

いつか、あたりまえになることを。

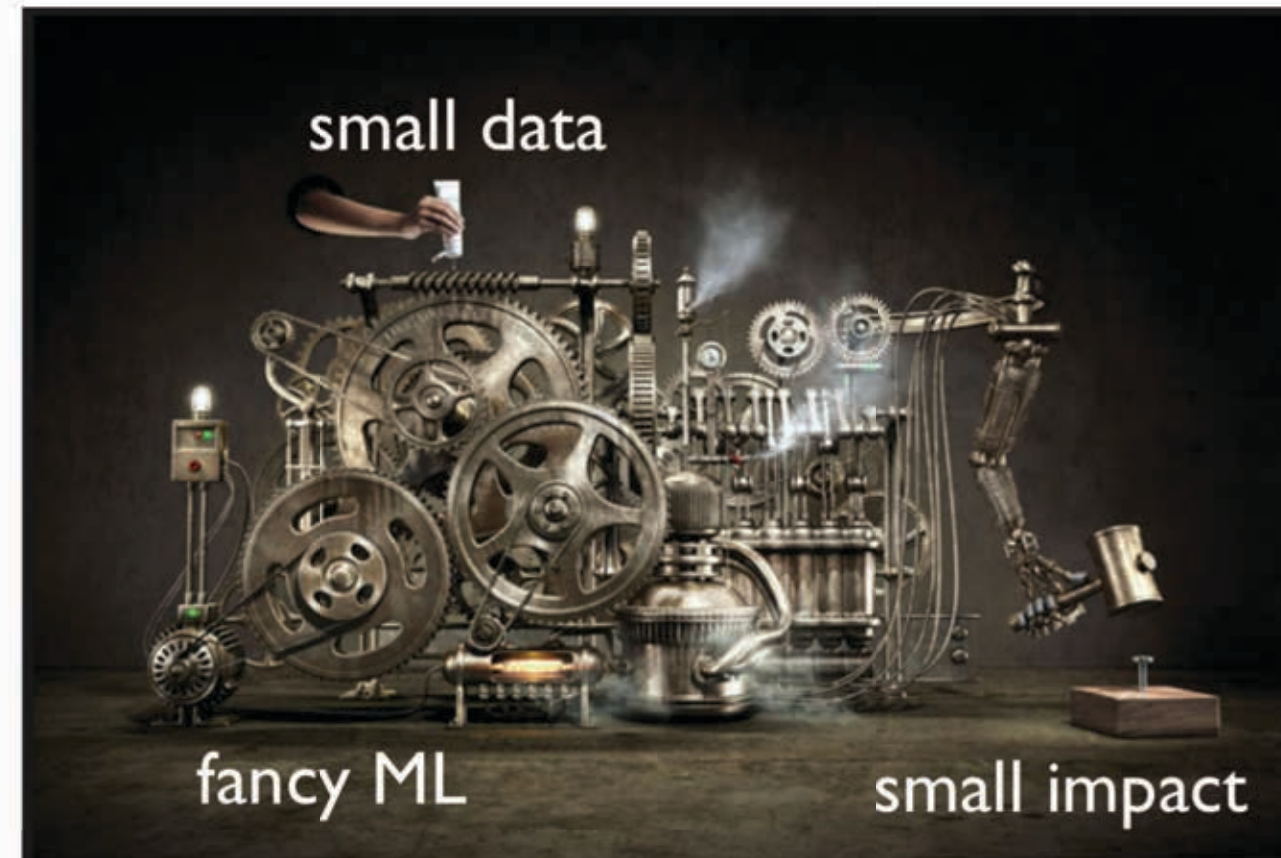
^{NTT}
docomo

これからのAI利用

情報通信審議会AI・脳研究WG（第2回）
栄藤 稔

2016年2月17日
株式会社NTTドコモ

The big practical lesson of the last 10 years



A simple ML algorithm that scales to more data generally beats a fancier algorithm that can't

Courtesy: Greg Corrado, Senior Research Scientist and Tech Lead at Google

Big Data Landscape 2016

Infrastructure

Hadoop On-Premise
 cloudera, Hortonworks, MAPR, Pivotal, IBM InfoSphere, splice, bluedata, jethro

