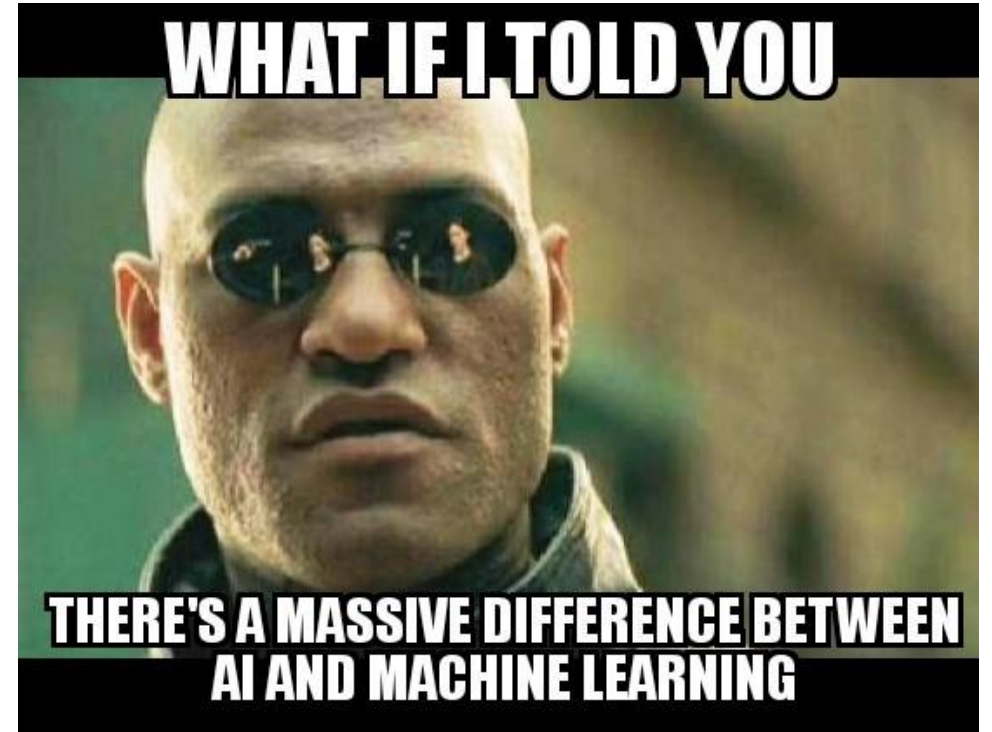


# Machine Learning and Artificial Intelligence (with Sports)

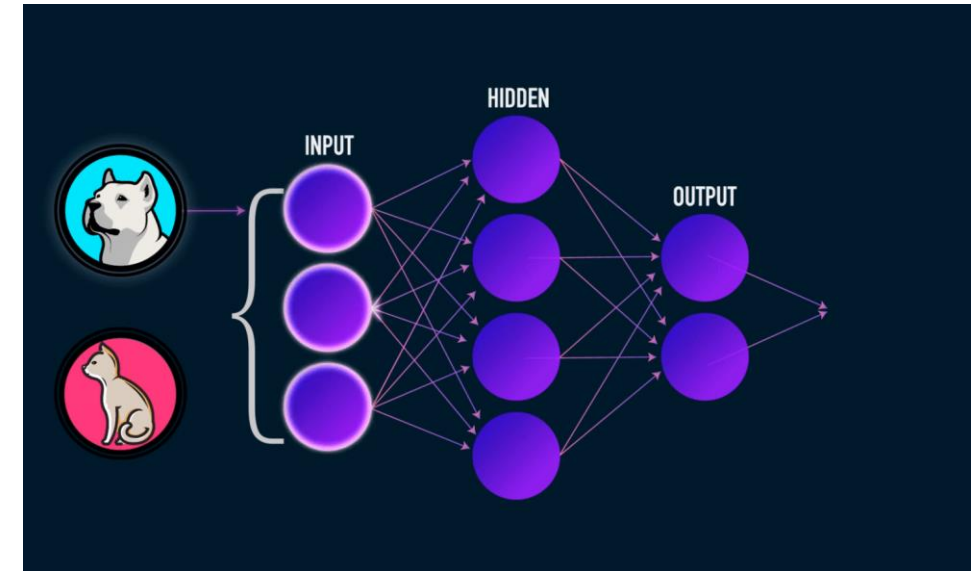
Dr. Vitaly Ford

Computer Science and Math Department



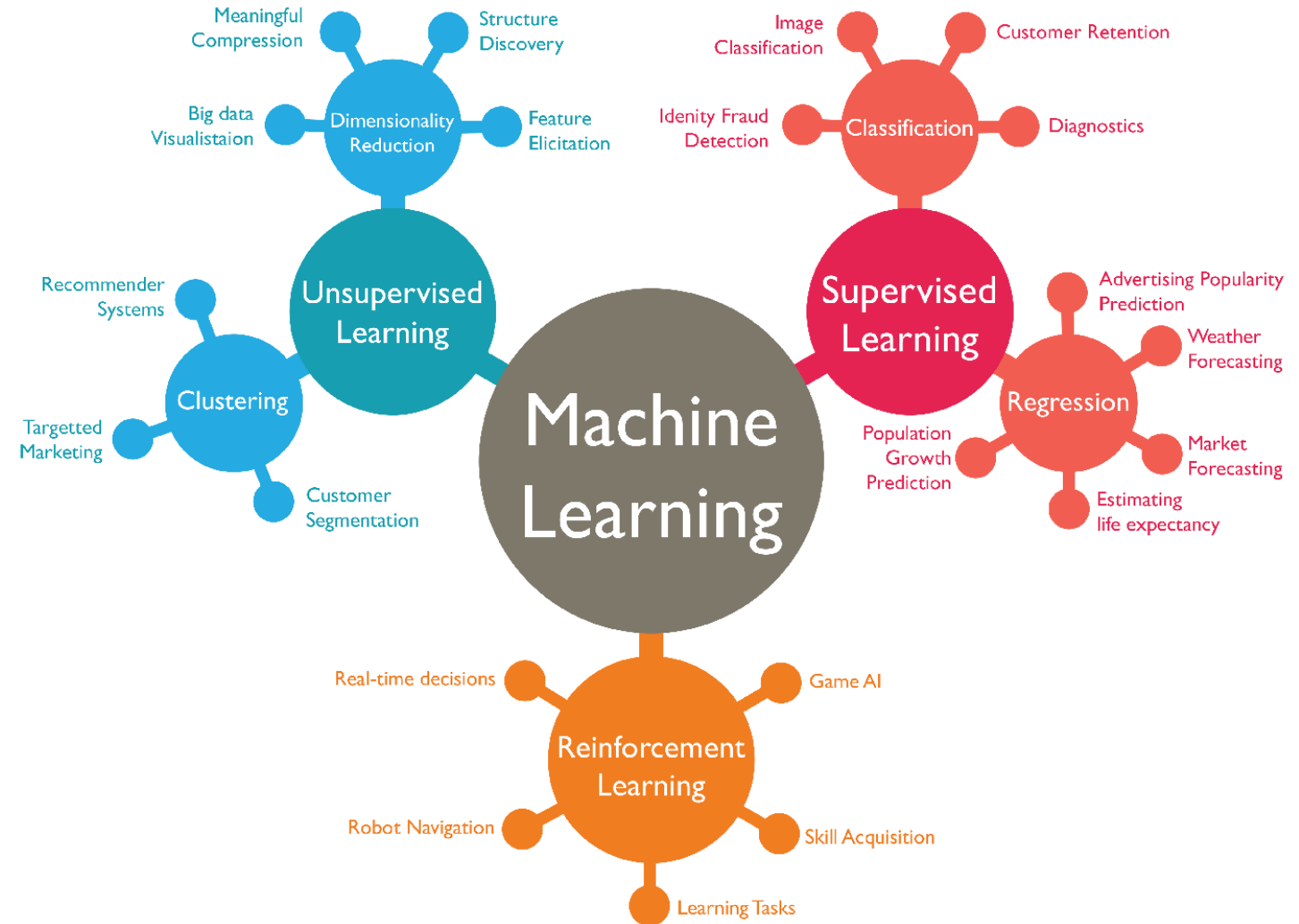
# Machine Learning (ML): Knowledge

- Automate analytical model building
- Find hidden insights in data
  - Learn from historical data
  - Identify patterns
  - Maximize performance
- Auto-learn and improve from experience
- Acquire
  - Knowledge
  - Skills



