



人工智能与未来城市空间规划
Artificial Intelligence and the Future of Urban Spatial Planning

HUANG Qian

Engineering Perspective of Geo-Spatial Intelligence
in Smart City



International Knowledge Centre
for Engineering Sciences and Technology
under the Auspices of UNESCO
联合国教科文组织国际工程科技知识中心



同济大学
TONGJI UNIVERSITY

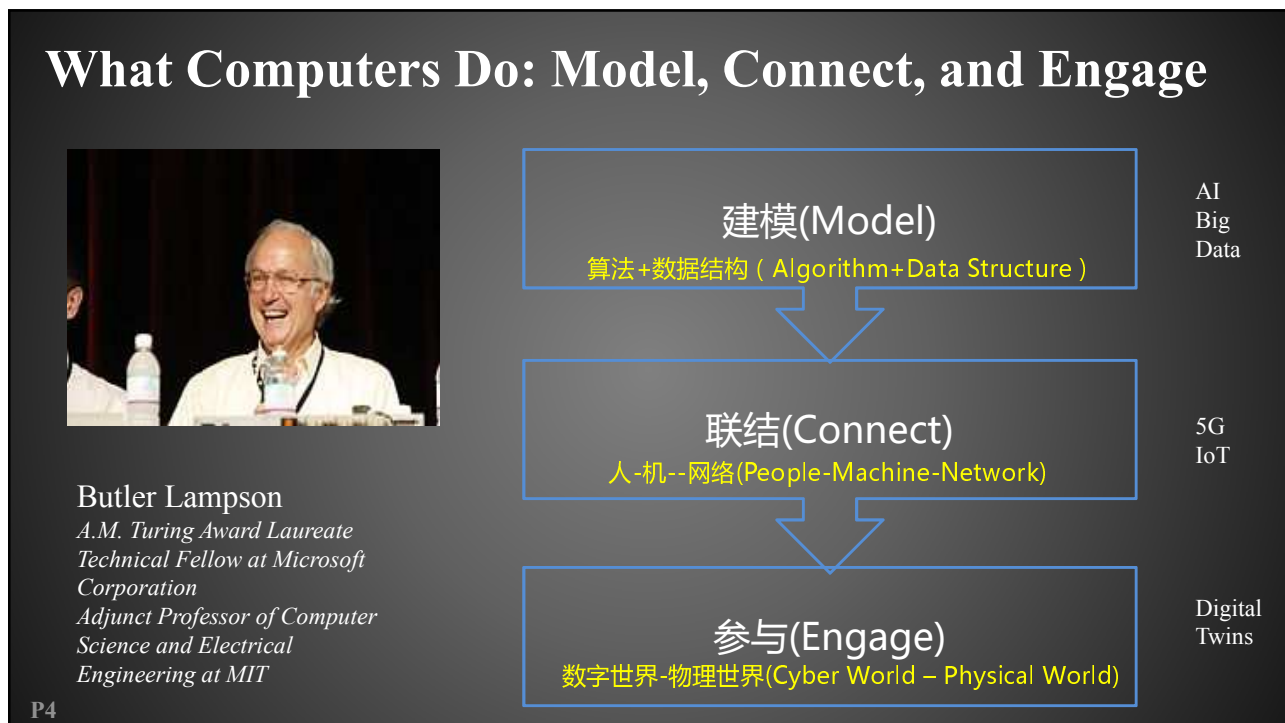
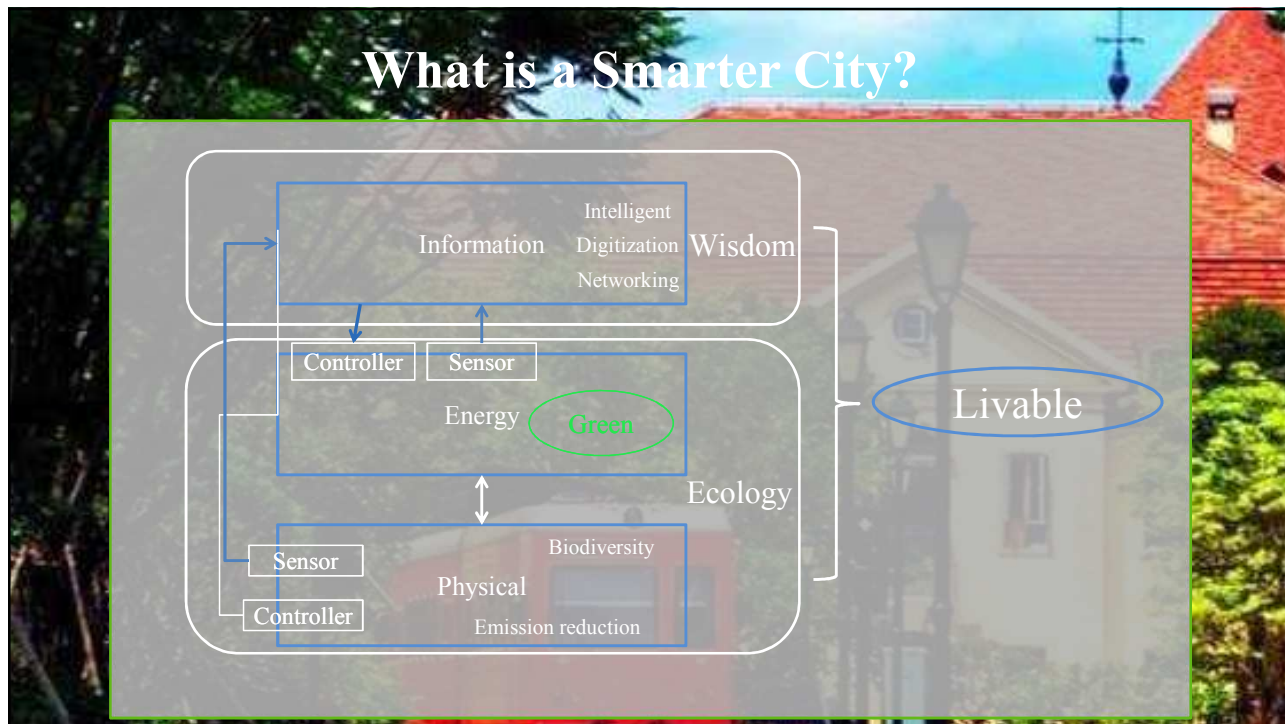


