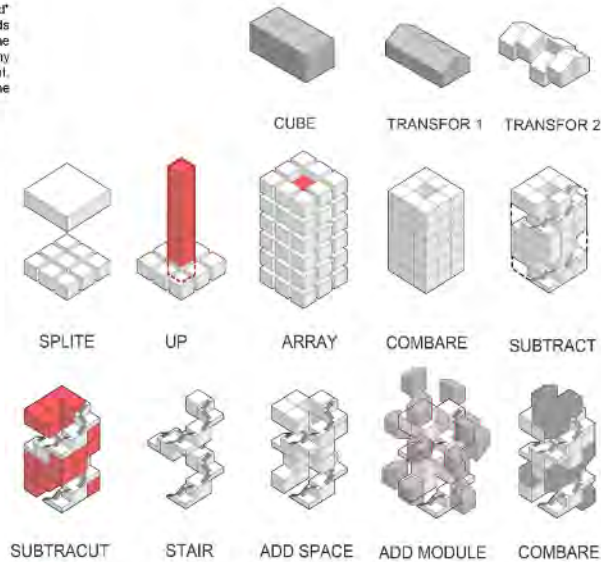
Architecture Concept

Mountains and mountains is a major feature of Guizhou region, the traditional local architecture will be based on different geographical and hydrological reasonable "growth" to form a unique geographical and cultural landscape.

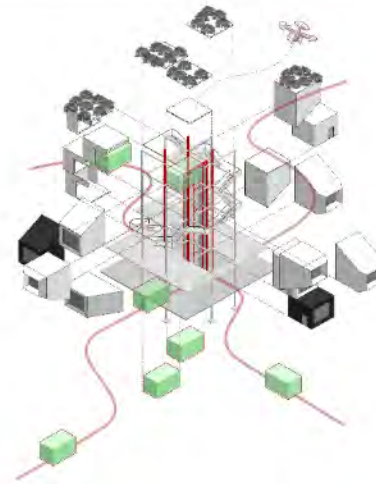
In this architectural design, we use the "traditional" architectural language of "sloping roof" in combination with the concept of "modularity" to freely combine the spaces and deepen the design to form the unique "Karma Stewart" image.

The building itself will also be reasonably "metabolized" according to the different needs of different periods to maintain the status quo and meet the needs of the times while promoting the national culture. In city, Many scholars began to focus on sustainable development, low carbon, the relationship between the city and the

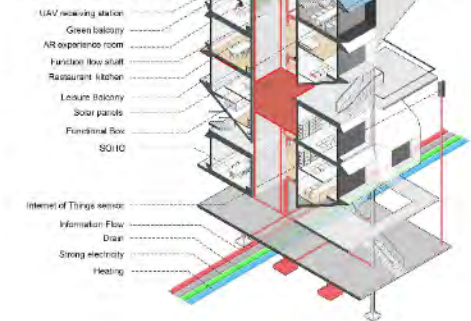
奇山峻岭是贵州地区的一大特色，传统的当地建筑会根据地理和水文的不同合理的进行“生长”，形成独一无二的地域人文风貌。在本次建筑设计中，我们运用“模块化”这一“传统”的建筑语言，与“新陈代谢”的概念相结合，自由的自由组合，并深化设计，形成贵州当地别具特色的“ Karma Stewart”形象。建筑本身亦会根据不同时期的不同需求进行合理的“代谢”，以不变应万变，在满足时代需求的同时，弘扬民族文化。