# ML Types

- Supervised -> Labels -> Task Driven
- Unsupervised -> No labels -> Data Driven
- Reinforcement Learning -> Maximize Reward -> Learn from Mistakes





# Artificial Intelligence (AI): Intelligence

- Mimic human reasoning (cognitive learning)
  - Thinking
  - Learning
  - Remembering
  - Find an optimal solution
- Mimic human abilities
  - Image/audio/video/text recognition and speech
  - Robotics

<https://news.stanford.edu/2018/12/12/artificial-intelligence-report-finds-advances-working-human-language-global-reach/>



# NBA Data Science 1

<https://youtu.be/MpLHMKToIVw?t=158>

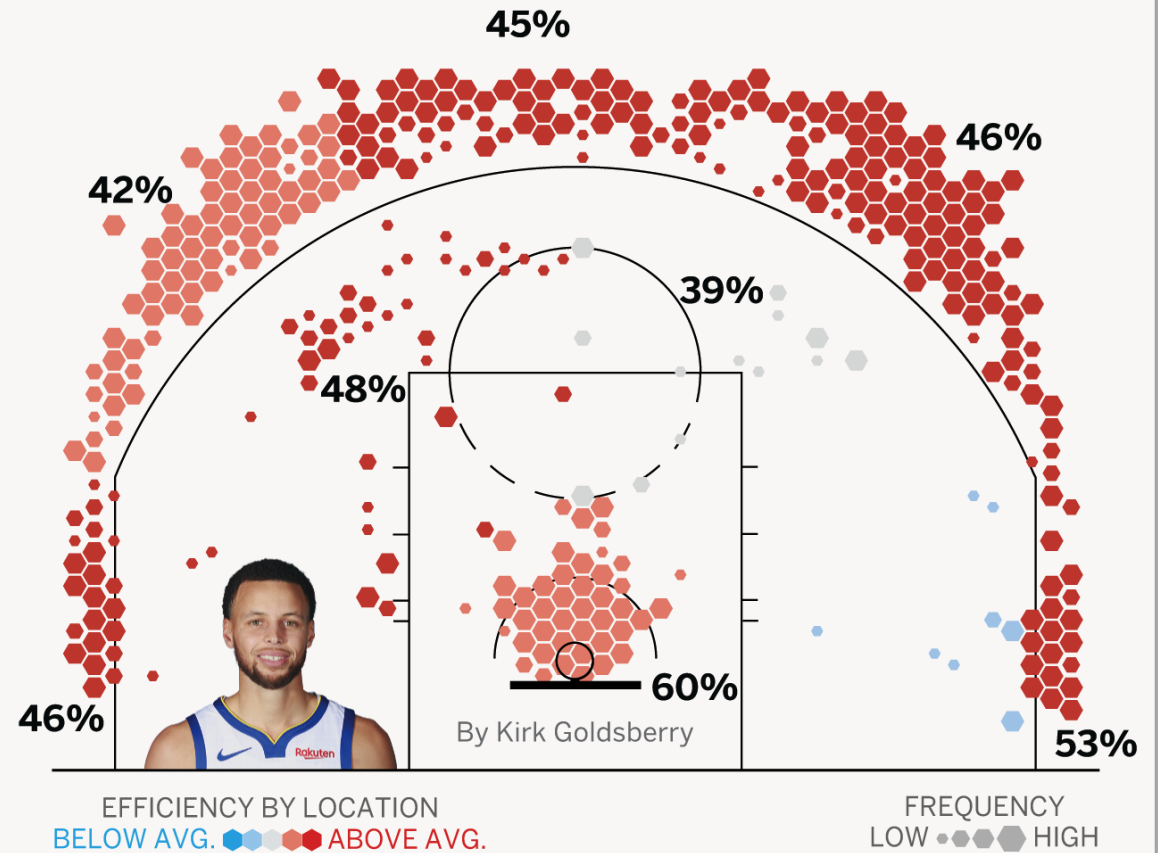


# NBA Data Science 2

<https://youtu.be/oUvvfHkXyOA?t=242>

## STEPHEN CURRY, 2018-19

Scored 36.5 points per game in the West Finals



<https://www.paxata.com/blog/parsing-big-data-json-for-nba-analytics-and-data-science/>



<https://youtu.be/A3JQCsM2qfA?t=66>

7



# Moneyball

<https://www.youtube.com/watch?v=AiAHIZVgXjk>

<https://studentsotgame.com/2018/06/12/short-stop-analytics-6-lets-talk-about-launch-angle/>

