

# TOP 10 MACHINE LEARNING APPLICATIONS OF 21ST CENTURY

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**For Machine Learning Elective Class Introduction**  
**Target Audience: Sem 6 Students**  
**Term: Feb to June 2019**

The Google Maps logo, featuring the word "Google" in its multi-colored font followed by "Maps" in a grey sans-serif font, all on a dark blue background.

## Faster Route Selection

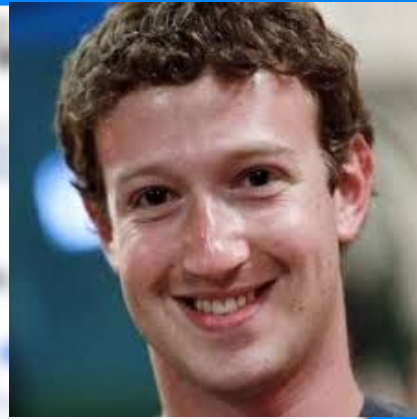
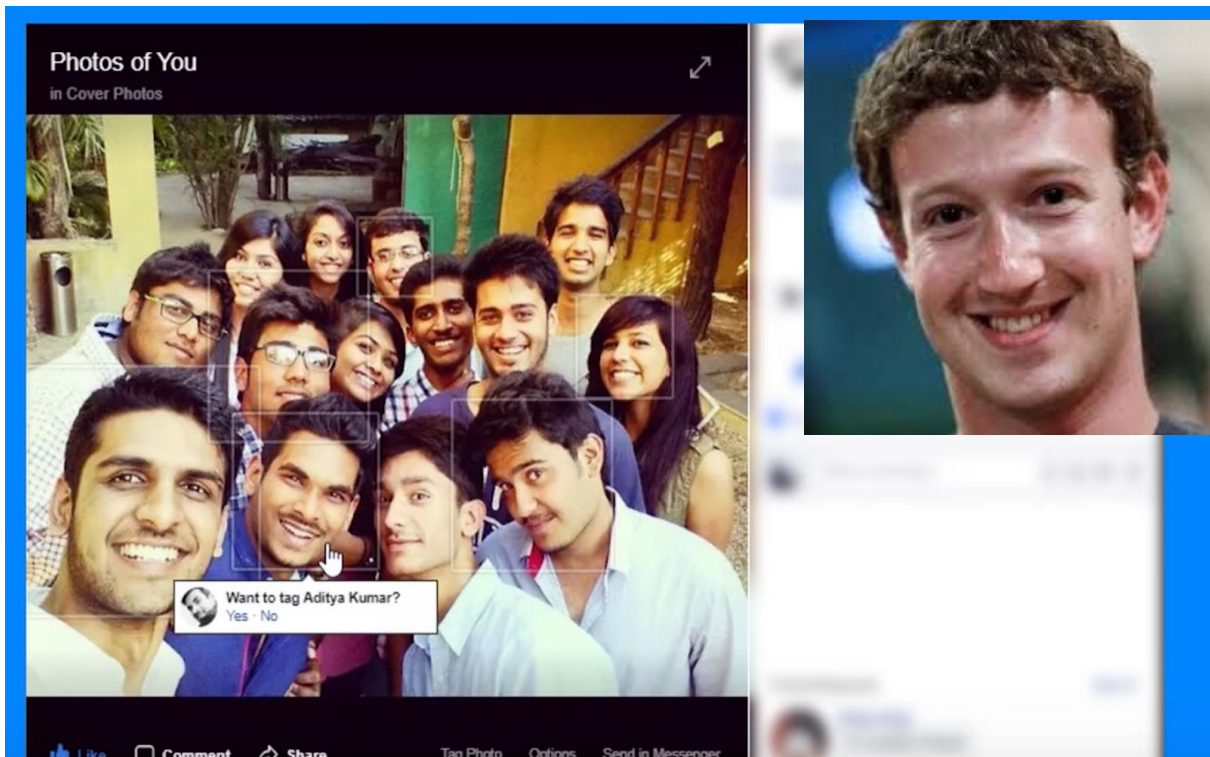
- Google Maps - THE app which we use every time we go out
- Despite of the usual traffic, you are on the fastest route
- Everyone who is using the Google Maps is contributing in making the app more accurate