Hadoop in the Cloud
 amazon, Microsoft Azure, Google Cloud Platform, IBM InfoSphere, CAZENA, TREASURE DATA, altiscale, Qubole, xplenty

Spark
 databricks, GridGain, TACHYON NEXUS

Cluster Services
 amazon, Microsoft Azure, Google Cloud Platform, IBM InfoSphere, CAZENA, TREASURE DATA, altiscale, Qubole, xplenty

Analytics

Analyst Platforms
 Palantir, AYASDI, Quid, enigma, Digital Reasoning, ORBITAL INSIGHT

Analytics Platforms
 Microsoft, guAVUS, Datameer, inter|ana

Data Science Platforms
 context relevant, CONTINUUM, DataRobot, Alpine, MODE, plotly, ADATA, dataiku, tonian, DOMINO, sense, yhat, ALGORITHMIA

Visualization
 +tableau, Roambi, GOMDATA, Qlik, CHARTIO

Applications

Sales & Marketing
 RADIUS, Gainsight, bloomreach, Zeta, livefyre, blueyonder, kahuna, Lattice, SAILTHRU, persado, infer, sense, AVISO, ACTIONIQ, QUANTIFIND, ENAGGIO

Customer Service
 MEDALLIA, ATTENSTY, CLARABRIDGE, STELLASERVICE, NGDATA, Preact, DigitalGenius, appurri, fuse|machines

Human Capital
 gild, Connectifier, textic, entelo, hiQ

Legal
 RAVEL, JUDICATA, Everlaw, Brevia, PREMORITION

NoSQL Databases
 amazon, Google Cloud Platform, Microsoft Azure, mongoDB, MarkLogic, DATASTAX, Couchbase, SequoiaDB, redislabs, influxdata

NewSQL Databases
 SAP, Clustrix, Pivotal, paradigm4, memsql, NUODB, MariaDB, VOLTDB, citusdata, deepdb, Trifolion, Cockroach LABS

BI Platforms
 Power BI, amazon, Wave Analytics, GoodData, birst, platfora, looker, atscale, BISSENSE

Statistical Computing
 sas, SPSS, MATLAB

Log Analytics
 splunk, sumologic, kibana, CLOUD PHYSICS, loggly

Social Analytics
 NETBASE, DATASIFT, tracx, bitly, synthesio, simple reach

Ad Optimization
 MediaMath, Integral, OpenX, theTradeDesk, Adgorithms, Livelihood, dstillery, DataXu, Cppier, TAPPD

Security
 CYLANCE, CounterTack, cybereason, AREA 1 SECURITY, SentinelOne, Recorded Future, Guardian Analytics, FORTSCALE, sift science, Keybase, feedzai, SICNIFYD

Vertical AI Applications
 facebook, Clara, KASIST, lumiata

Graph Databases
 neo4j, OrientDB, InfiniteGraph

MPP Databases
 TERADATA, VERTICA, NETEZZA, kognitio, dremio

Cloud EDW
 amazon, Google Cloud Platform, Microsoft Azure, Pivotal, snowflake, WATERLINE DATA, Infoworks

Data Transformation
 alteryx, TRIFACTA, tamr, Paxata, StreamSets, Alation

Data Integration
 informatica, MuleSoft, snapLogic, Bedrock Data

Real-Time
 amazon, METAMARKETS, confluent, DATATORRENT, dataArtisans

Machine Learning
 Azure Machine Learning, H2O, Dato, SKYTREE, rapidminer, DATAFORM, deepinsight, VINZEN, PredictionIO, glowfish

Speech & NLP
 NarrativeScience, api.ai, NUANCE, Gridspace, semanticmachines, cortical.io, molulus, MindMeld, iDIBON, vscope

Horizontal AI
 IBM Watson, Cortana, sentient, viv, nervana, nora, HyperScience, MetaMind, clarifai

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Vertical AI Applications
 facebook, Clara, KASIST, lumiata

Management / Monitoring
 New Relic, APPDYNAMICS, amazon, actifio, Numerify, splunk, DATADOG, Yroqana, Anodat

Security
 TANIUM, illumio, CODE42, DataGravity, CipherCloud, VECTRA, sqrrl, BlueTalon

Storage
 amazon, Google Cloud Platform, Microsoft Azure, panasas, nimblestorage, Qumulo