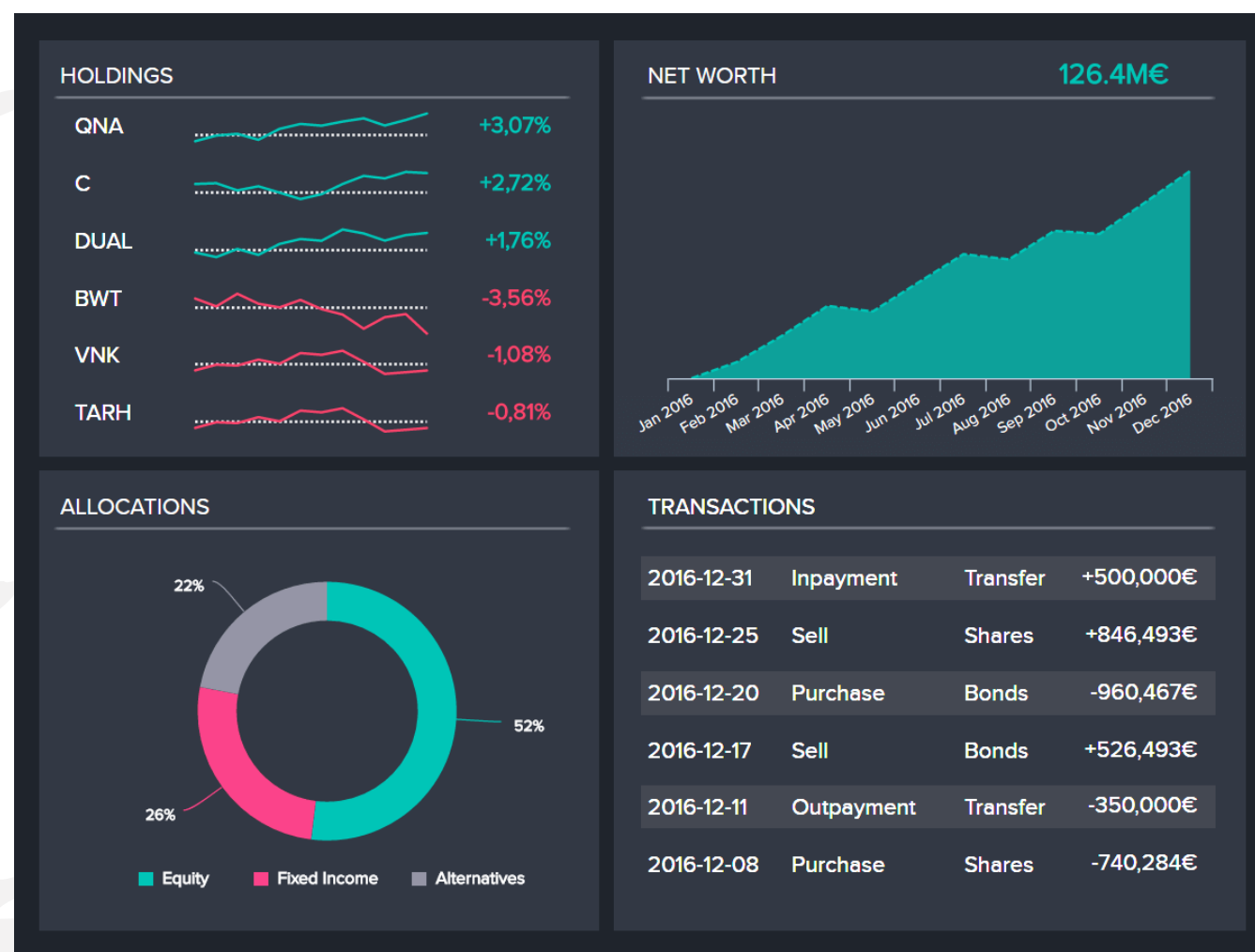


70°	0.000 (0 for 0)	0 HR, EV: 89.8 MPH
60°	0.000 (0 for 3)	0 HR, EV: 90.1 MPH
55°	0.500 (1 for 2)	0 HR, EV: 98.5 MPH
50°	0.000 (0 for 7)	0 HR, EV: 96.1 MPH
45°	0.077 (1 for 13)	0 HR, EV: 97.1 MPH
40°	0.200 (2 for 10)	0 HR, EV: 98.9 MPH
35°	0.313 (5 for 16)	3 HR, EV: 100.4 MPH
30°	0.667 (10 for 23)	4 HR, EV: 93.8 MPH
25°	0.435 (10 for 20)	0 HR, EV: 96.8 MPH
20°	0.800 (16 for 20)	0 HR, EV: 97.8 MPH
15°	0.889 (24 for 27)	0 HR, EV: 84.5 MPH
10°	0.577 (15 for 26)	0 HR, EV: 86.8 MPH
5°	0.429 (12 for 28)	0 HR, EV: 82.9 MPH
0°	0.48 (8 for 23)	0 HR, EV: 70.7 MPH
-10°	0.214 (3 for 14)	0 HR, EV: 98.9 MPH
-15°	0.100 (1 for 10)	0 HR, EV: 69.7 MPH
-20°	0.143 (1 for 7)	0 HR, EV: 54.4 MPH
-25°	0.000 (0 for 4)	0 HR, EV: 52.5 MPH
-30°	0.000 (0 for 1)	0 HR, EV: 52.5 MPH
-35°	0.000 (0 for 1)	0 HR, EV: 52.5 MPH
-40°	0.000 (0 for 2)	0 HR, EV: 52.5 MPH
-50°	0.000 (0 for 1)	0 HR, EV: 52.5 MPH
-55°	0.000 (0 for 1)	0 HR, EV: 52.5 MPH
-60°	0.000 (0 for 1)	0 HR, EV: 52.5 MPH