Architecture



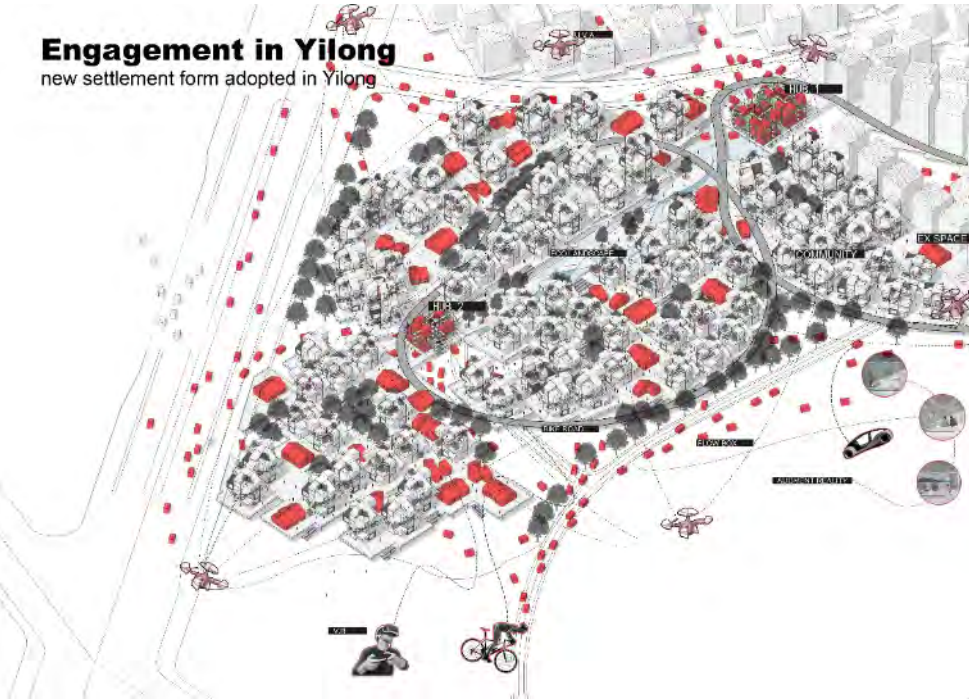
SECTIONAL VIEW



The Next Form of Human Settlement

Engagement in Yilong

new settlement form adopted in Yilong

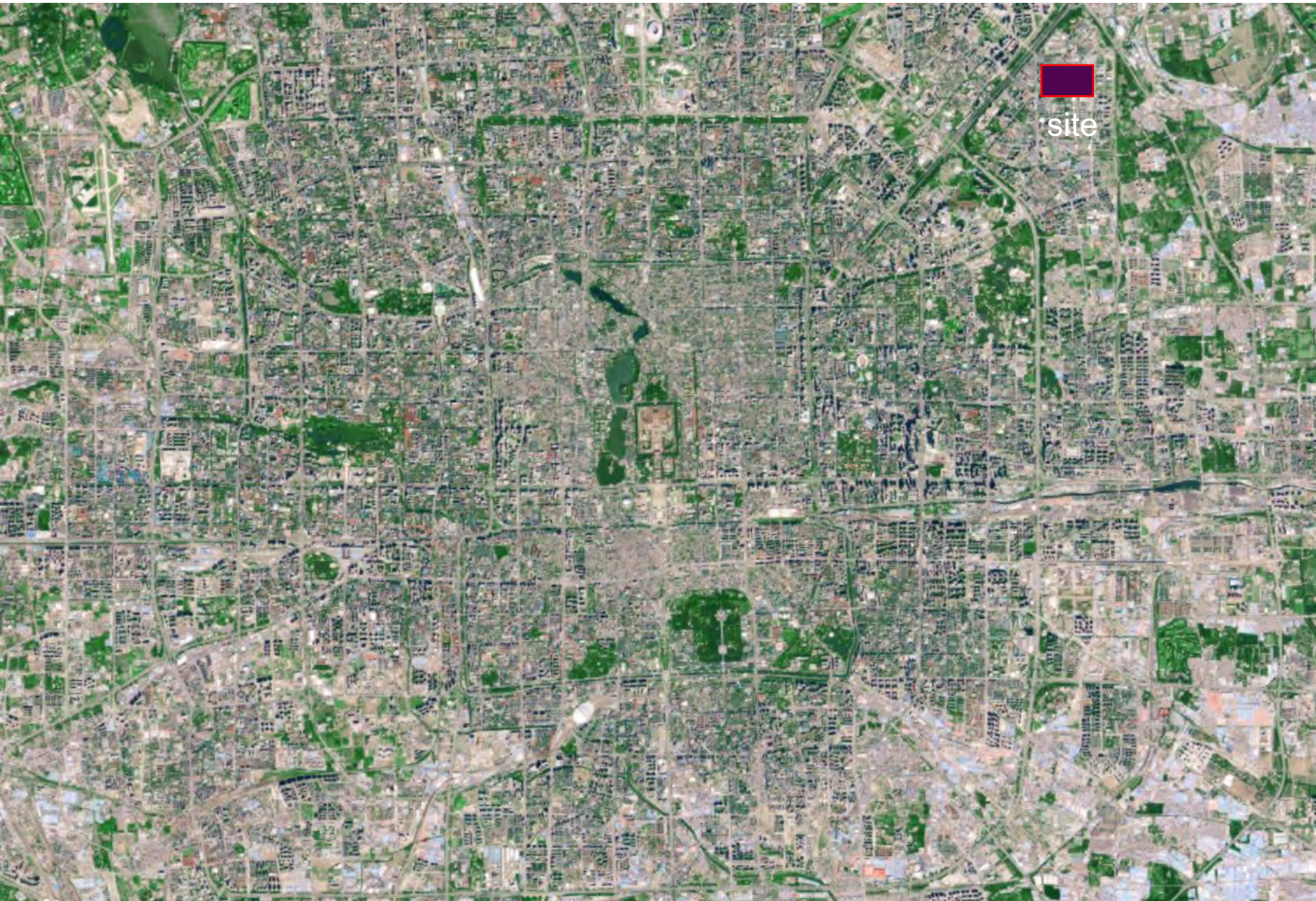


