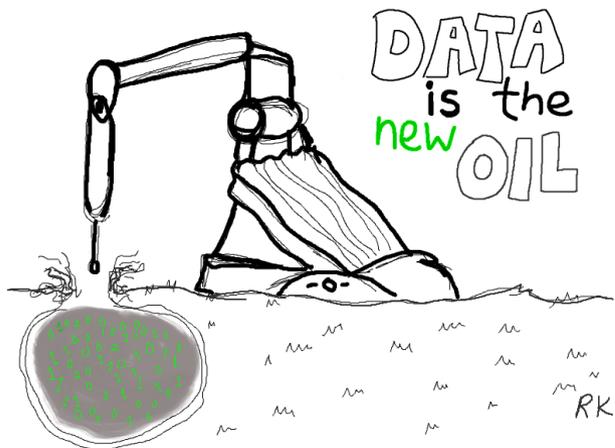# Artificial Intelligence & Big Data challenges in the 5G era
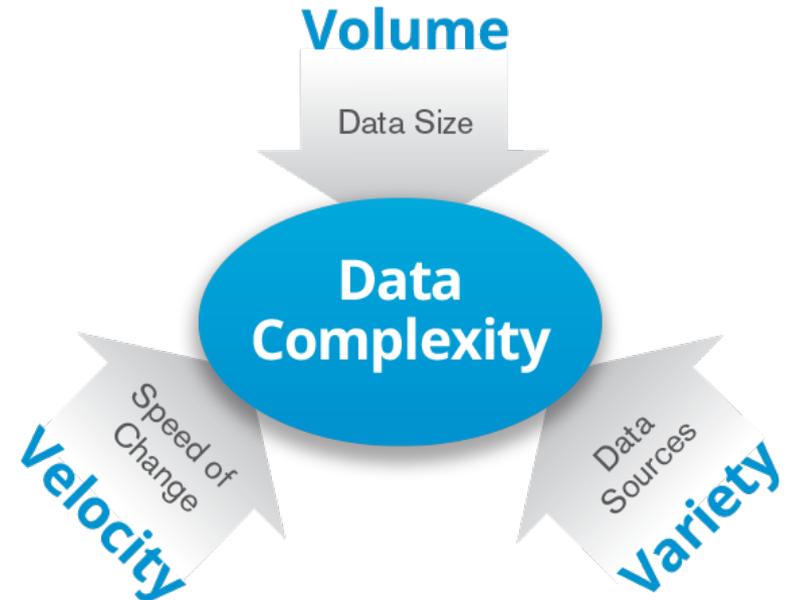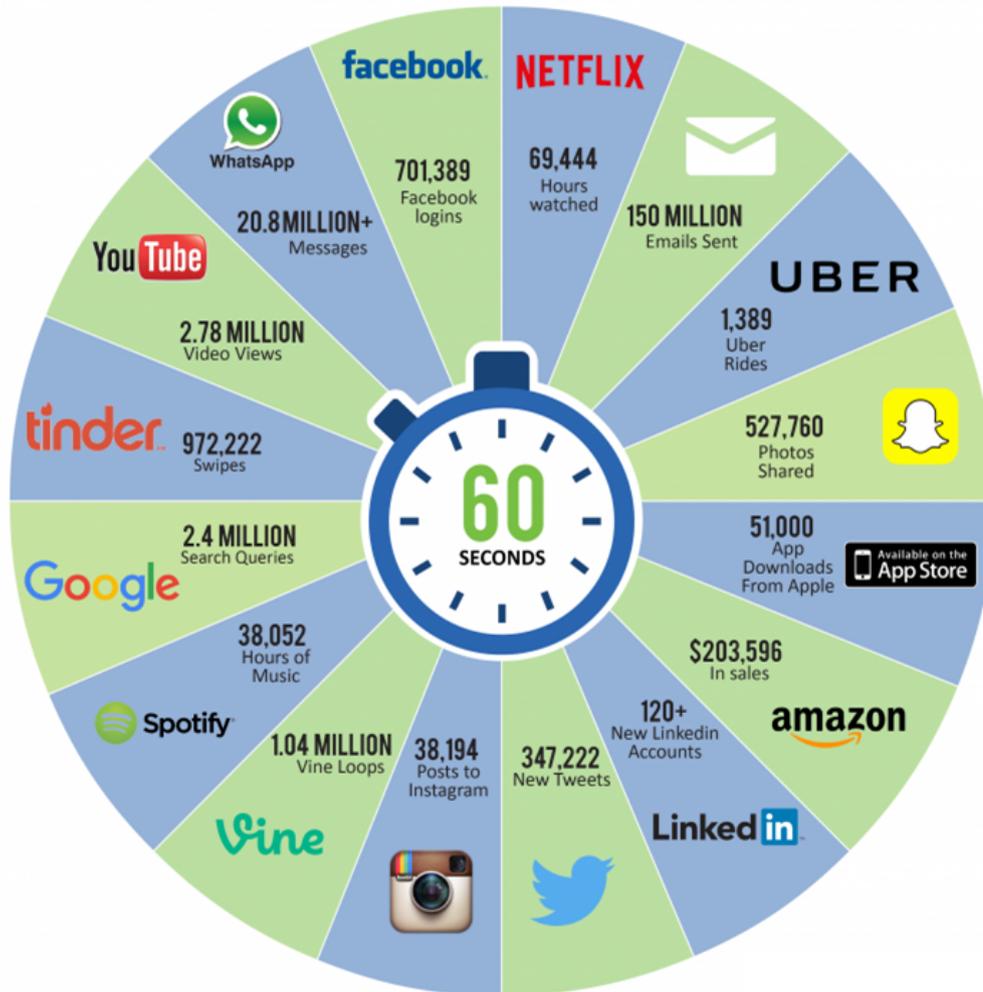
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Big Data