# AI in Accounting

<https://www.youtube.com/watch?v=v-7iZEsPWZ4>



<https://www.datapine.com/finance-analytics>

# AlphaZero and AlphaGo

<https://www.youtube.com/watch?v=7L2sUGcOgh0>



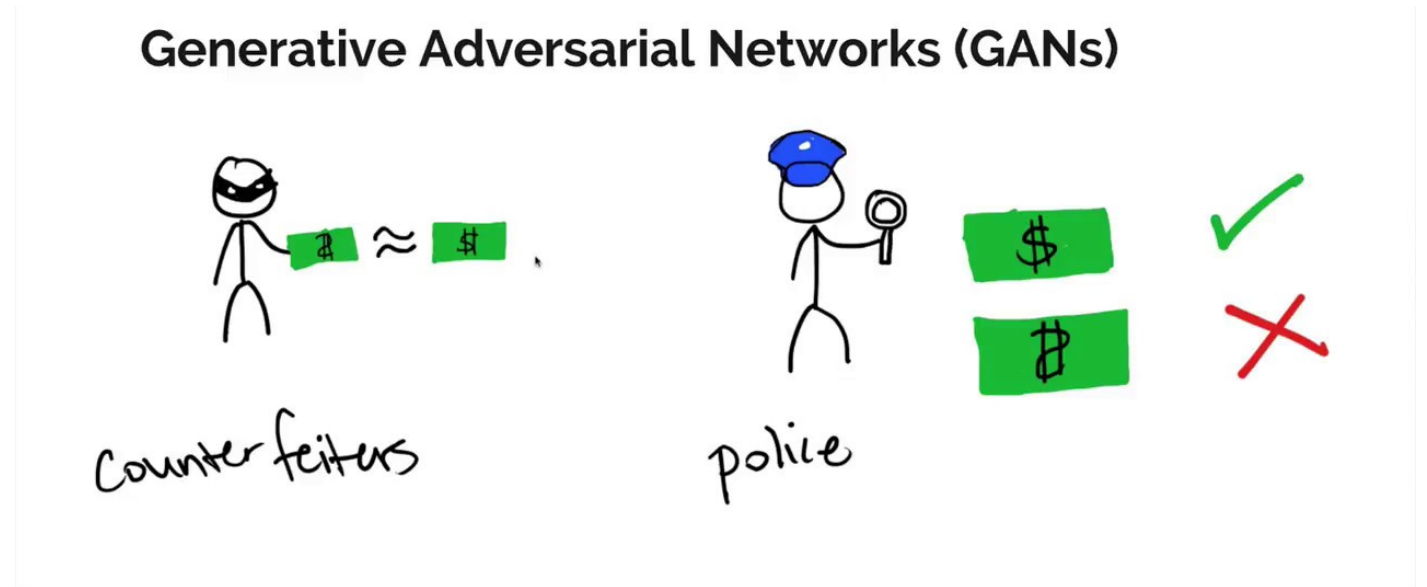
<https://deepmind.com/blog/article/alphazero-shedding-new-light-grand-games-chess-shogi-and-go>



# DeepMind

<https://www.deepmind.com/>





# Generative Adversarial Networks

<https://thispersondoesnotexist.com/>

<https://youtu.be/kSLJriaOumA?t=28>

[https://medium.com/@jonathan\\_hui/gan-some-cool-applications-of-gans-4c9ecca35900](https://medium.com/@jonathan_hui/gan-some-cool-applications-of-gans-4c9ecca35900)

<https://www.youtube.com/watch?v=e0yEOw6Zews>



# Meme Generator

[https://www.vice.com/en\\_us/article/gyk3dq/stanford-researchers-trained-a-neural-network-to-make-these-memes](https://www.vice.com/en_us/article/gyk3dq/stanford-researchers-trained-a-neural-network-to-make-these-memes)



# Google Predicts Match Outcome

See live scores when a game starts: shows you “win probability”