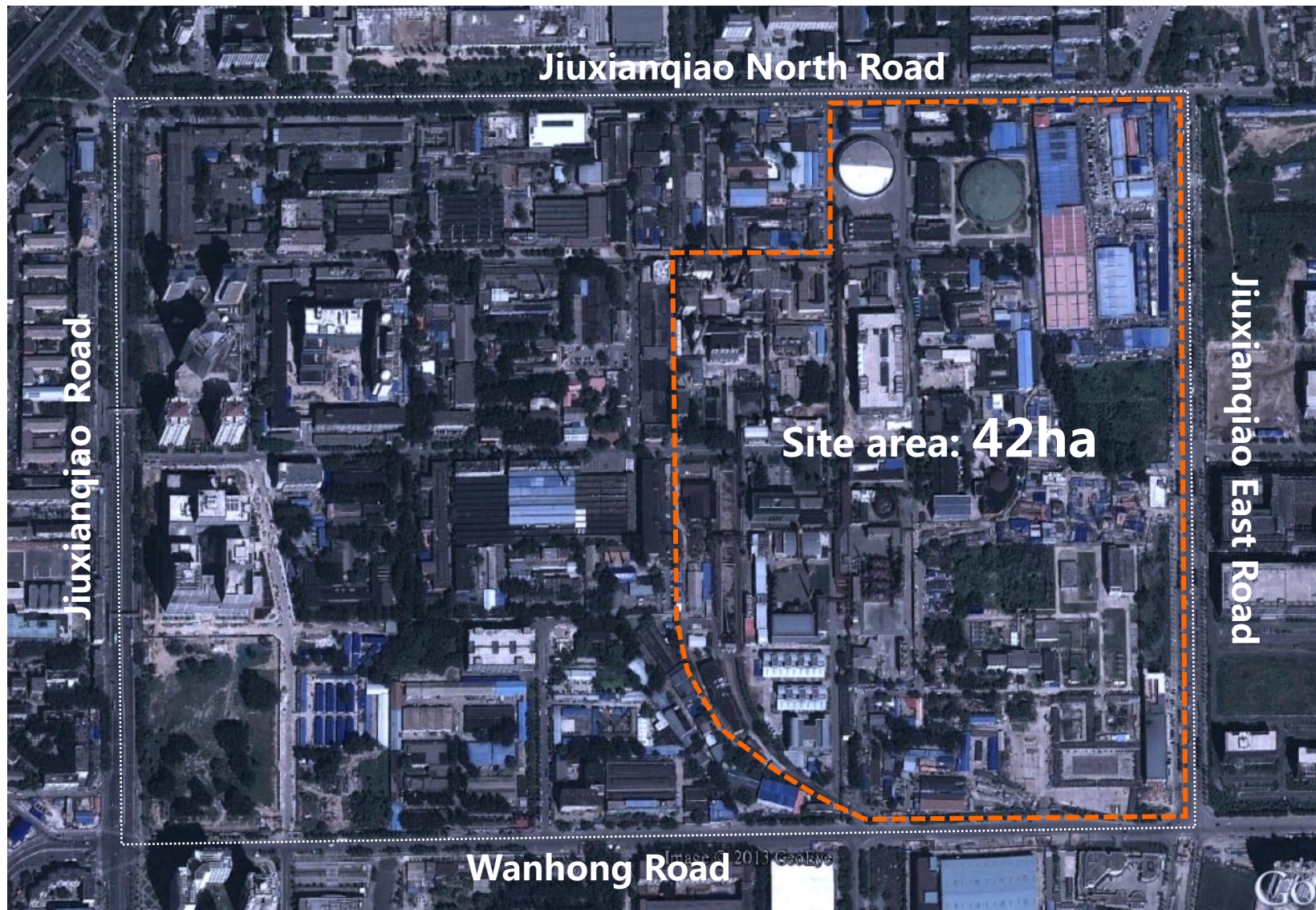
Design Sketch

a daily perspective in future Yilong



So what to do with our site?





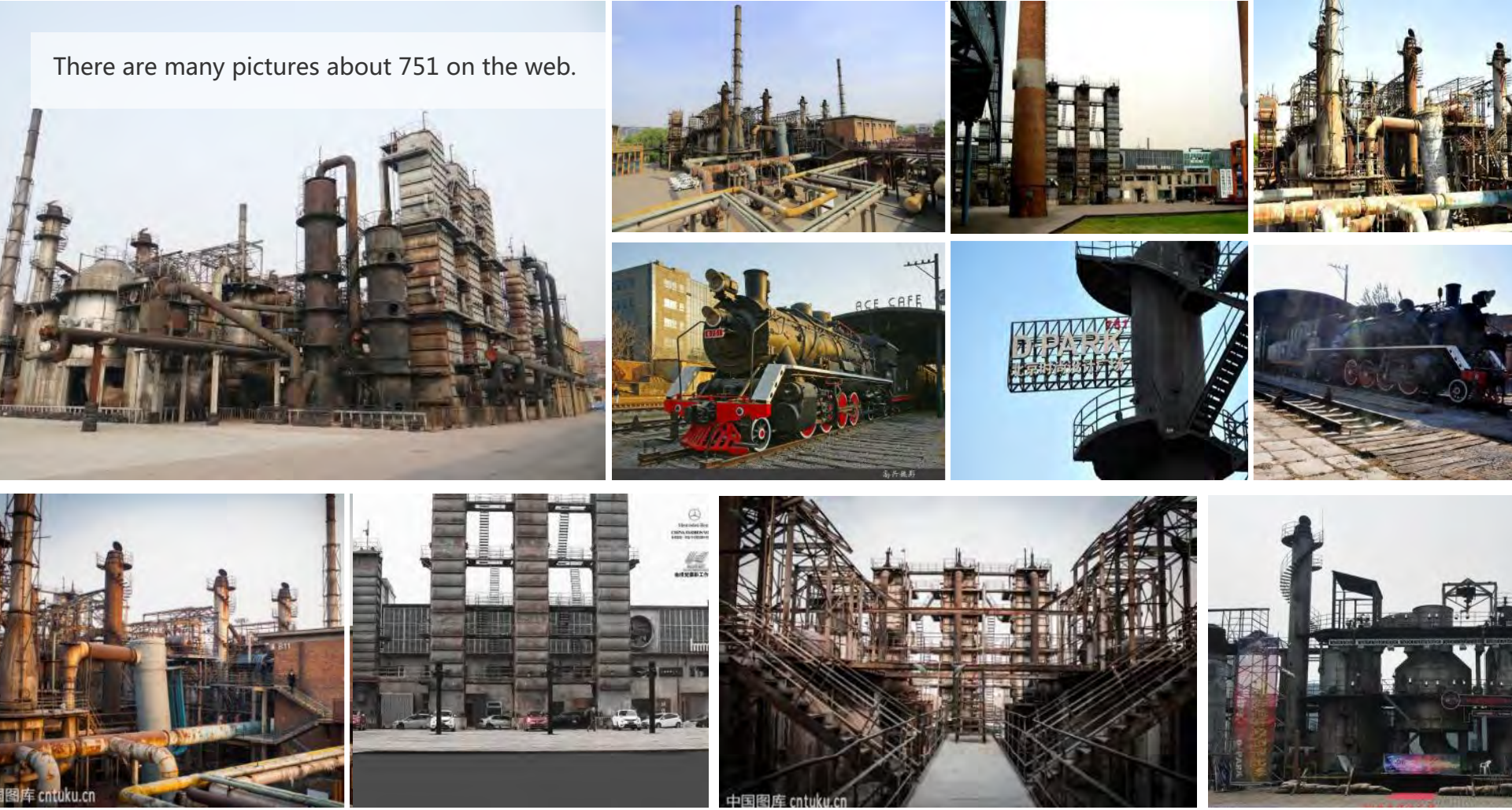
Expected Applications of DAD in our studio