App Dev
 apigee, CASK, Klean IO, Typesafe, CONCURRENT

Crowd-sourcing
 amazon, mechanicalturk, CrowdFlower, WorkFusion

Search
 hp, ORACLE, ENDECA, EXALEAD, Lucidworks, elastic, ThoughtSpot, MAANA, swifttype, Algolia, SINEQUA

Data Services
 UO, OPERA, Mu Sigma, DATA SCIENCE, kaggle, datascience

For Business Analysts
 OrigamiLogic, ClearStory, CIRRO, import.io

SMB / Commerce
 Google Analytics, AMPLITUDE, RJMetrics, BLUECORE, sumall, granify, Airtable, retention, custora

Publisher Tools
 Outbrain, mixpanel, Chartbeat, yieldbot, Yieldmo

Govt/ Regulation
 Socrata, OPENGOV, FN FiscalNote, enigma, mark43, PREDPOL, OpenDataSoft

Finance
 Affirm, LendingClub, OnDeck, Kreditech, zest finance, LendUp, Kabbage, tidemark, uora, Dataminr, Lenddo, KENSHC, AIDYIA, ISENTIUM, Quantopian, sentient

Cross-Infrastructure/Analytics

amazon, Google, Microsoft, IBM, SAP, sas, hp, VMware, talend, TIBCO, TERADATA, ORACLE, NetApp

Open Source

Framework
 HADOOP, HORTONWORKS, YARN, MESOS, Flink, CDHP

Query / Data Flow
 HADOOP, HORTONWORKS, YARN, MESOS, Flink, CDHP

Data Access
 cassandra, mongoDB, kafka, CouchDB, TRIC

Coordination
 Apache Zookeeper

Real-Time
 spark, Flink, druid

Stat Tools
 Scala, Aerosolve, Caffe, CNTK, TensorFlow, FeatureFu, DIMSUM, jupyter, DL4J, WEKA, VELS

Machine Learning
 Aerosolve, Caffe, CNTK, TensorFlow, FeatureFu, DIMSUM, jupyter, DL4J, WEKA, VELS

Search
 Elasticsearch, Solr, Lucene

Security
 Apache Ranger

Visualization
 Zeppelin

Data Sources & APIs

Health
 Apple, JAWBONE, GARMIN, practicefusion, fitbit, Withings, VALIDIC, netatmo, kinsa, Human API

IOT
 UPTAKE, ThingWorx, helium, samsara, AUGURY, estimote

Financial & Economic Data
 Bloomberg, DOW JONES, YODLEE, PREMISE, S&P CAPITAL IQ, quandl, xignite, CB INSIGHTS, mattermark, estimize, PLAID

Air / Space / Sea
 PLANET LABS, spire, WINDWARD, CRUISE, SKYWATCH, Airware, DroneDeploy

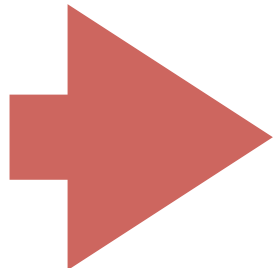
Location/People/Entities
 GARMIN, foursquare, InsideView, esri, STREETLINE, CARTODB, factual, PlaceIQ, Crimson Hexagon, placemeter, BASIS, Sense

Other
 qualtrics, panjiva, DATA.GOV

Incubators & Schools
 GA, DataCamp, INSIGHT, DataElite, METIS, The Data Incubator

2015年2月頃 顔画像認識の精度が人間を上回った。

今後、動画の認識能力が向上しロボット制御に応用されるだろう。

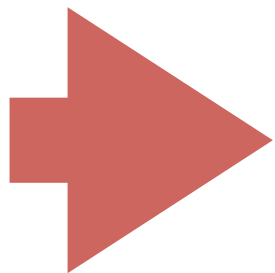
 産業の自動化が遅れていた農業、建設、食品加工に進む。多分、健康・医療分野にも。

2015年11月 AWS がIoTプラットフォームを公開。

 トランザクション系(Web, FinTech, e-commerce)に加えて製造業を初めとした非ICT産業データへのAI応用が進むだろう。Sparkを筆頭としたビッグデータ処理系の進化に注意。