Engineering Perspective of Geo-Spatial
Intelligence in Smart City

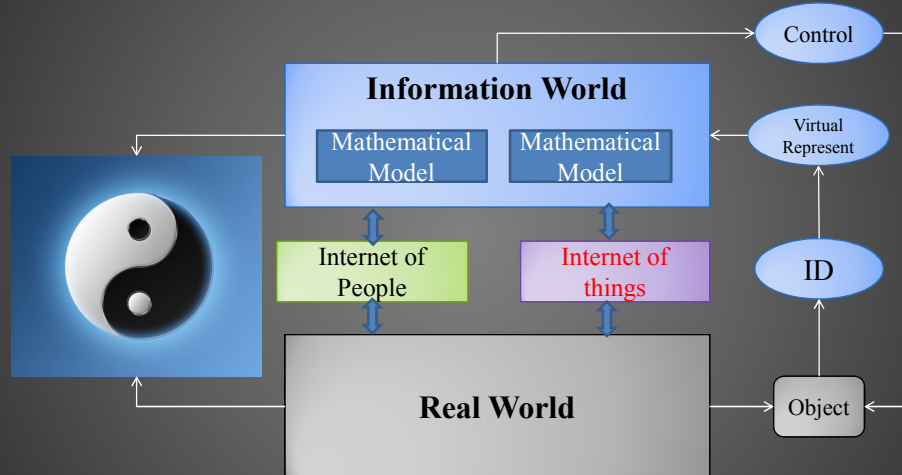
Huang Qian
19 November 2018

时空智慧 升维赋能

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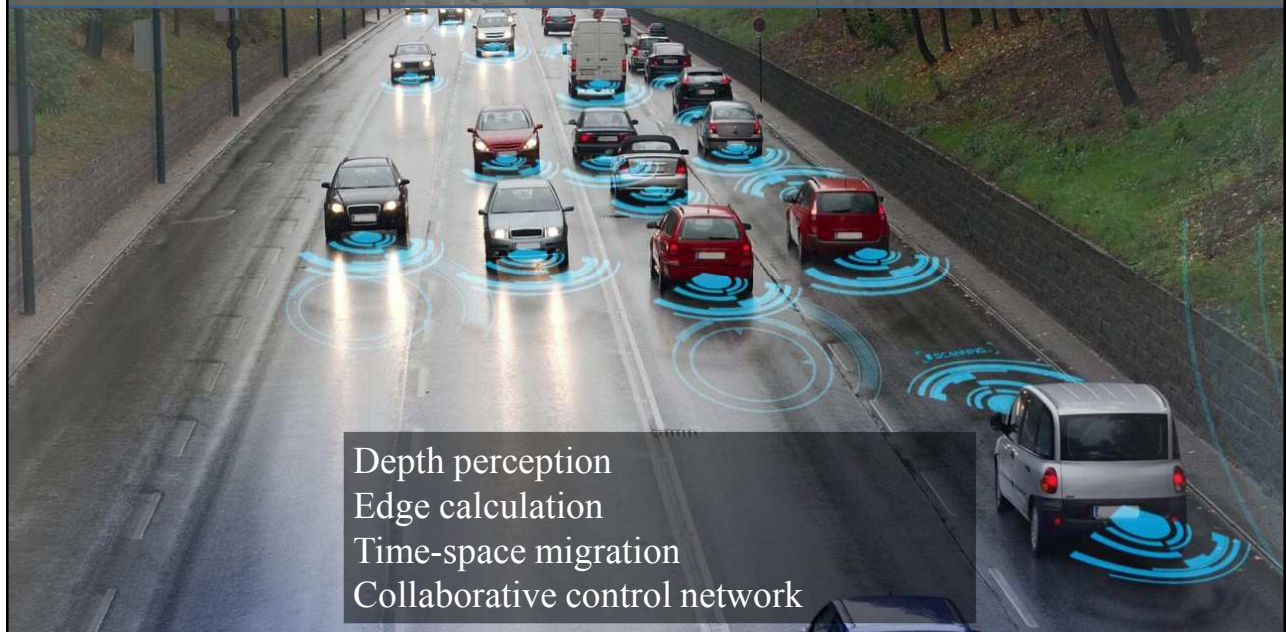
Connection, more and faster