- 0 Collect information via site surveys by my group
- 1 Quantitatively analyze selected cases worldwide
- 2 Understand quality of space with self collected pictures or street view pictures
- 3 Study the design site from functional and activity dimensions with emerging new data using the open GIS software GeoDA

Understand the elements of the site

Pictures on the web

There are many pictures about 751 on the web.



Learn from other excellent cases

General information

Data	Information of city and population	Brief introduction of the case	Image of location	Urban pattern with building footprints	Floor number
Data sources	Wikipedia, Twitter, Facebook	Official website, Twitter, Facebook, Tourism website	Twitter, Facebook, Tourism website, Google street viewer	Open street map, Google earth(360 cities)	Google earth (360cities), Google street viewer


Detailed information

Data	photos	Images	diagram	text	Google Street View pictures
Data sources	Twitter, Facebook, Instagram, Linked in Youtube	Google map (Google earth) NASA	Twitter, Facebook, Tourism website, Official website	Official website, Twitter, Facebook, Linked in	Google map (Google earth)

In China, there are some other resources of data

Baidu map, Baidu pictures, Wechat, Sina microblog

Case study: sharing work : Wework in London South End, UK

	
Type	Private
Founded	2010; 7 years ago
Founders	Adam Neumann Miguel McKelvey
Headquarters	New York City, New York, USA
Number of locations	171 ^[1] (2017)
Areas served	18 countries
Key people	Adam Neumann (Co-founder and CEO) Miguel McKelvey (Co-founder and COO)
Products	Workspace for startups, small businesses, freelancers and entrepreneurs
Brands	WeWork, WeWork Labs, WeLive, Rise by We, WeGrow
Services	Shared workspaces and related services for entrepreneurs
Owners	Adam Neumann Miguel McKelvey
Subsidiaries	Flatiron School Meetup (pending)
Website	wework.com

WEWORK: <https://www.wework.com>

WELIVE: <https://www.welive.com>

WEGROW: <https://wegrowapp.com/>

We can scan the basic information about wework

WeWork is an American company which provides shared workspaces, technology startup subculture communities, and services for entrepreneurs, freelancers, startups, small businesses and large enterprises. Founded in 2010, it is headquartered in New York City. WeWork has a current valuation of roughly US\$20 billion and manages 10 million square feet of office space.

WeWork designs and builds physical and virtual shared spaces and office services for entrepreneurs and companies. The company's 100,000+ members have access to health insurance, an internal social network, social events and workshops, and an annual summer retreat.

General information

WeWork has more than 2000 employees and has locations in 59 cities and 20 countries including Australia, Argentina, Brazil, Canada, China, Colombia, France, Germany, India, Ireland, Israel, Japan, Mexico, Netherlands, Peru, Singapore, South Korea, Spain and United Kingdom.

The screenshot shows the WeWork website's 'Office Locations' page. The header includes the WeWork logo and navigation links for 'Office Locations', 'Membership Plans', 'WeWork Vision', and 'Business Entry'. The main heading is 'WEWORK 办公空间地点' with a sub-heading '278 个办公地点 | 59 个国家'. Below this, there are four columns of office locations categorized by country.