**Amanda Moore:**  
Map  
Manager

**Leicht**  
Google  
Product

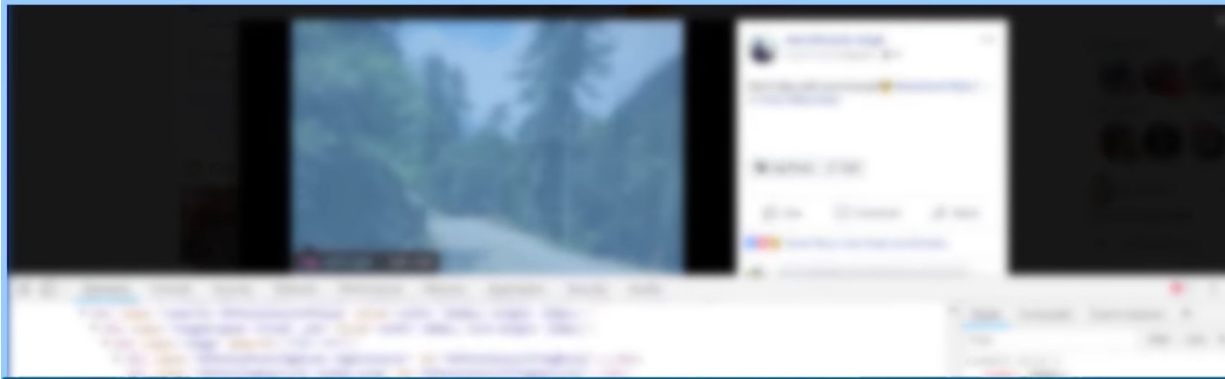
**End Result:** Live feeds on traffic situation and predicted time of arrival at destination etc. Machine Learning Model to dynamically predict the ETA based on traffic density, traffic flow speed, time of travel. **Traffic density** got through satellite imaging. **Speed of traffic & Time of travel** got through # of people who are currently using the App. **Prediction** done from Current + Historical Data in App's DB. When App is opened it constantly sends info of traffic speed, time of travel, route taken etc to Google servers. Helps make the prediction more accurate.



**End Result:** Auto-Friend Tagging suggestion

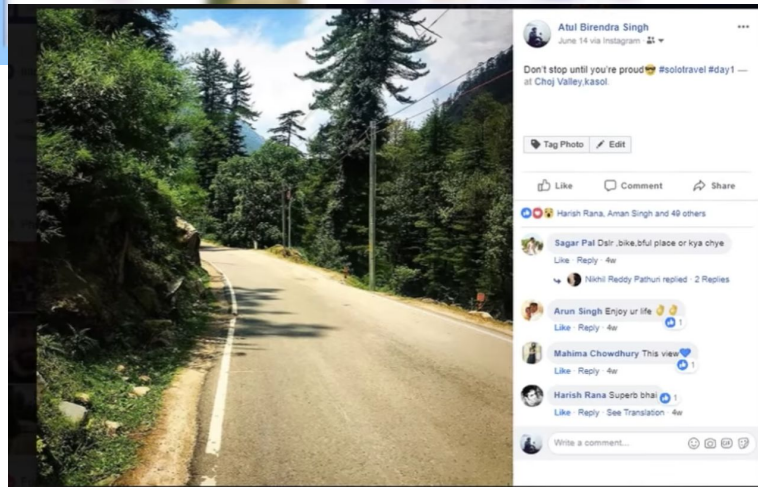
**Deep Learning Model:** "Deep Face".