2015年11月 GoogleがTensor Flow公開

Deep learningを使うためのOSSが発達

 Tensor Flow(Google), Chainer(PFN), Caffe(画像認識では古参/メジャー), Theano(研究社内で広く使われている), Torch, Deplearnin4j s 等々。

→Deep Learningは誰でも始められる時代

IoTは流行言葉で終わるのか？

ロボティクスの応用は？

ヘルスケアはエコシステムを確立出来るのか？

オンデマンドエコノミーはどこへ向かうのか？

大企業のビッグデータはマネタイズ出来るのか？

メッセンジャーアプリはB向けに進化するか？

ビッグデータパラダイムを超えるAI技術はできるのか？

2016年はVirtual Reality元年となるか？

AIはマネタイズ出来るのか？

自動運転の車はいつ商用化？

ゲームはドル箱であり続けるのか？

Droneで管制システムはいづ実現されるのか？

ネット広告は本当に従来マスメディアよりも効果的か？

商用ステージ (Revenueアリ)

高性能/低コスト化、プレイヤー増加による競争激化

画像解析

音声対話

Personalization

マーケティング

セキュリティ/認証

農業

Human Resource

教育

先進的研究ステージ (Revenueほぼナシ)

自動運転

Medical

Legal



Orbital Insight



MetaMind

System
Insights

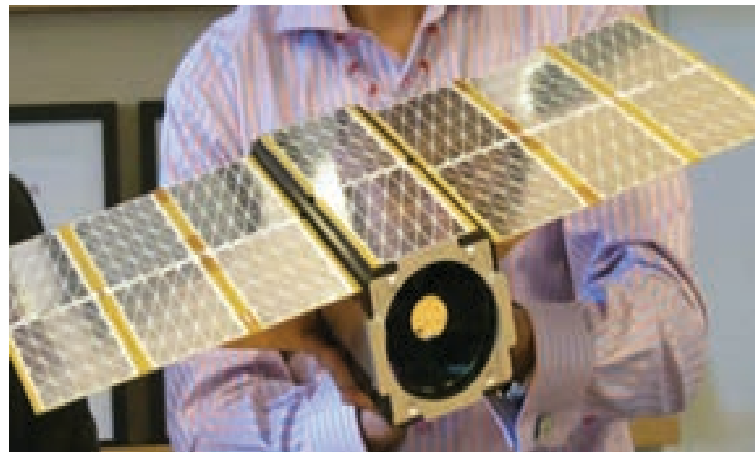


The Macroscope

Courtesy:



Orbital Insight

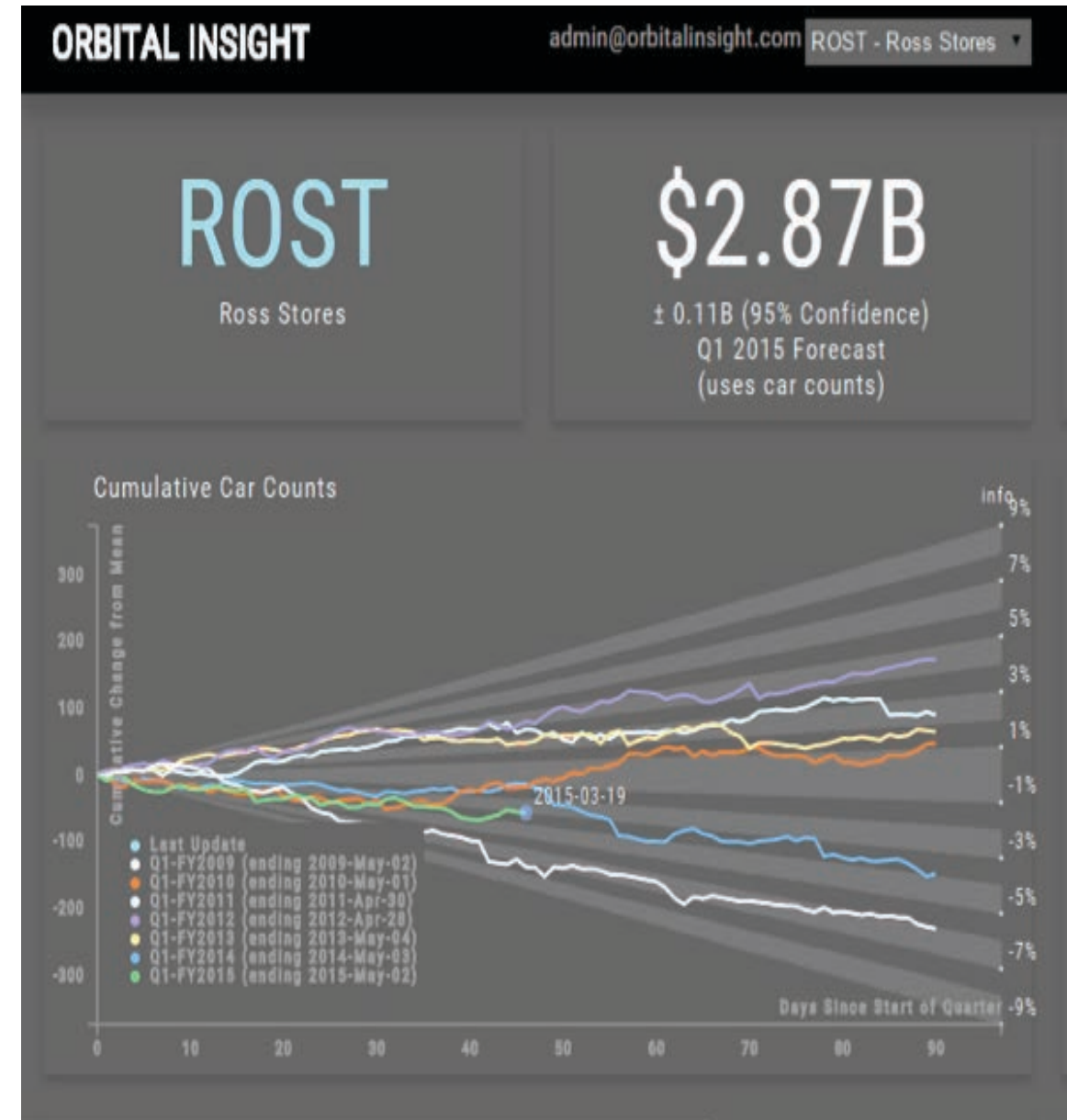


Web Portal

Statistical Analysis

Decision Trees Deep Learning

Re-projection Tiling



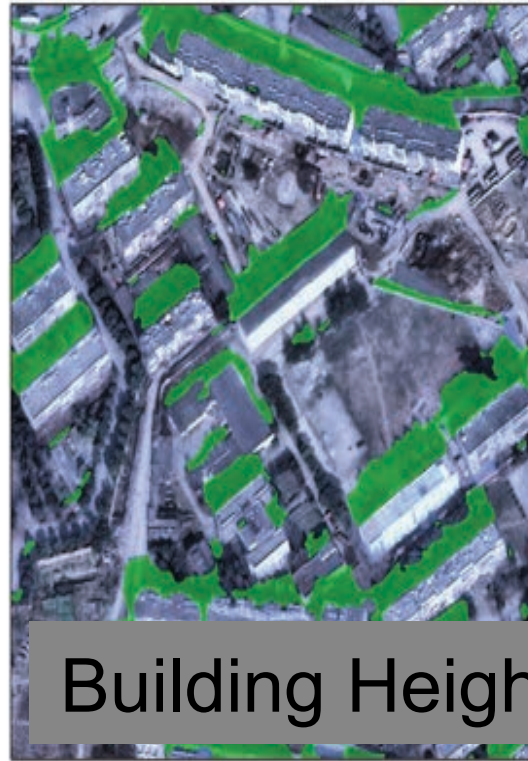
Wide Area Search and Advanced Object Counting