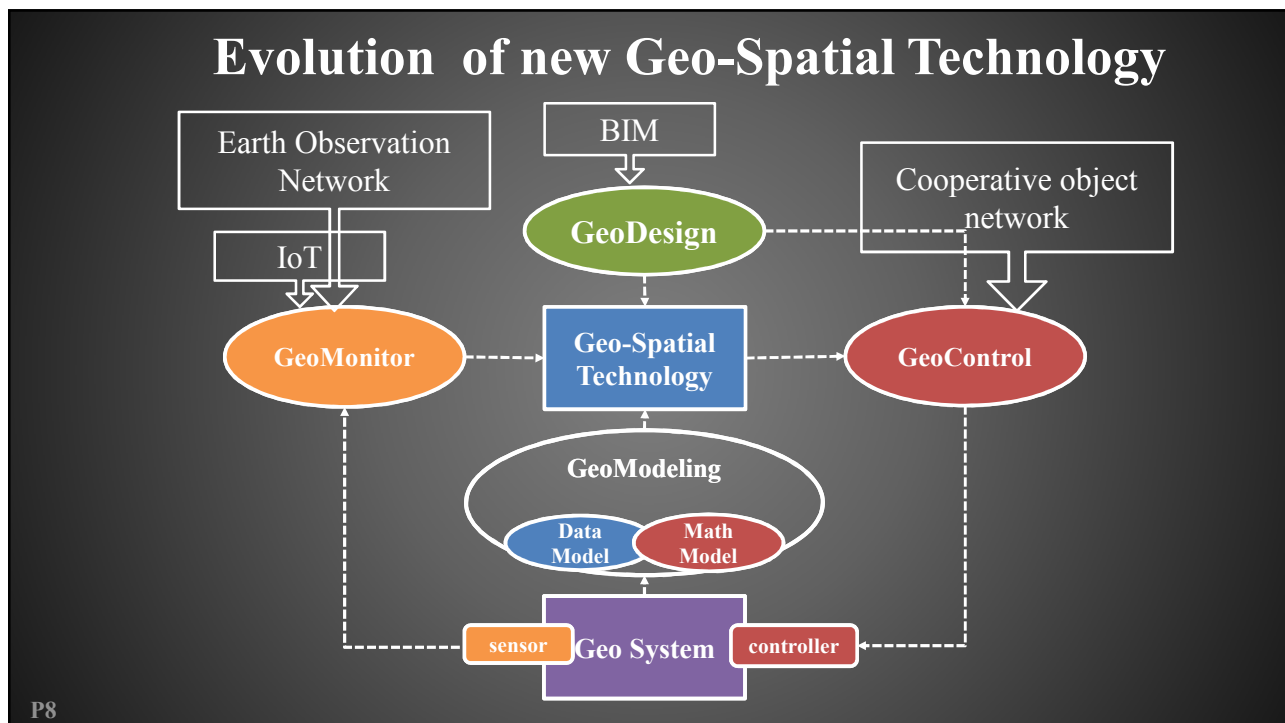
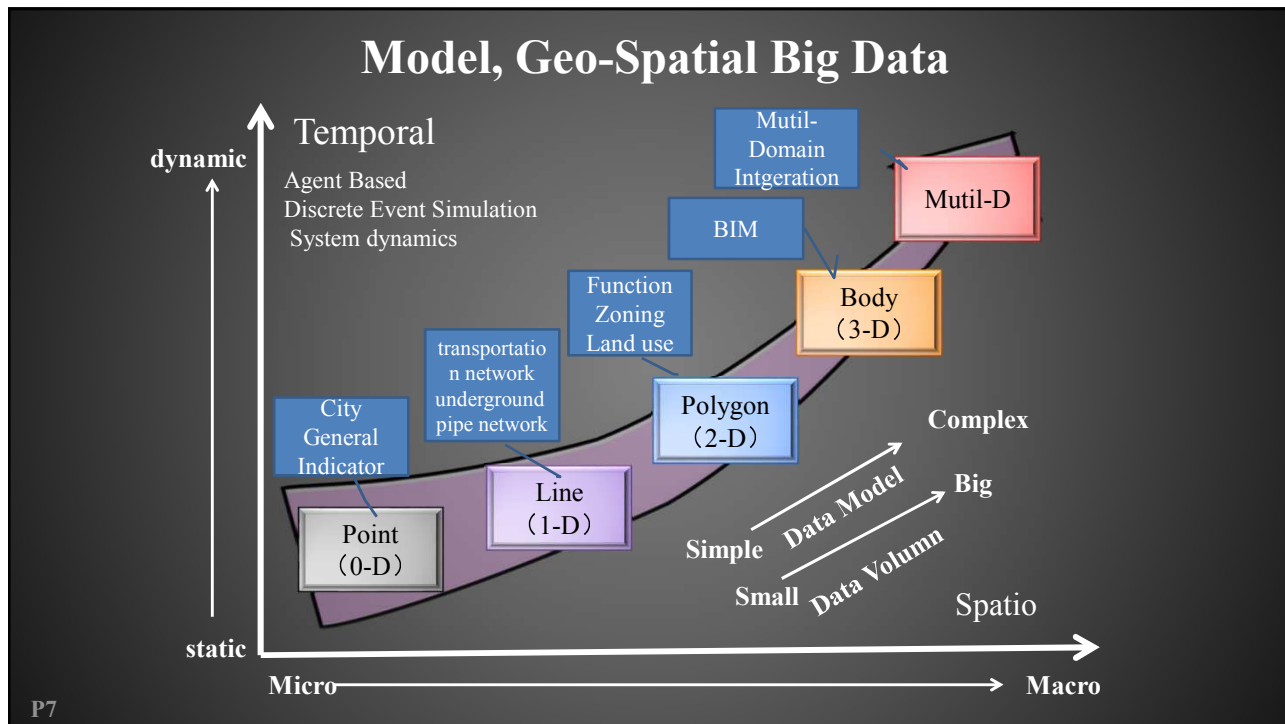