**Technology:** Deep Learning applied to Image detection, processing and recognition algorithms.

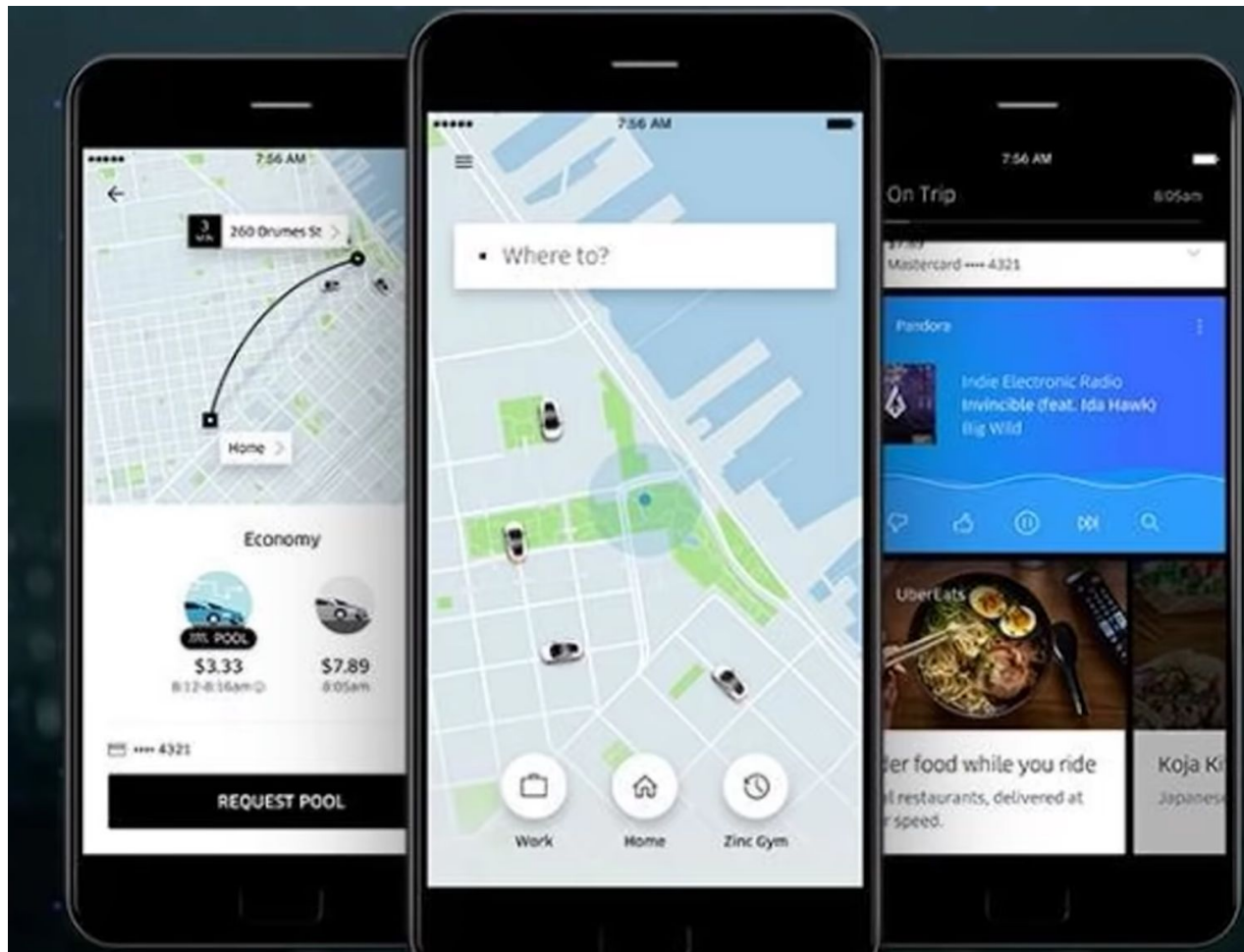


# facebook

```
<div class="_2-sx" style="width: 520px; height: 520px;">  
***  
<img class="spotlight" alt="Image may contain: tree, sky, plant, outdoor and nature" aria-busy="false" src="https://  
scontent.fmaa1-1.fna.fbcdn.net/v/t1.0-9/35240488_102138617077...3088487424_n.jpg?nc_cat=0&oh=abe04fa...&oe=58D5C958" style="width:  
16
```