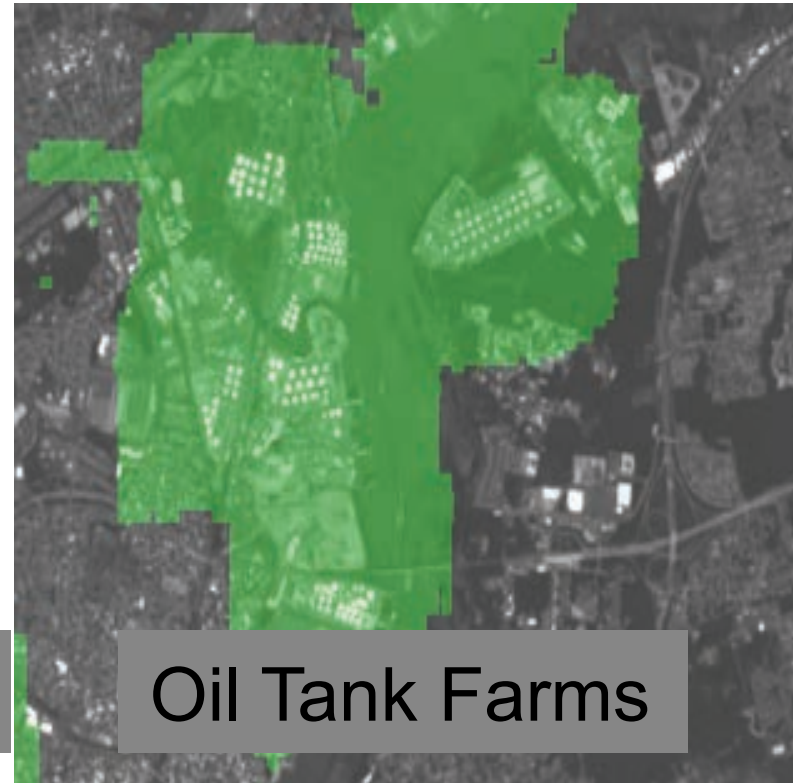
Courtesy:



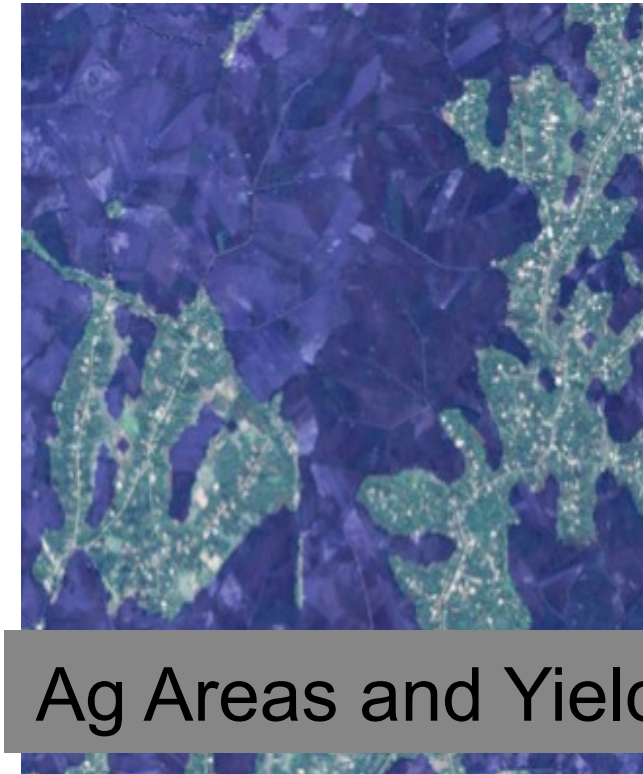
Orbital Insight



Building Height



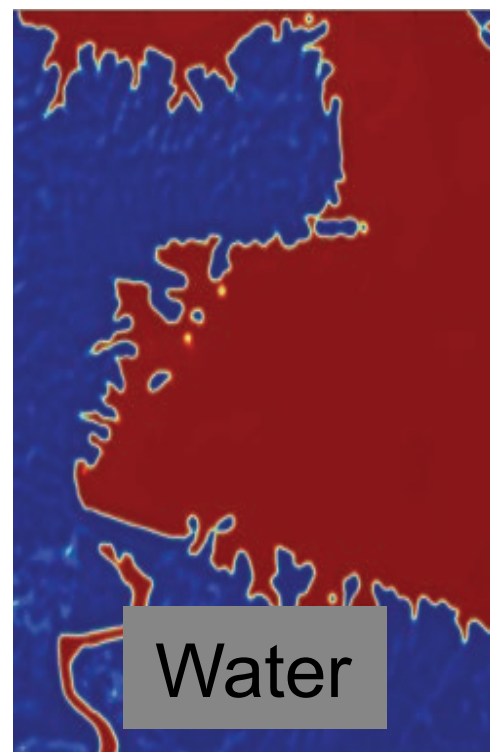
Oil Tank Farms



Ag Areas and Yield



Tract Housing



Water



Clouds & Haze



Development

