Presentations

Speaker: Jonathan Rosta

Topic: CAPTCHA cracking

* Google map team was trying to identify street addresses in street view
* Some options
  + Amazon mechanical truk
  + Digital piecework, pennies per image
* Character recognition
* The team use deep convolutional neural network operating directly on the image pixels

The results

When this approach was applied to the publically available street view house numbers dataset it achieved 96% accuracy in recognizing street numbers

After training set of millions of capthcah images it got 99.8% accuracy on transcribing the puzzles

This could help the reCAPTCHA in making them better

Speaker: Nasmah Alnaimi

Topic: Detecting human body language in video

GreenDot is a reseach project that investigates motion capture, pattern recognition, to detect and analyze human movement

Focus was on analyzing the body language of national and international public figures

They built a large database on that data

They created a 3d model based on Rivera videos

Some areas this could work are: lie detector, duress detector, inter-culture communication assistance

Could be used with google glass to help blind people know if the person they are talking to is getting bored or not

Speaker: Adam eortferd

Topic: Partical accelerator

Modeled the Relativistic heavy ion collider which is used to study the universe

There are currently two “racetracks” where heavy ions are accelerated in opposite directions

The tracks intersect at the detectors

By modeling and simulating the new tracks the best or optimal configuration can hopefully be found

Speaker: Riley

Topic: Need to fill out

Speaker: Sarah Bass

Topic: Monitoring and predicting wind and solar power

Endless supplies, no emissions

Needs to be consumed immediately

Solar is steady

Don’t know how much wind will get at a given time, so need to run backups

NCAR developed weather models that predict wind with much greater accuracy

While predictions are better than they have been in the past the wind is not set and can change

They have started tracking the wind at every wind farm and turbine they can

The wind forecasting tools use seven different weather modeling programs

The main model used is

Dynamic integrated forecast

Combines forecasts from different models into one

Uses regression analysis to remove bias from individual forecasts

Has increased available energy from renewal sources by 30% and saved 6 million dollars in 2010

Speaker: Tom Schultz

Topic: AI learning for facial recognition

Using data to train AI

Recognizing cats on youtube

Deep learning has hidden layers and you treat each lay as its own neural network

Googles Cat’s is a deep learning system

* 10 million youtube stills

Facebook is another deep learning

Uses cropped images to match with a matching of 97.25% vs human at 97.50

Deep learning does not model the human brain it is a mathematical model

Deep learning is kind of like monte carlo as it is fed un-labeled data

Speaker: Jeremy Reineman

Topic: SpaceX reusable rockets

SpaceX has recovered a booster rocket for the first time. Was damaged, but recoverable

The rocket has four landing legs and is over 20 stories tall

Space Exploration technolohies was founded in 2002 with the goal of reducing the space transportation costs

They have done 3 cargo runs up to the space station, they are the first private company to launch, orbit and recover

They have tested by launching the rocket to different heights and then landing it

It is the first rocket designed to land when done

Current rockets cost about the same as a new jet, so cut the cost and you can have more missions, reducing the cost down to about 1%

Speaker: Matt Hemplesman

Topic: The maddingly model a simulation of all life on earth

General ecosystem model

Simulation of earths biosphere

Motivations of the project

Answer to eco-wuestions

Policy making

Prediction

Climate change

Pandemics

Food security

Human pressures

From the data the following models can be improved

Improving earth systems models

Climate, ocean circulation, water cycle

The model couples all key biological processes

The model does not model every organism in any eco system, it abstracts them away into cohorts: omnivour, body mass etc.

The model can work on many different scales to see anything from the behaviors of a specific function group

Data problems:

Getting the abundance of an animal type

Ecosystem properties

Speaker: Reid Fortier

Topic: Modeling Global climate change

The global climate is changing

The earth has about 7 billion people

The three major project in the works are:

GISS GCM by NASA

Global programs of disticiont

CIMP5

Can go to CMiP5’s web site and look at different nodes

NASA is focusing on the cloud cover and ocean interaction with clouds

They can model the earth back up to 1000 years back and 1300 years from now

They are currently adding ‘ENT’ which is a dynamic vegetation modeling system that factors in trees

University of Virginia

They use the results of the models to influence the global policies

The help predict future disasters

To optimize diminishing land availability

Connecting scientists on a global scale

Speaker: Peter Griffin

Topic: 4D Printing

It is taking something from a 3D printer and changing it to make it 4D

Skylar Tibbets came up with the idea

Stratasys is working on a new material for 4D printing

It is a proprietary water absorbent plastic

They are now trying to find out what other mediums they can use to cause the 3D printed shapes to remake themselves

Speaker: Fawaz

Topic: magnetism simulation software to model US presidential elections

They used magnetism to simulate the presidential election

The model use designed to model the voting patterns in the US

Factors of influence are used to create model that predicted how votes will vote

It is a pipe dream

What the team is trying to do is model human behaviors to see how the opinions of others affect how the vote

The new model wouldn’t focus on trying to find out who wins, but the margin by which they will win

There are lots of graphs representing the collected data over the 36 year study

New topic?

Five traps to avoid when simulating

1. Failure to understand the physics
   1. Should understand how the code works in relation to real life
2. Going blind
3. Waiting to simulate
   1. Don’t wait to simulate, start simulating early to make sure things work right
4. Failing to plan
   1. Should have a plan for when to start running the simulation
5. Assuming you know everything
   1. Do analysis to find out what some of the solutions might be

Speaker: Mckenzie Murphy

Topic: Aereo

Have the powerpoint

Speaker: Jesse Scholer

Topic: Computers teaching each other

One computer teaching another to play pac-man with parameters and instructions the learning computer needs to follow

Benefits

* Computers teaching other computers so when you upgrade to a new robot you don’t have to teach it or download instructions
* Testing programs
* Teaching humans

Easiest way is to transfer the hard drive, but not practical

So they give advice, but it needs to strike a balance between helpful and annoying because computers get confused easy and shut down

Some ways to teach computers

Start simple

Using ideas from dog training

A wiki for robots

Or self-learning: programed for specific task in conjunction with a feedback loop

Speaker: Jason helms

Topic: FPGAs for server defense

ASIC – application specific intergrated circuit takes a long time to develop

FPGA != ASIC

They are developed on FPGAs though

FPGA development is hard and takes a long time

H architecture: find the bottleneck

Testing and debugging on PCI bus is expensive as the cable is about five grand

Test the hardware more for shipping that working

They don’t figure out the gates themselves they send them out to a server farm which find 600+ different hardware configurations

FPGA does the mass IP packet processing between internet fabric and companies such as amazon and Comcast

Basically if they don’t get an ack back they don’t process what the request wanted them to

Speaker: Ahmed Al aswad

Topic: A system detects global trends in social networks two months in advance

Designed by university of carlos II de Madrid in cooperation with

NICTA of Australia

Universities of Yale

University of California-san Diego

They monitor twitter for social movement, consumer reactions and for possible outbreaks of epidemics

The friendship paradox:

On average most people have fewer friends than their friends have

In twitter the more friends you have the more likely to you are to have more friends

98% of users are subject to the friendship paradox