2025年我国物联网连接数将达到53.8亿，其中5G物联网连接数达到39.3亿。——《2018年中国5G产业与应用发展白皮书》赛迪

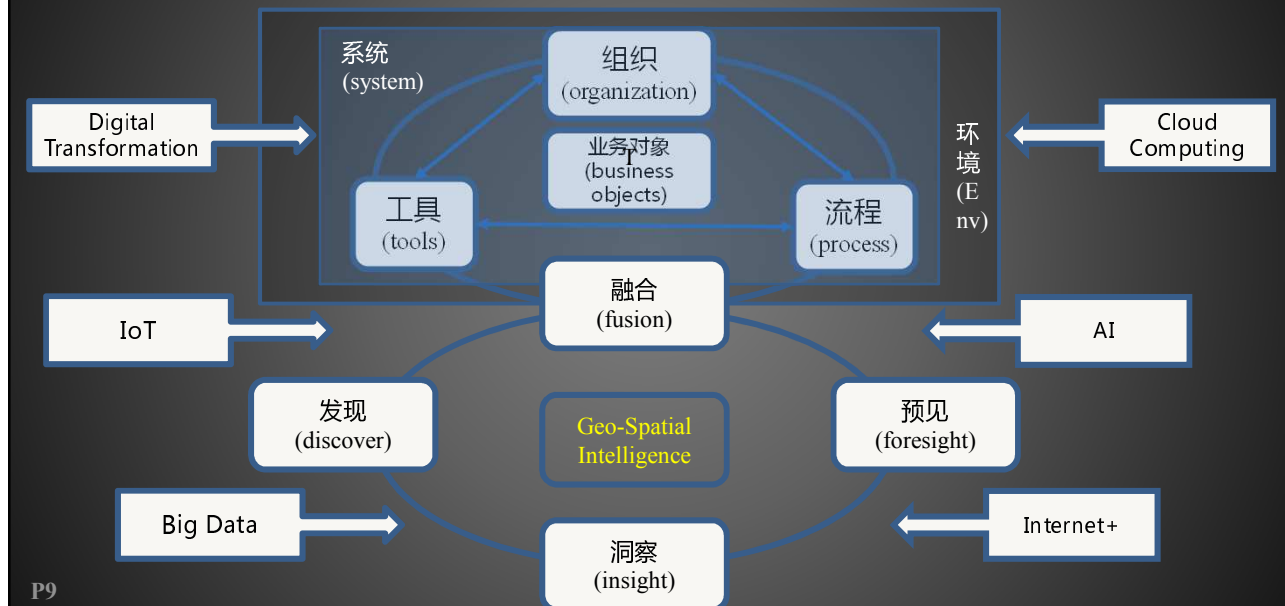
P5

Engage, interactive and automatic





Geo-Spatial Intelligence Structure and Mechanism



Can we reform traditional transportation?