**End Result:** ALT-Tag contents of a Facebook Image View - Inspect Element for the HTML Content  
ALT tag describes the objects recognized in the image.  
**Technology:** Deep Learning model with Image Detection and Recognition



## End Result:

### Personalized App

- Understand and predict / guess your travel habit
- E.g. If at office it will guess it you want to go to gym, pub or home - based on time of the day.

### Estimated Time of Arrival

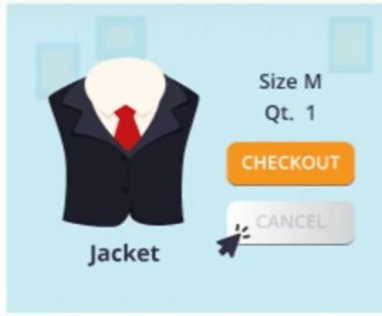
- Based on historic data

Uber saw a 26% uplift in accuracy when “Uber Eats” was integrated into the Uber App.



**Danny Lange:**  
Former head of  
ML at Uber





### Ad Recommendations:

- Google Tracks your search history
- E.g. A jacket at Amazon
- Recommends products (Ads) based on this search history
- Stores this history data and makes it available to YouTube and Facebook, so when you go there the ad appears.

**Technology:** Machine Learning Model for Recommendation.

35% of Amazon revenue is from this recommender system.



# iPhone

## Face Recognition:

- **Problem Solved:** Touch ID has a 1 in 50,000 chance that a random person could unlock your phone, this technology has upped that possibility to one in a 100,000 chances.
- Only time to fool: When you have an identical twin!!
- **Hardware:**
  - Infra-red camera : Structured light receiver
  - Flood Eliminator: Ambience and Proximity Sensor
  - Front Camera: 2D Face Image
  - Dot Projector : Structured light emitter. Projects 30,000 infra-red dots on to the user face when they stare at their phone to unlock it.

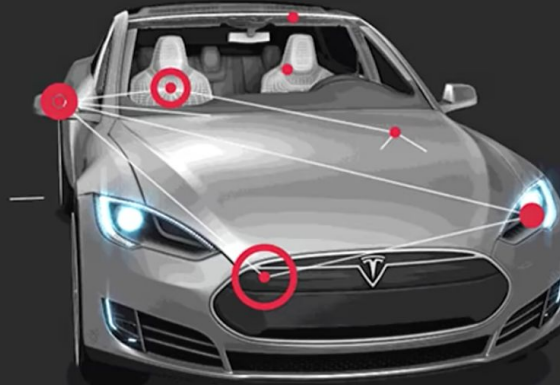
**Technology:** Artificial Neural Network with Face Recognition