美国	香港	法国	日本
亚特兰大	香港	巴黎	东京
奥斯汀	阿根廷	德国	墨西哥
波士顿	布宜诺斯艾利斯	柏林	墨西哥城
夏洛特	澳大利亚	法兰克福	荷兰
芝加哥	墨尔本	汉堡	阿姆斯特丹
达拉斯 - 沃思堡	悉尼	Munich	秘鲁
丹佛	巴西	印度	利马
底特律	里约热内卢	班加罗尔	新加坡
休斯顿	圣保罗	德里 NCR	新加坡
堪萨斯城	加拿大	孟买	韩国
洛杉矶	蒙特利尔	爱尔兰	首尔
迈阿密	多伦多	都柏林	西班牙
	温哥华	以色列	巴塞罗那
	中国	贝尔谢巴	马德里
	北京	海法	
	上海	赫兹利亚	英国
	哥伦比亚	耶路撒冷	伦敦
	波哥大	特拉维夫	曼彻斯特

There are 32 WeWork offices in London

Camden (3), Southwark (4), City of Westminster (4),

City of London (6), 南岸 (4), Central London (8),

West London (2), East London (5)

We can find basic information about wework in London, and the reason to choose someplace. Besides, we can catch the detail information about every coworking space.

WEWORK: <https://www.wework.com>

Detail information

There are 4 WeWork offices in in London South End



**WeWork
Tower Bridge**
1 St. Katharine's Way London
E1W 1UN

专属办公室	每月 £768 起
固定工位	每月 £550 起
移动工位	每月 £450 起

了解更多



**WeWork
South Bank Central**
30 Stamford Street London SE1
9LQ

专属办公室	每月 £860 起
固定工位	每月 £550 起
移动工位	每月 £450 起

了解更多



**WeWork
南岸**
22 Upper Ground London SE1
9PD

专属办公室	每月 £750 起
固定工位	每月 £500 起
移动工位	每月 £450 起

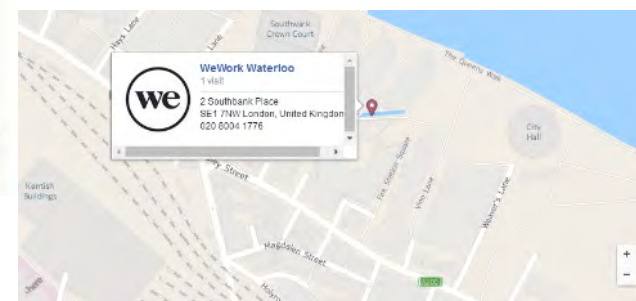
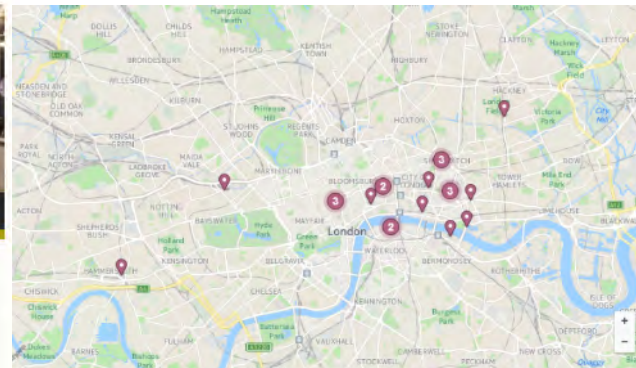
了解更多



**WeWork
Waterloo**
2 Southbank Place London SE1
7NW

敬请期待

了解更多



Why they choose South Bank?

With theatres, galleries, dance companies, and film studios, South Bank is always bustling with cultural events. Businesses in entertainment, hospitality, and tourism are attracted to South Bank office space for its scenic strolls and abundant art venues.

We can get the detail information including locations.

Facebook Page: WeWork

Navigation: Like, Follow, Share, Book Now, Send Message

Post:
 Status: Photo/Video
 Post as your Page or as yourself.
 December 24, 2017 at 5:09am
 We've partnered up with Transformify to give you one month of free workspace, recruitment, and related business services worldwide.
 WeWork & Transformify: Business Growth Pack for Startups
 To help startups grow fast and enter new markets, Transformify has partnered up with WeWork to offer startups and entrepreneurs the opportunity to hire...
 TRANSFORMIFY.ORG

Community:
 Community Organization in New York, New York
 4.5 ★★★★★
 628,998 people like this
 626,767 people follow this

About:
 +1 855-593-9675
 Typically replies within a day
 www.wework.com
 Community Organization - Workplace & Office