Amplification of toll gap



Hard condition in field investigation



Repetition of route design



Difficulties in Highway Construction Management

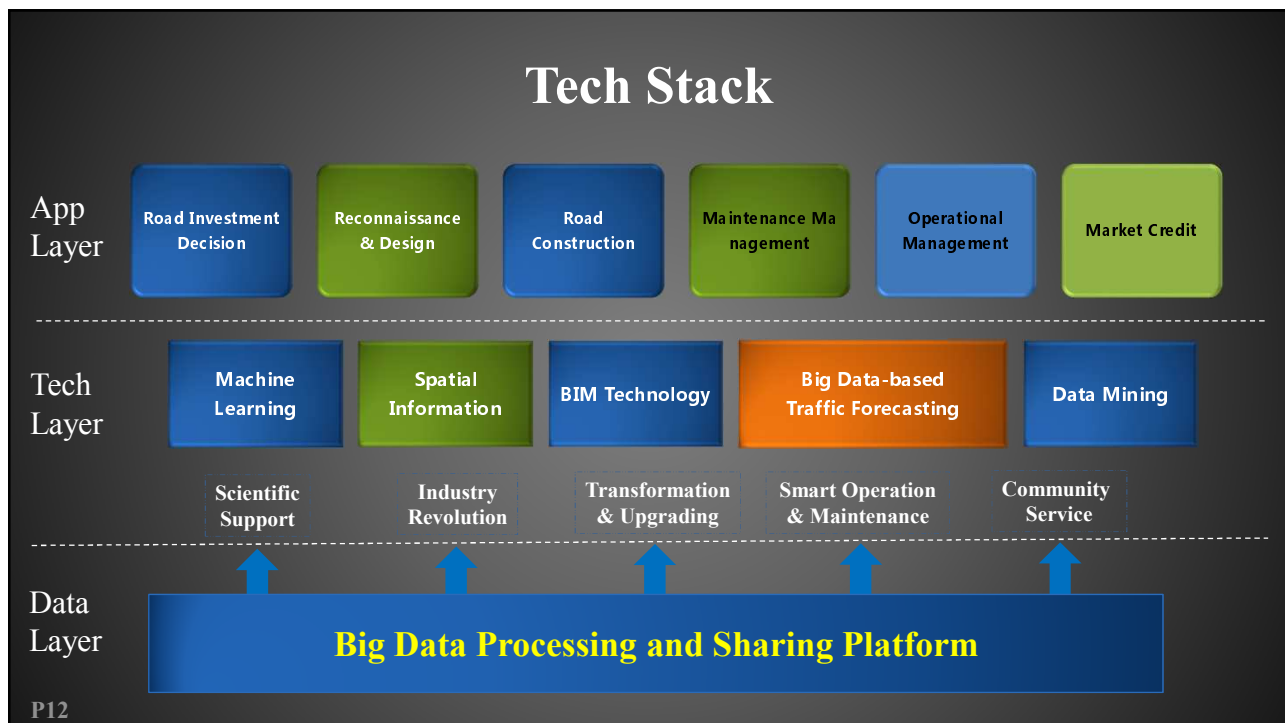
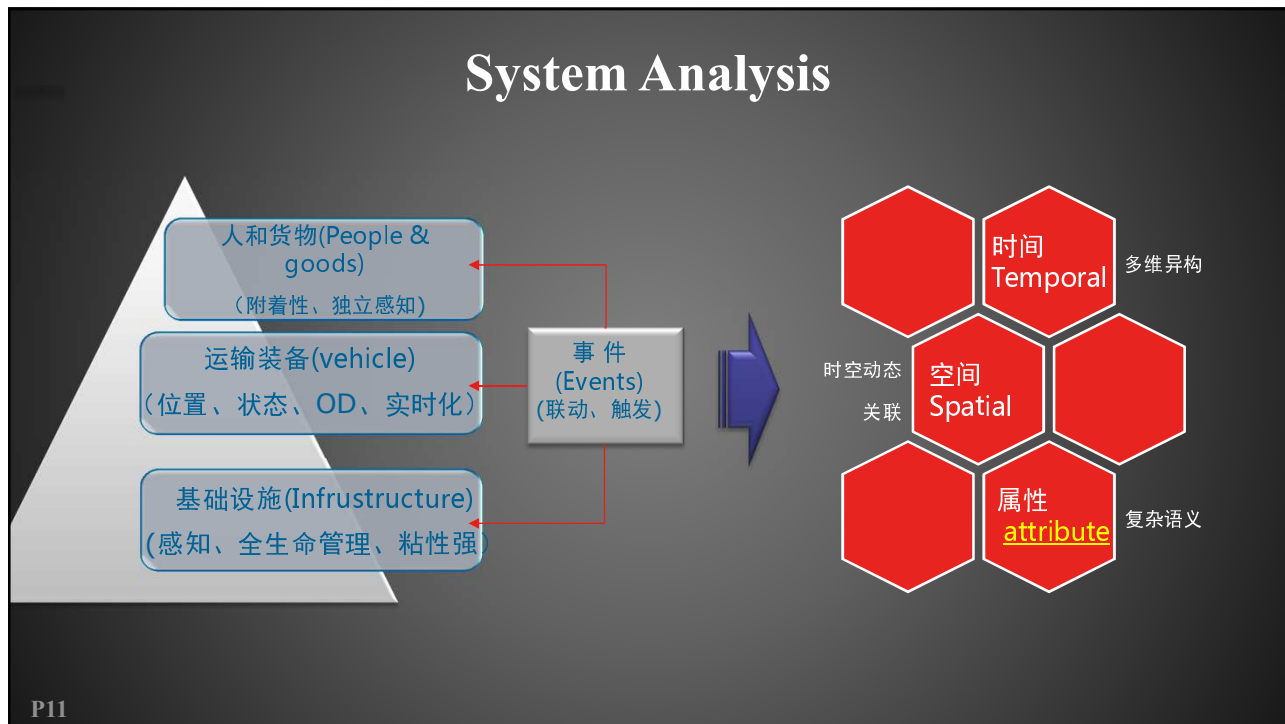