- Uses **Apple A11** Neural Network Enabled Chip

# SCANNING



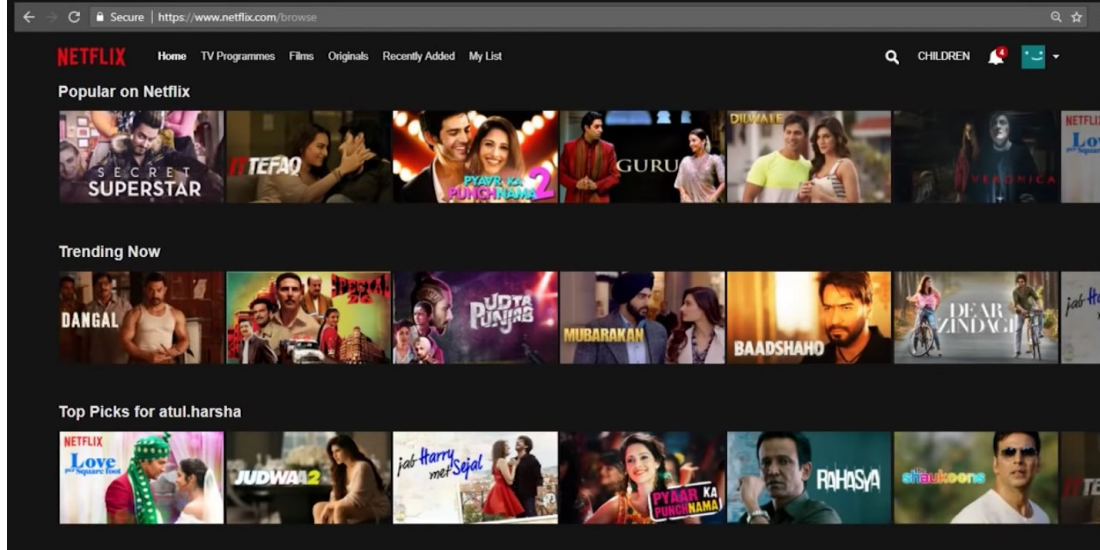
TESLA



## Self Driving Cars:

- Tesla's Artificial Intelligence is powered by NVIDIA's hardware
- Focuses on Unsupervised Learning
- The car "observes" human drivers and learns continuously. Driver's hand placement on an instrument and how they operate them.
- Tesla crowd-sources its data from all of its vehicles and drivers through internal and external sensors.
- Market for this vehicle gathered data will be worth 750 billion dollars by 2030.
- Will be used to predict traffic density, time of travel, locate and identify hazards along the way etc.
- Will evolve to "talk" to other such cars and gather vital data to be processed later.

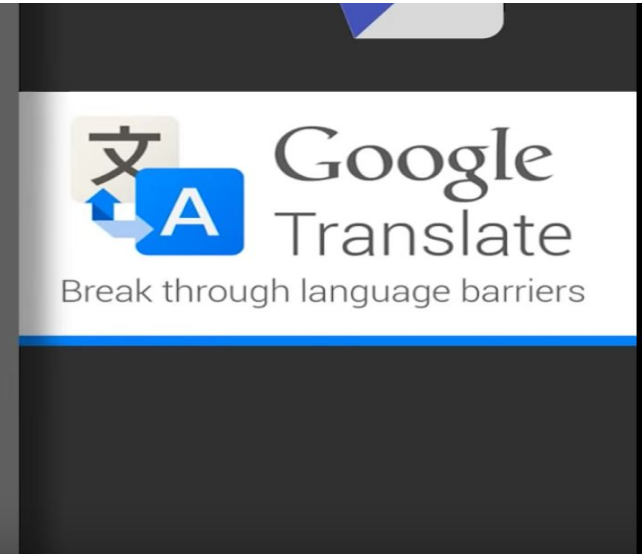
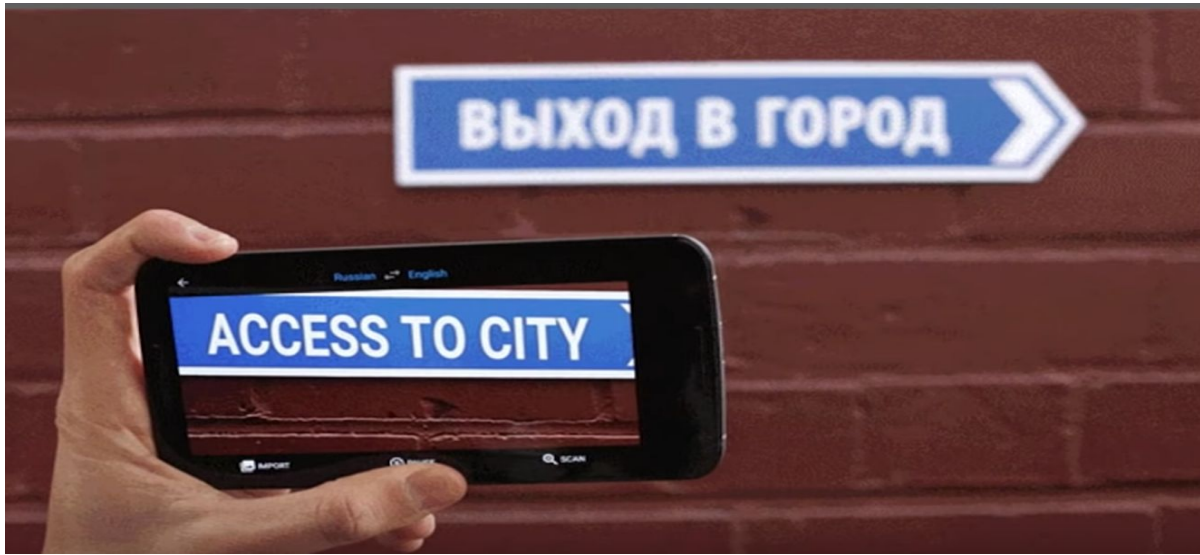