Pages liked by this Page:
 LUXCARTEL, Fueled, Allstate

LinkedIn Page: WeWork

118,083 关注者
 1001,539 人
 职位 工作经历

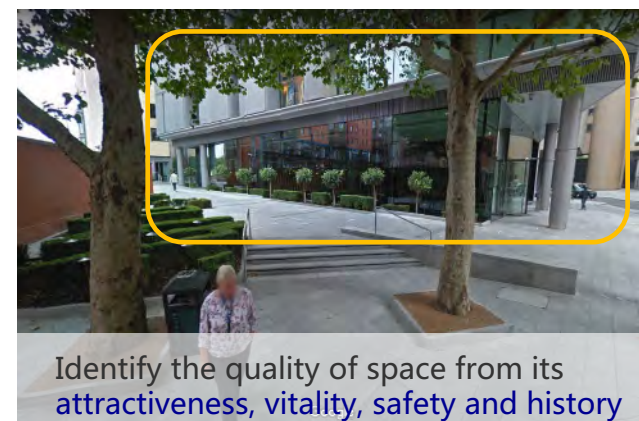
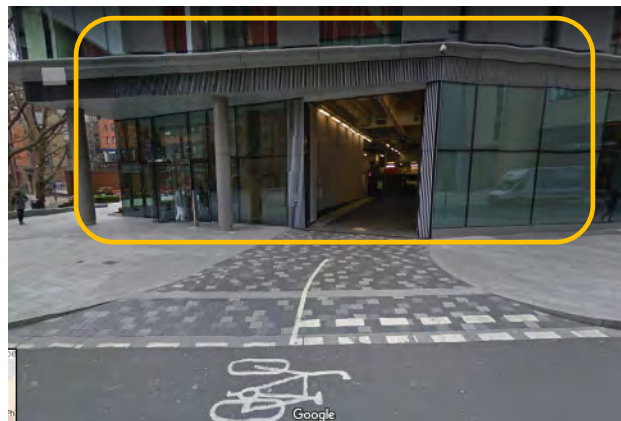
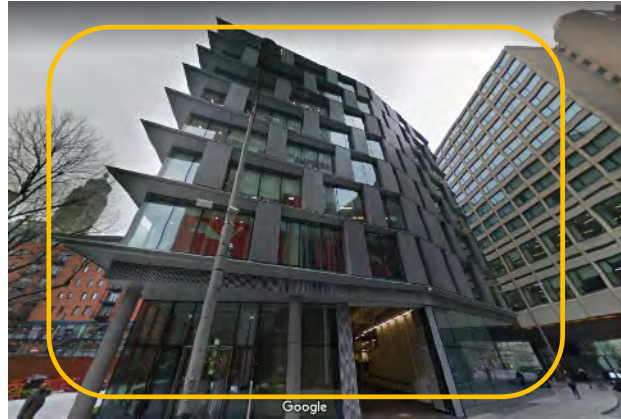
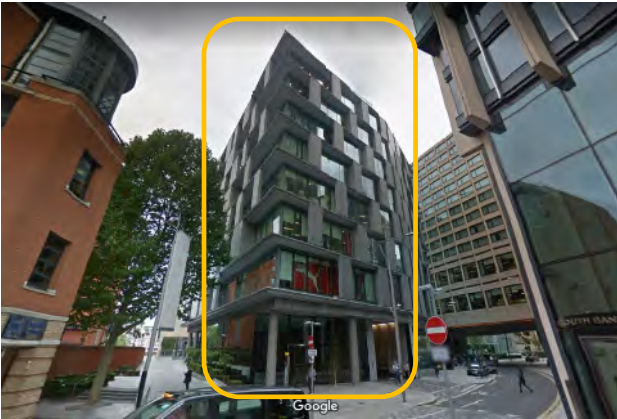
LinkedIn Bio:
 WeWork is a global network of workspaces where companies grow together. Teams of any size can find refreshingly designed collaborative space, private offices, and meeting rooms that energize their employees and their guests. But WeWork is so much more than four walls—providing community, amenities, events, and technology to evolve space into experience.
 专注领域

Instagram Profile: wework

1,659 posts | 190k followers | 5,457 following
 WeWork Make a life, not just a living. we.co/creatorawards

Photos, videos, posts, events, locations and reviews are available in Twitter, Instagram, Facebook, and Linked in.

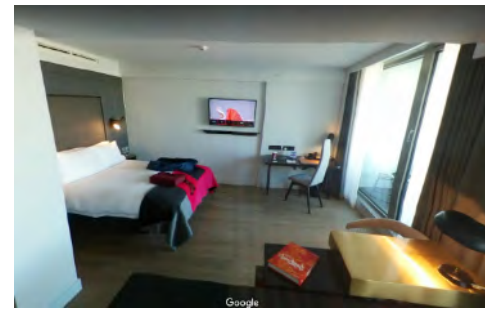
Google street view pictures



Identify the quality of space from its attractiveness, vitality, safety and history