Lag of road maintenance management



Weak basis of road-informatization

P10



Case 1, Remote Sensing Recognition

P13

Algorithm, Generative Adversarial Networks

- 生成器：生成以假乱真的图像
- 鉴别器：尽可能鉴别真假
- 当鉴别器无法区分真假时，模型训练完毕。



训练数据



数据样本

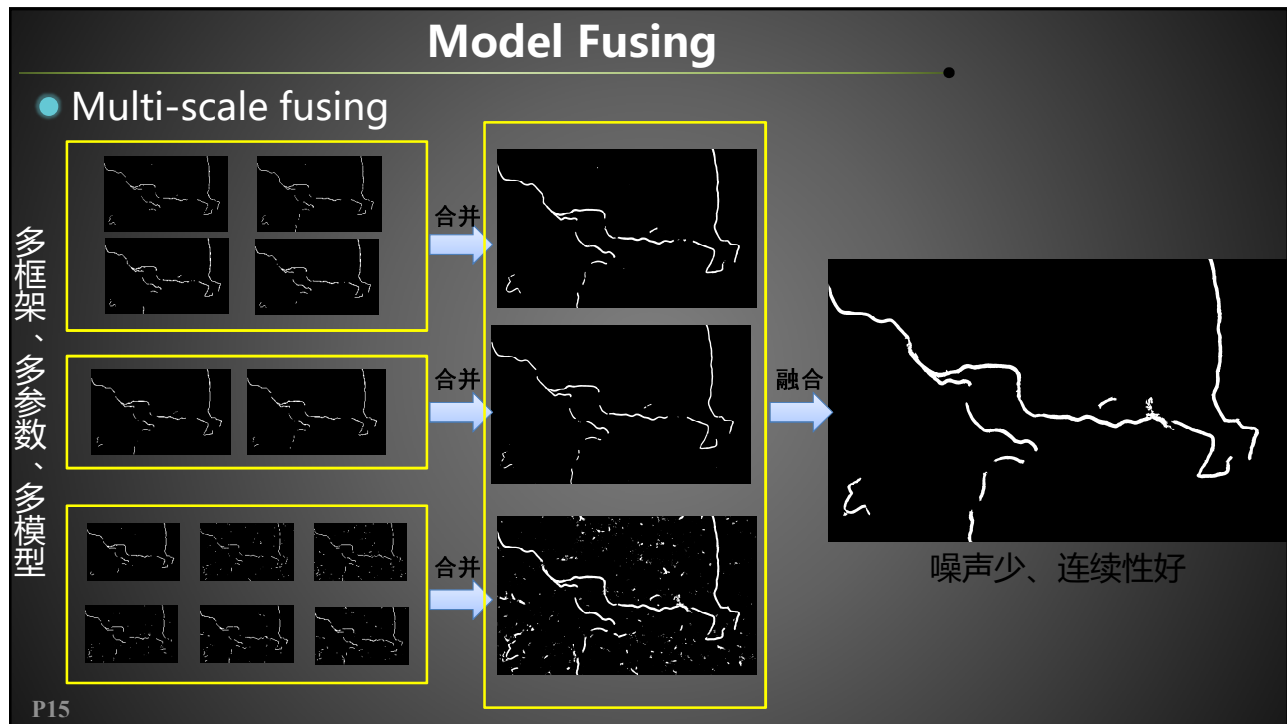


生成样本




