Big Data for Smarter Transportation  
Racing toward a digital future

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1. Data
2. Sensors, Weather
3. Video Analytics
4. AI, ML and AR
5. IoT
6. Prediction / Decision Optimization
Predictions about the future

Software will account for 90% of future innovations in the car and lines of code will be ten-fold what they are today (Economic Times)

An autonomous vehicle, driven an average distance, generating up to 4,000 GB of data per day (Intel)

Each person will own 15 connected devices (Martechadvisor)

Personal mileage could increase by 23% ... (PWC)

Car-sharing could make up 26% of global miles traveled (Morgan Stanley)

The cost per mile of a shared ride can be 40% cheaper than driving your own car (Blackbook)

Up to 70% of new cars sold could have self-driving features with 15% fully autonomous (McKinsey)

TaaS (Transportation as a service) will provide 95% of the passenger miles traveled (Rethinking Transportation)

Electric vehicles will hit 125 million (CNBC)

250 million hours could be saved annually in the US with autonomous cars (US Census)
87% of all the CxOs interviewed suggested that Data is critical, However less than 18% have strategy in place to deal with Data.

More than 80% of all the generated data will be Big Data
Consumers expect value in return for their willingness to share their personal information

Types of personal information to be shared

<table>
<thead>
<tr>
<th>Types of personal information</th>
<th>Urban</th>
<th>Rural</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical - in case of an emergency</td>
<td>54%</td>
<td>44%</td>
</tr>
<tr>
<td>Mobility usage - for better products and services</td>
<td>51%</td>
<td>35%</td>
</tr>
<tr>
<td>Personal preferences - for personalized marketing/sales</td>
<td>47%</td>
<td>28%</td>
</tr>
<tr>
<td>Financial - for ecommerce</td>
<td>41%</td>
<td>21%</td>
</tr>
</tbody>
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Source: Automotive 2030 Consumer Survey
1. Video Analytics
2. Text Analytics
3. ML / DL
4. Weather
5. IoT
6. Prediction / Decision Optimization
Analyzing video content is a dynamic challenge.

The Technology Component:
- Scenario and object identification is not one size fits all – businesses have unique security needs.
- Tedious, expensive custom model creation and training
- Mediocre real-time analytics performance
- Lack of comprehensive, flexible video platform with leading AI capabilities

The Human Component:
- Human error increases drastically after only 22 minutes of monitoring two screens
- Tedious, error prone and causes fatigue
IBM Video Analytics (IVA) with Power AI Vision (PAIV) empowers enforcement and operations.

Analyze and identify established and objects without the need for AI experts or developers dramatically lower operational costs and risks.
IVA + PAIV
Video analytics solution with Custom Deep Learning Models

Easy-to-create training models
Configurable AI-infused video analytics platform

Real-time Analytics
Real-time deep learning and large scale video indexing

Ease of use
Intuitive, drag-and-drop without development or AI skills to easily create new visual recognition models. The solution’s UI can be used to quickly identify, track, search, filter and alert on objects and events.
SAFETY & SECURITY

Identify and monitor people and objects to improve public safety.

**Key Capabilities:**
- Facial recognition
- Object missing / left behind
- Trip wires / Intrusion detection
- Detect potential weapons
- People count and movement
- Post Event video analysis (forensics)

WORKPLACE SAFETY

Spot safety risks and ensure compliance to workplace regulations.

**Key Capabilities:**
- Safety equipment compliance – hats, vests, suits, gloves etc.
- Heat Maps
- Detection of workplace risks (spills, fallen objects, animals, etc.)
- People count
- Crowd formation

COMMERCIAL/RETAIL ANALYTICS

Analyze demographics and patterns of movement to gain insights.

**Key Capabilities:**
- Heat map
- Track summary
- Demographics
- Anomalous direction
- Trip wires, complex alerting
- Inventory management
Public safety agency in Brazil uses IVA to keep people safe during major events.

**CHALLENGE**

Improve security monitoring and analysis capabilities during major events such as the 2016 Olympics and World Cup.

**HOW WE HELPED**

- Shortened response time due to quicker detection of threats
- Improved coordination of response to potential security threats through dashboard-enabled collaboration across agencies
Event venue uses IBM Video Analytics to streamline security and operations

CHALLENGE
Improve security monitoring and analysis capabilities during major events while streamlining operations where possible.