<http://www.google.cn/maps/@51.5076784,-0.1068119,15z>

Other pictures

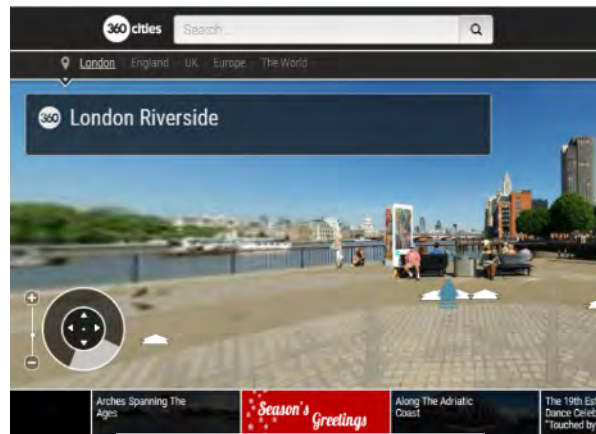


Some indoor scenes are available in google street viewer



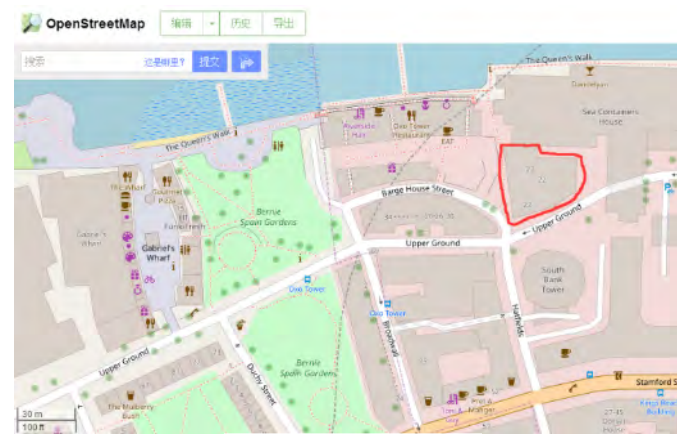
Three-Dimensional Building

Google Earth software



360 Cities

<https://www.360cities.net/>

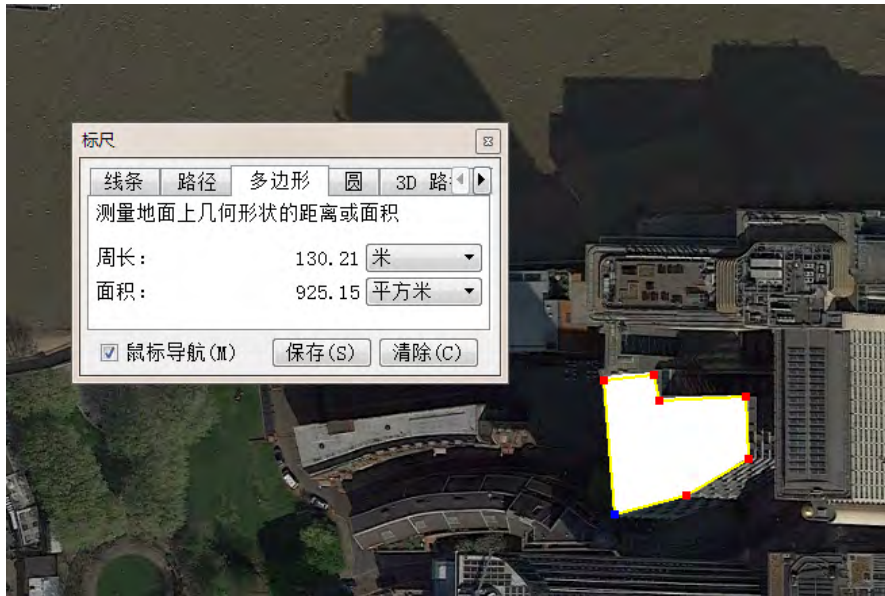


Open street map

<http://www.openstreetmap.org/#map=18/51.50780/-0.10868>

Quantitatively analysis

traffic organization, network characteristics, open space, building texture, etc. can be analyzed via [open street map](#) and [google earth](#).



In small scale

Layer: 8

Perimeter: 130m

Area: 925m²

Quality of space :

quiet, comfortable, clean and new



QGIS

A Free and Open Source Geographic Information System



In large scale

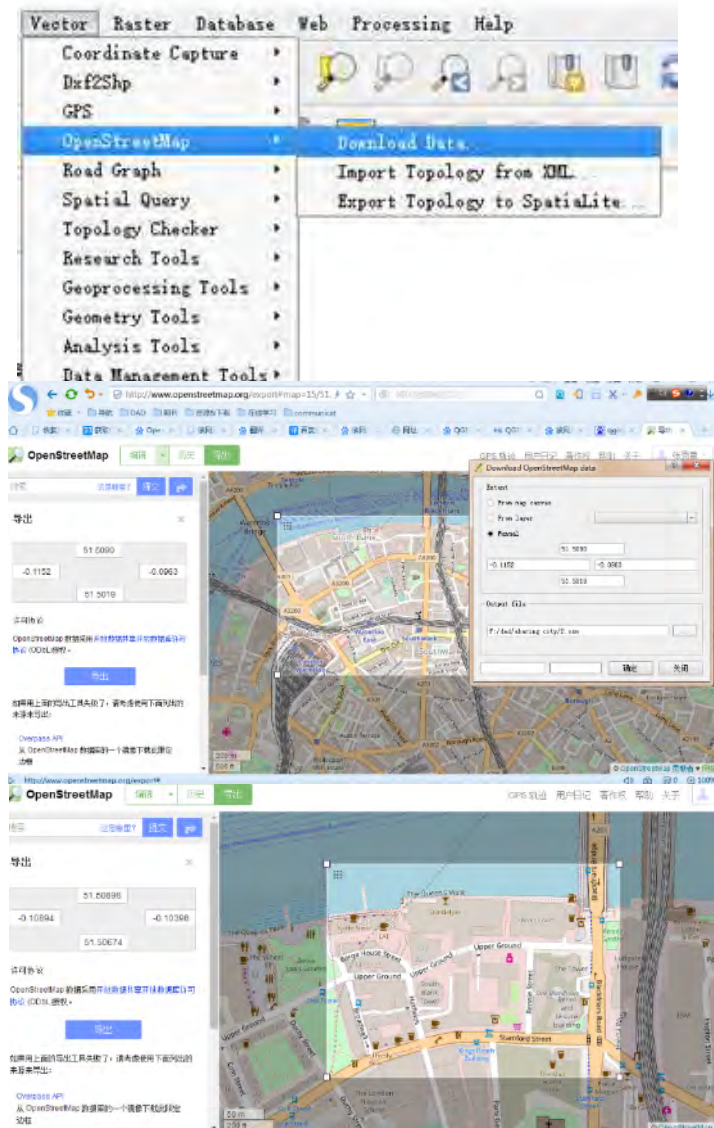
<http://www.openstreetmap.org/#map=18/51.50780/-0.10868>