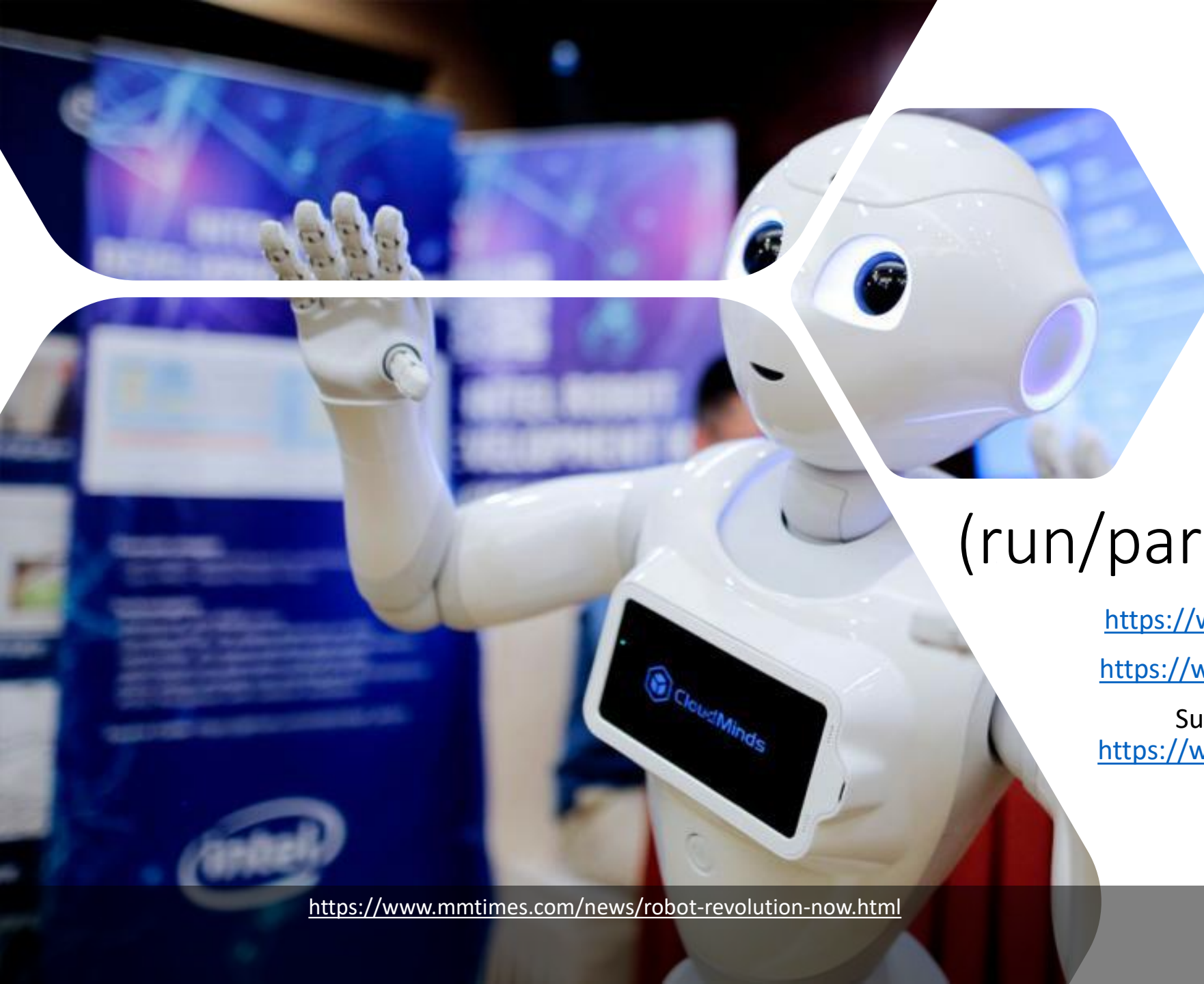


<https://kyeye.com/near-or-far-what-does-20-40-vision-mean/>



# Vision/Text/Speech

<https://cloud.google.com/vision/>



# Robotics (run/parkour/jump/move)

<https://www.youtube.com/watch?v=kHBcVlqpvZ8>

<https://www.youtube.com/watch?v=aFuA50H9uek>

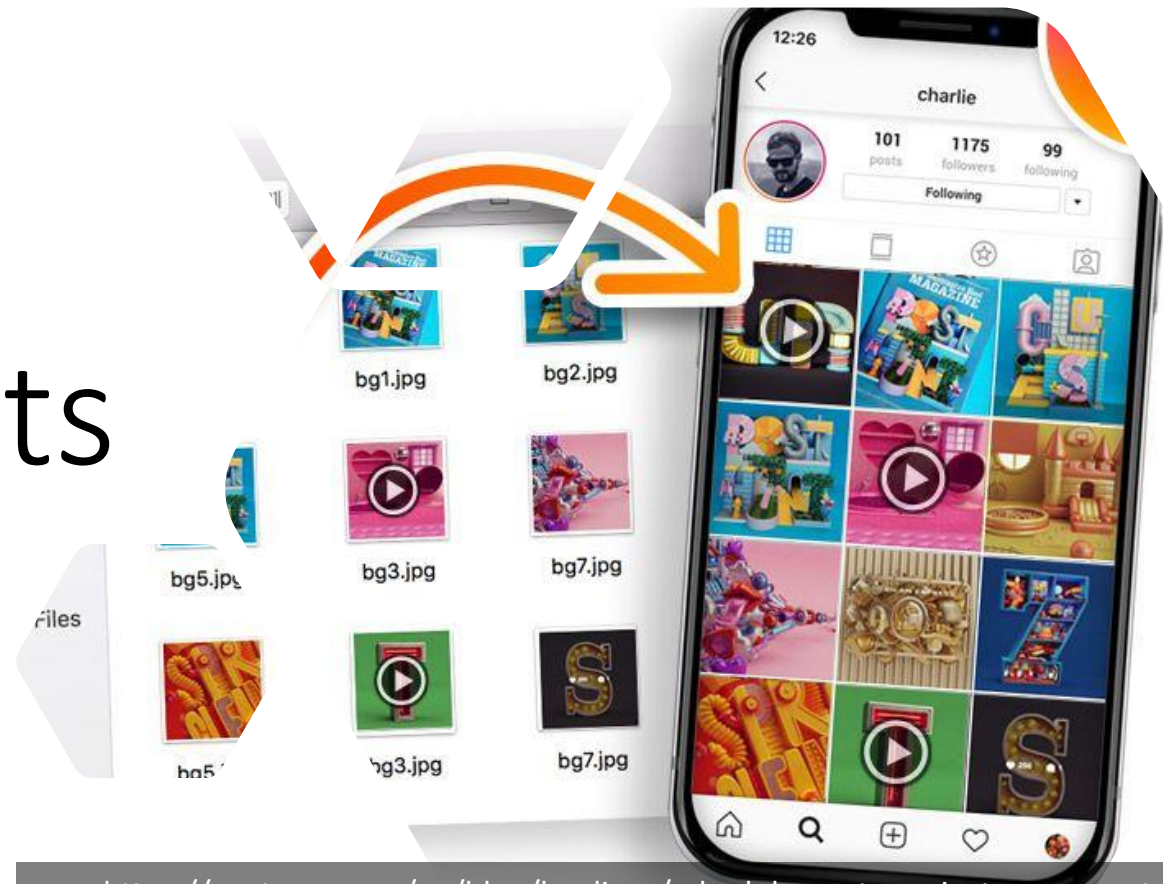
Superball Boston Dynamics explained:

<https://www.youtube.com/watch?v=Jq0GknnKvXM>

<https://www.mmtimes.com/news/robot-revolution-now.html>

# Automating Instagram Posts

<https://www.linkedin.com/pulse/how-i-am-earning-500-followers-weekly-instagram-using-fernandes/>



<https://postcron.com/en/blog/landings/schedule-posts-on-instagram-postcron/>





# GPT-3-powered Business Ideas Generator

<https://ideasai.net/>

<https://smallbusinessforum.co/6-things-to-consider-when-starting-a-small-business-without-initial-investment-a8ccb8ad6aaf>



Pepper

## Smart Checkout

Train your app to recognize different types of produce to help checkout faster without the need to remember price look-up codes.

# Lobe (AutoML) – Train Your App

<https://lobe.ai/>

# Trends

- Google Trends (<https://trends.google.com>)
- Self-driving Cars
- Speech Emulation
- DeepFake
- Robotics/Automation
- Predictive Analytics (stocks, healthcare, sales, insurance, win/loss, etc.)
- Data Analytics Competitions (<https://www.kaggle.com/competitions>)
- Completely mimicking human logic/abilities/reasoning
  - Nearly impossible
- Neural Implant (<https://neuralink.com/>)
- Deep Learning



# Social Concerns

- Will AI take over the jobs?
- Will AI take over the world?
- Are we living in a simulation?

# DIY

- Practical Deep Learning Course: <https://course.fast.ai/>
- Mastering ML: <https://machinelearningmastery.com/start-here/>
- Google ML: <https://ai.google/education>
- AI Playbook: <http://aiplaybook.a16z.com/docs/intro/getting-started>
- Toward Data Science: <https://towardsdatascience.com/>
- Coursera Deep Learning Courses:  
<https://www.deeplearning.ai/programs/>
- Google Colab: <https://colab.research.google.com/>