HOW WE CAN HELP
- Monitor and assess line management to determine which lines move most quickly for routing and staff training
- Analyze parking lot vacancies to route traffic and reduce backups
- Bag scanning support to flag prohibited items and reduce wait times
- Crowd behavior analysis to flag for rioting, fighting and general emotional overtone
### Some relevant use-cases

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td><strong>Security</strong></td>
<td>Queue management, tracking and tracing people, people/crowd counting, face detection, detecting abandoned objects, incident/action detection, worker safety on tarmac, inspection of planes, scanning xray bags for objectionable items</td>
</tr>
<tr>
<td><strong>Worker safety</strong></td>
<td>Ensure wearing safety gear, worker surveillance, worker count, equipment inventory, incident detection, alert detection</td>
</tr>
<tr>
<td><strong>Analysis</strong></td>
<td>Auto/real estate/agriculture analysis, prompt quotes on accident ridden auto, drone based property premiums, satellite imagery for crop analysis</td>
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<tr>
<td><strong>Smarter cities</strong></td>
<td>Traffic management, commuter management, people/vehicle tracking, parking/traffic lights/sign violators, near miss detection, crime/threat detection, infrastructure maintenance</td>
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<tr>
<td><strong>Advance Driving Assisted Systems (ADAS)</strong></td>
<td>In vehicle assistance to drivers, detect sign boards/signals/speed limits in all weather conditions, land change, monitor alertness of drivers, integrate with auto insurance</td>
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<tr>
<td><strong>Incident</strong></td>
<td>On floor heat maps, inventory management, cart management, sweet-heart fraud detection, incident detection, objectionable item detection, security, parking lot management, off hour surveillance of premises</td>
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<tr>
<td><strong>Safety management</strong></td>
<td>Worker safety management, asset monitoring and management, inventory management</td>
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<tr>
<td><strong>Hospitals/Medical</strong></td>
<td>Analyze MRIs/Xrays/dermatology, integrate with mobile initiatives</td>
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<tr>
<td><strong>Defense</strong></td>
<td>Satellite image analytics for tracking cargo ships, aircrafts, surveillance of regions</td>
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Data Science and AI is driving transformation

“Data Science ill help power the next phase of decision-making and profitably”
-Dataconomy, “How AI is Transforming Business Intelligence,” February 19, 2018

“In 2021, AI augmentation will generate $2.9 trillion in business value and recover 6.2 billion hours of worker productivity.”
What is Data Science and AI?
Surface hidden intelligence to transform how your business operates

Unlock the value of data in new ways

- Predict and shape future outcomes
- Optimize people to do higher value work
- Automate decisions, processes
- Reimagine new business models

“AI is generating real value across industries”

BCG-MIT Report: Progress of AI in Business in 2018
### Insight
What happened or is happening and how to measure or monitor?
- Customer experience
  - Customer segmentation
  - Churn analysis
  - Lifetime value
- Risk & fraud
  - Risk scoring, monitoring
  - Fraud analysis
  - Governance and security
- Operations
  - Operational cost
  - Staffing productivity
  - Waste and abuse

### Prediction
Based on historical data, what is the likelihood of an event occur in the future?
- Customer experience
  - Customer churn
  - Buying pattern
  - Offering recommendation
- Risk & fraud
  - Risk management & monitoring
  - Fraud detection
- Operations
  - Demand forecast
  - Operational efficiency
  - Predictive maintenance

### Action
What is the best allocation of resource, plan, schedule, next best action?
- Customer experience
  - Next best action
  - Staff allocation for NPS improvement
- Risk & fraud
  - Offering optimization
  - Pricing optimization
  - Fraud prevention posture
- Operations
  - Capacity management optimization
  - Operational efficiency
  - Workforce optimization
IBM Watson Studio

Easily develop, train, manage models
Deploy AI-powered apps

IBM Watson Studio provides tools for subject matter experts to collaboratively and easily work with data to build and train models.

Flexibility to build models and deploy anywhere

Train models with positive and negative classes
Near-real-time insights help Southwest Airlines pilots see ahead of stormy weather

The Electronic Flight Bag (EFB) application helps airlines create safer, smoother flights by giving pilots the same insights into weather and hazardous conditions as dispatchers on the ground.

Knight Transportation

Steering clear of disruptive weather to transport goods safely and on time

Truck drivers regularly contend with bad weather conditions that can cause delays and unpredictability, and lead to accidents. To help teams reach their destination safely and on time, Knight Transportation has joined forces with The Weather Company®, an IBM Business, to deliver real-time weather alerts that help drivers avoid adverse conditions.