"Big data is a term for data sets that are so large or complex that **traditional data processing applications are inadequate** to deal with them."
- Wikipedia

Artificial Intelligence

"Artificial Intelligence is the **science and engineering of making intelligent machines**... Intelligence is the computational part of the **ability to achieve goals in the world**. Varying kinds and degrees of intelligence occur in people, many animals and some machines." - John McCarthy
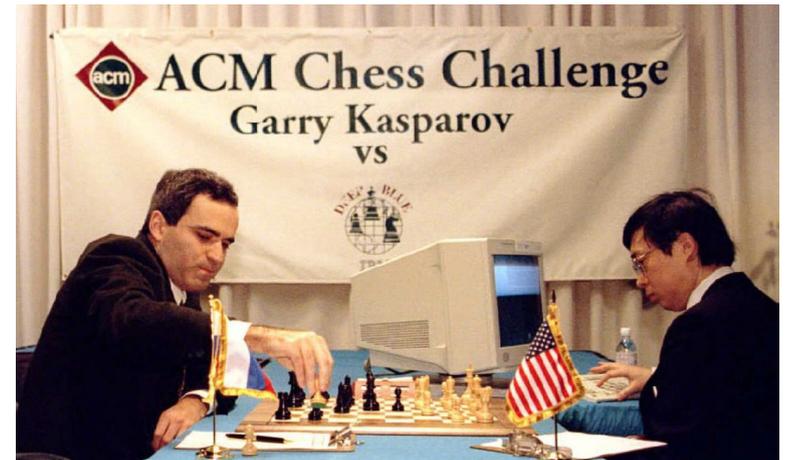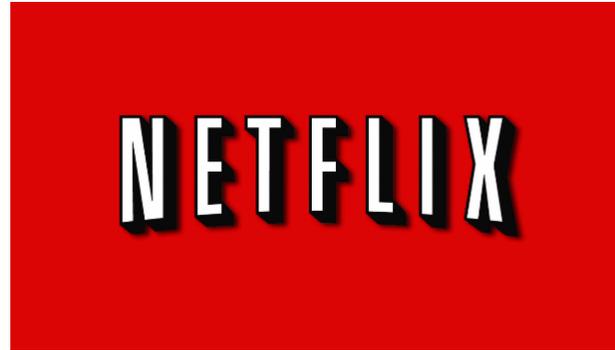
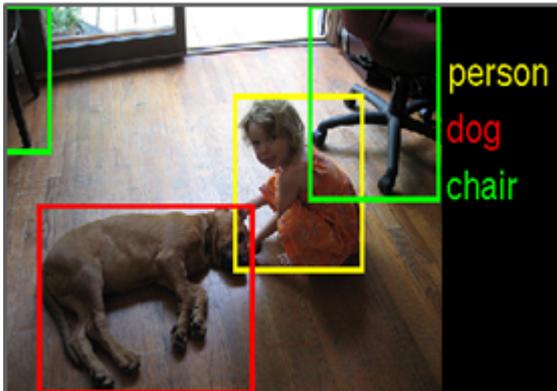# Big Data + AI in Narrow Environments

Search engines

Recommendation systems

Personal assistants

Computer Vision

Speech translators

Beating humans …

Big Data + AI in Open Environments

Self-driving cars

RoboCops

Smart Cities

Drones

Wearables & Smart Healthcare

Smart Everything Everywhere supported by 5G + IoT

In the 5G era we will have …

1. Higher data rates (>10 Gbps)
2. Reduced latency (<1 ms)
3. Massive growth of connected devices (100x more connected devices)
4. Huge increase of data volume (1000x higher mobile data volume)

5. AI will be integrated in all city sectors, industries and people's lifes
6. Much more complex and less controled environment for AI
7. Machines will make real-time decisions that can benefit or harm us
8. No undo button

Challenges

1. **Scalability:** How to process all these data in a timely manner? Systems must extract insights and react in real-time at this order of magnitude. We need "Super" Big data tools.
2. **Integration:** How to integrate all these systems that need to cooperate in complex tasks? How coordination will be achieved? How to avoid error propagation?

3. **Security:** How to guarantee the security of all systems, devices and data? A security breach in one system should not turn all the other systems vulnerable.
4. **Privacy:** How to guarantee the privacy of all data? Several anonimized sources should not identify a person even when combined. All sensitive data cannot be disclosed.
5. **Ethical & legal:** Who is responsible when someone is harmed or injured? Should we blame the machine, the owner, the actors or the company which created the machine?

6. **Open data:** How should we learn from mistakes and successes? All machines need to be continously monitored and their interactions make available to everyone.
7. **Transparency:** How to avoid AI discrimination against some segments of population (e.g. ethnic groups or genders)? It must be clear why an AI algorithm has produced a given conclusion or recommendation.

Thank you.

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