### Recommender Systems:

- Gives list of movies similar to your interest.
- More than 75% of users watch movies recommended by NetFlix

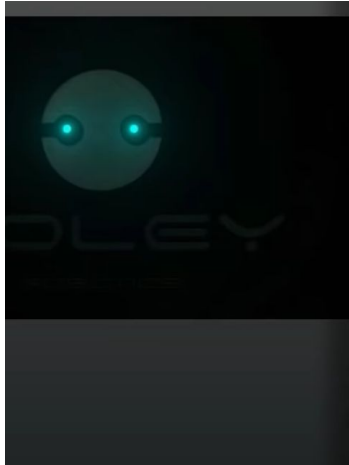




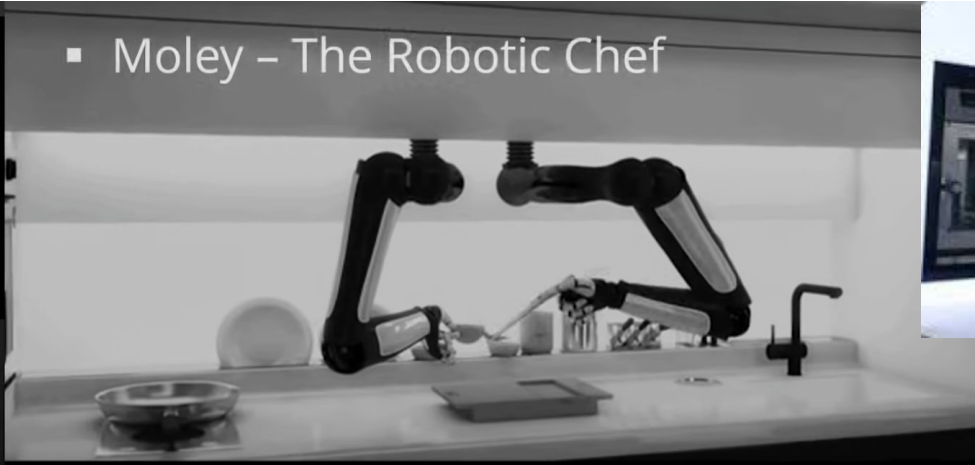
### **Google Translate:**

- Works using SMT - Statistical Machine Translation
- Real time translation using camera
- Looks for patterns in the language
- Google Translate picks the most statistically probable translation when asked to translate a new bit of text.