真or假？

P14

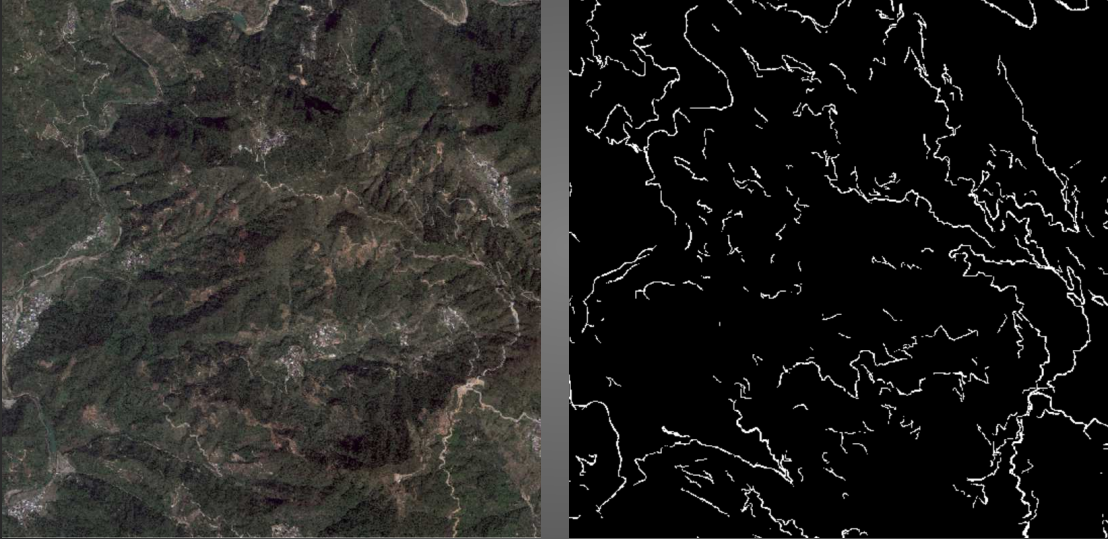


Building Recognition



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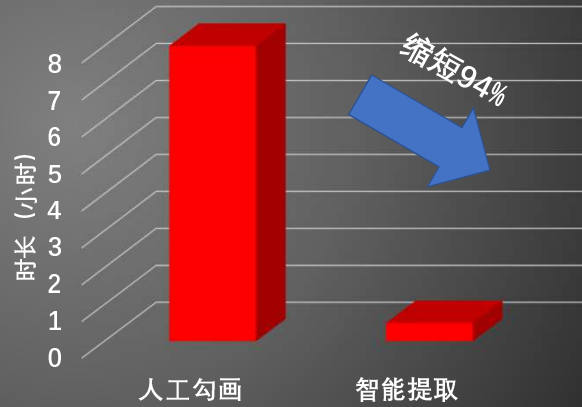
● Xiamen



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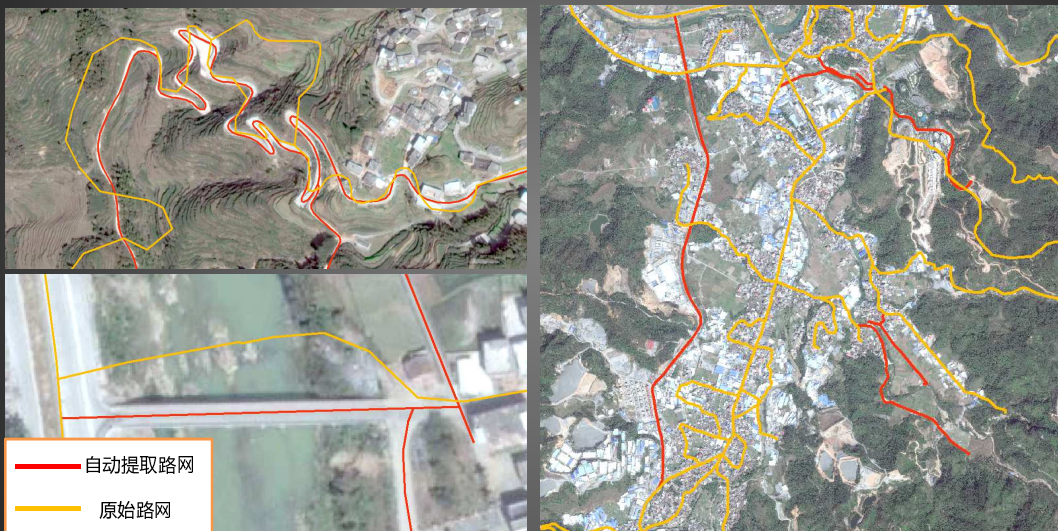
● Faster