[Download](#)

[QGIS://www.qgis.org/en/site/forusers/download.html](http://www.qgis.org/en/site/forusers/download.html)

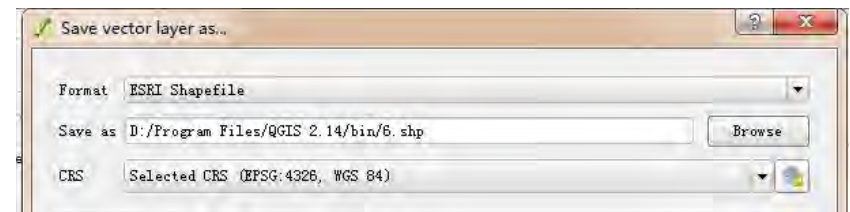
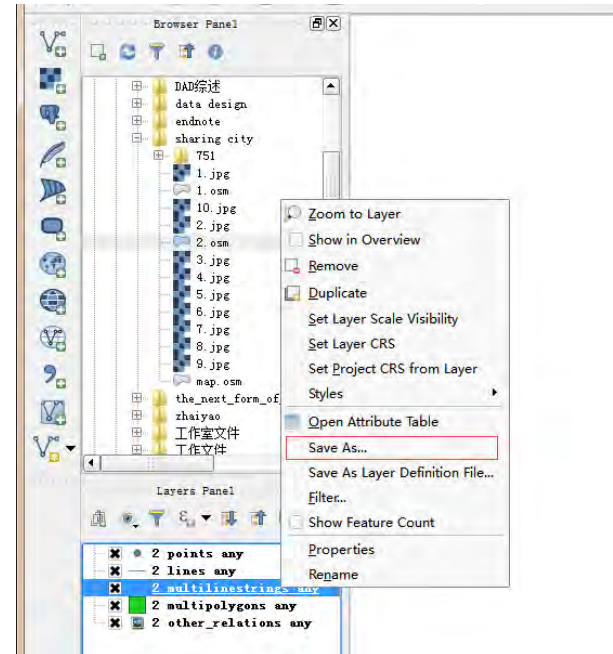
Step1: Download the open street map from QGIS software or in the website.

①



②

Step2: Select data in the QGIS's content list, right-click, select Geometry Tools-, click Saved /Export/Add geometry column, export to SHP suffix data, and then edit it in ArcGIS software.



<https://zhuanlan.zhihu.com/p/25889246>

Data and Resources

Data type	Database name	Main information	website
Open data	Creative Commons	Sharing Knowledge	https://creativecommons.org/
	Open Access Library	Open journal articles, technical reports, dissertations	http://www.oalib.com/
	open street map	Map with street information	http://www.openstreetmap.org/#map=15/51.5057/-0.1046
	Global geographic GeoJSON data	Various geospatial data information	
	SVG-EPS map	Vector map data	http://bbglab.irbbarcelona.org/svgmap/
	Global cities Data	Bike data	http://www.lboro.ac.uk/gawc/group.html
	sightsmap	Photo address information	http://www.sightsmap.com/#
	Public data from the government	Human data: economy, industry, education, population, road traffic; Natural data: geology, topography, climate, soil, hydrology	
Social data	WeChat, blogs, twitter, Wiki, Facebook, Linked in, etc.	E - mail, documents, pictures, audio, video	
Enterprise data	Baidu, Google, MapABC, MapBar, Sina micro-blog, Sogou, United Nations comprehensive database, International Monetary Fund, CEIC global database, world bank, World Bank EdStats, Taobao, Alibaba, Jingdong	Space, society, economy, education, Shopping	

http://mp.weixin.qq.com/s?src=3×tamp=1515401421&ver=1&signature=qZStl*2RcaqXL2O4JLB3F2KIq0mLXME3CgAXrOhr2UyrHtm1Xt22cdACG8oMpkBZfGXdBAeN006hTMP12uqnj91XawYMKy3xEPE0oNcW04yu3WVMGsfMKJzRyAIH8c1WYsd*NWBh7VT09debcPUZQ==

http://mp.weixin.qq.com/s?src=11×tamp=1515412736&ver=624&signature=VbtgzWuyXebGqJ01DCK1*G9dydl-BRF3jgoXb08KQa2Ce3OI28XmTKmCdHdvyVHyM1RsXf*8LXHoOeJNuiIoNg1ntnSS-UkiD8kVLOwM6jFyj7W7Zxe3JP1I4yzf0Z1&new=1

清华大学



2018 Spring TSINGHUA & NUS Joint Studio

SHARING CITY

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