**Are these Machine Learning??**



## ■ Moley – The Robotic Chef



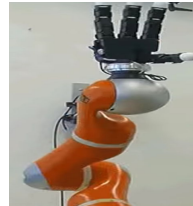
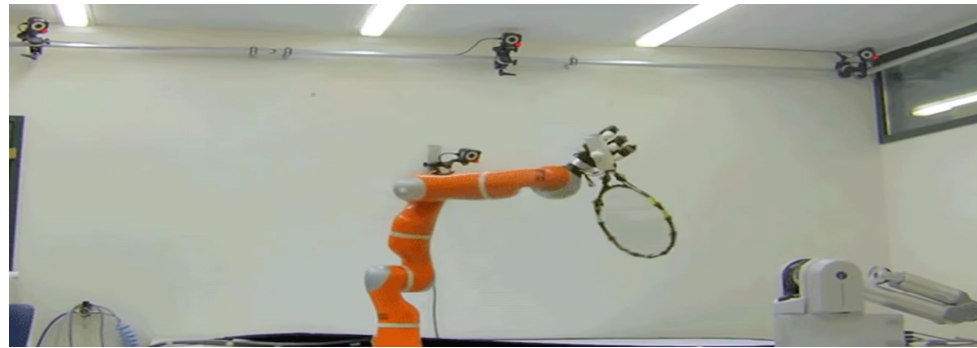
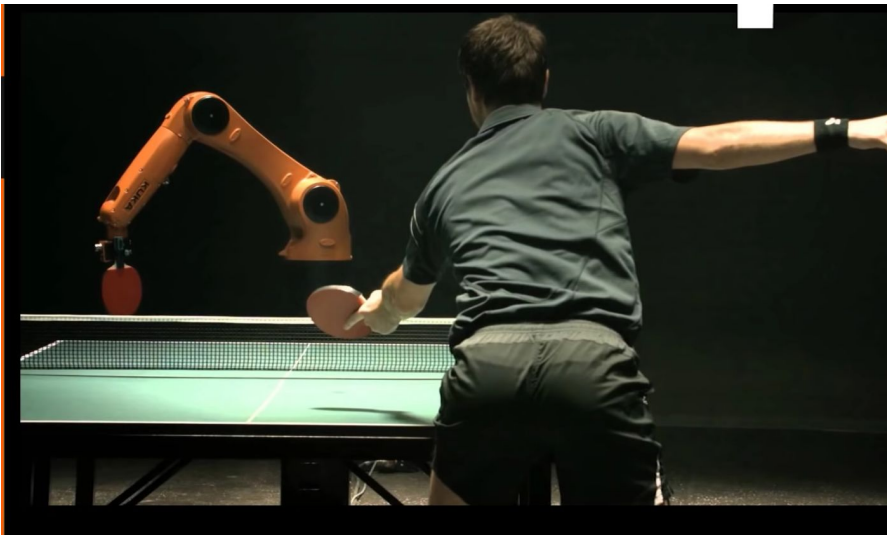
**Dr. Mark Oleynik** - Inventor of Moley



**Tim Anderson** - Master Chef's Recipe and hand movements being recorded for Moley to learn

### **World's First Robotic Kitchen:**

- Capable of replicating any dish cooked by any chef in the world.
- Has a pair of robotic hands - replicates human hand speed, sensitivity & movement.
- 2018 Moley launched the consumer version of its robotic kitchen - sophisticated, yet, compact!
- **Hardware:** Touch Screen Unit, Oven, Robotic Hands. Can be remote controlled via smart phone.



German Manufacturer  
for Industrial Robots

### Industrial Robot (E.g. Sports)

- Increased safety of human-robot collaboration
- Still in research stage
- Research on Data Analytics and Machine Learning sensitising the issues that arise with this interaction and how to solve them.
- Offers solutions on Factory Automation
- Examples of Industrial Robots:
- Heat, Dirt and Dust Resistant Robot for extreme weather conditions
- HRC capable light weight robot for direct human-robot interaction
- Industrial Robots for maintaining strict hygiene requirements (such as hospitals)