以25平方公里的区域为例，人工勾画路网需8小时/人，利用机器学习自动提取，结合半自动化的后处理，仅需半小时/人



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● Better



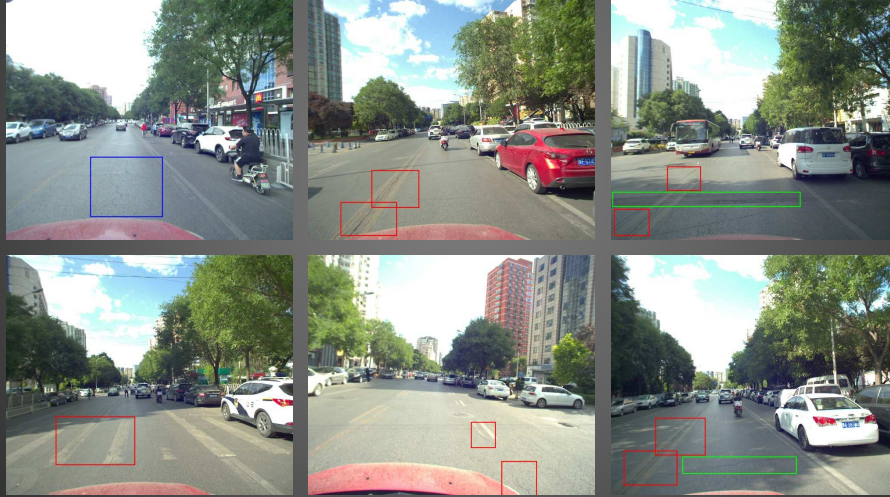
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Algorithm in Smart Maintenance

养护

养护计划

养护资金



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Traffic Volume Forecast

公路投资决策

综合交通智能联动

高速收费标准制定

路网规划决策

预防性养护方案制定

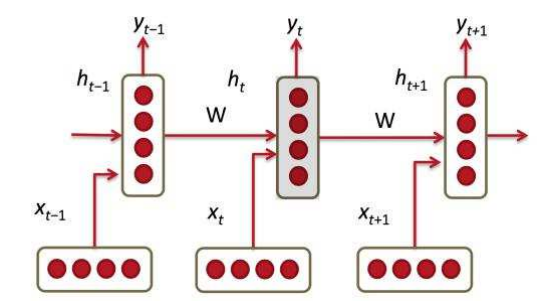
节假日交通量预警

公路运营管理

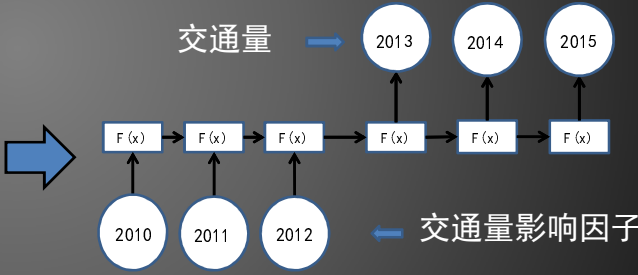
交通安全态势监测管理



P22



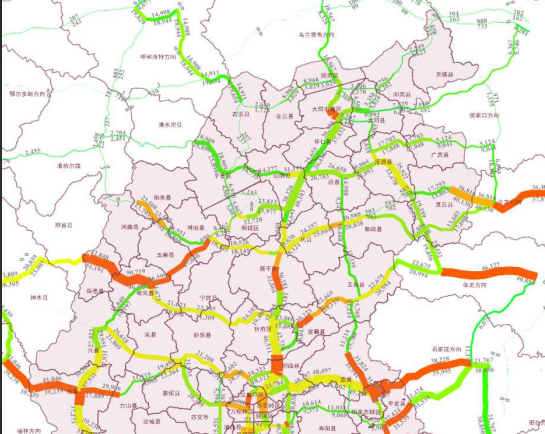
recurrent neural network(RNN)




Synthetic control method

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Traffic Volume Forecast Platform



山西省全路网交通量预测



年份	南靖丰田(3705) - 金山(3706)		金山(3706) - 南靖丰田(3705)	
	客车(辆)	货车(辆)	客车(辆)	货车(辆)
2018	9017711.41653	2602238.31726	9290871.15855	2668465.97741
2017	7570970.78913	2351242.28867	7800935.49855	2415960.01013
2016	6317875.31006	2119057.14145	6509999.48506	2181903.57538
2015	5239147.02575	1905072.10795	5398392.67253	1965732.72922
2014	4278102.93617	1811787.79178	4366851.70175	1855436.59921
2013	4934907.77612	1998439.41934	5114277.30053	2078900.56026
2012	3899802.81018	1744456.15681	4046137.3652	1819674.72232

福建省拟建高速公路交通量预测

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