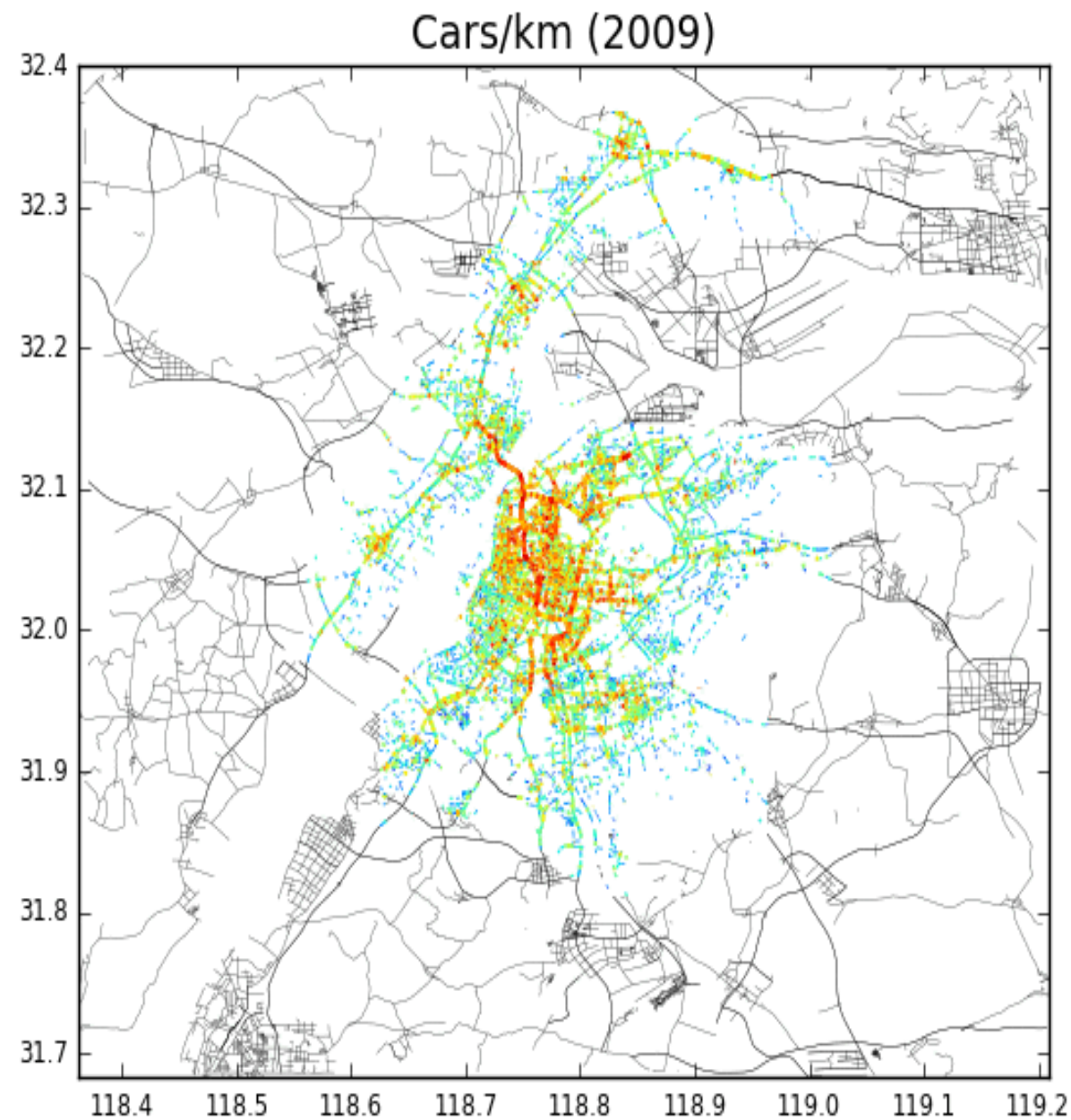


Airplanes

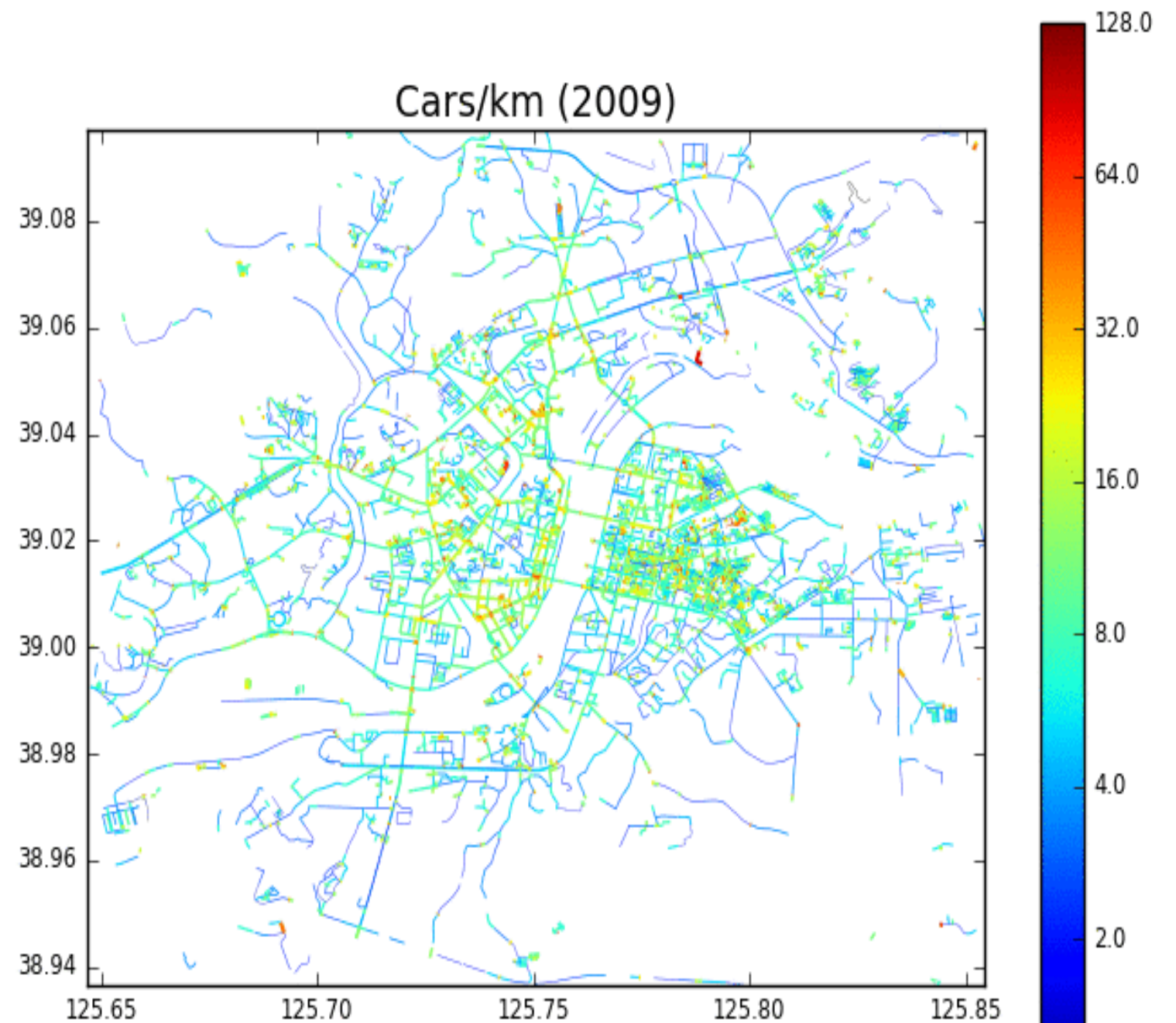
Application: Car Density Over Time



Courtesy:  Orbital Insight



Nanjing



Pyongyang

**AI = IOTにおけるデータ解析 (IOT解析屋のキャッチコピー)
の応用を考えると、日本に欠けているのはなにか？**

