

**SUPERHEROES
OF DEEP LEARNING**

#1

MACHINE

LEARNING

LEARNING



PARENTAL
ADVISORY
SATIRICAL CONTENT

TERMS OF USE

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PARENTAL
ADVISORY
SATIRICAL CONTENT

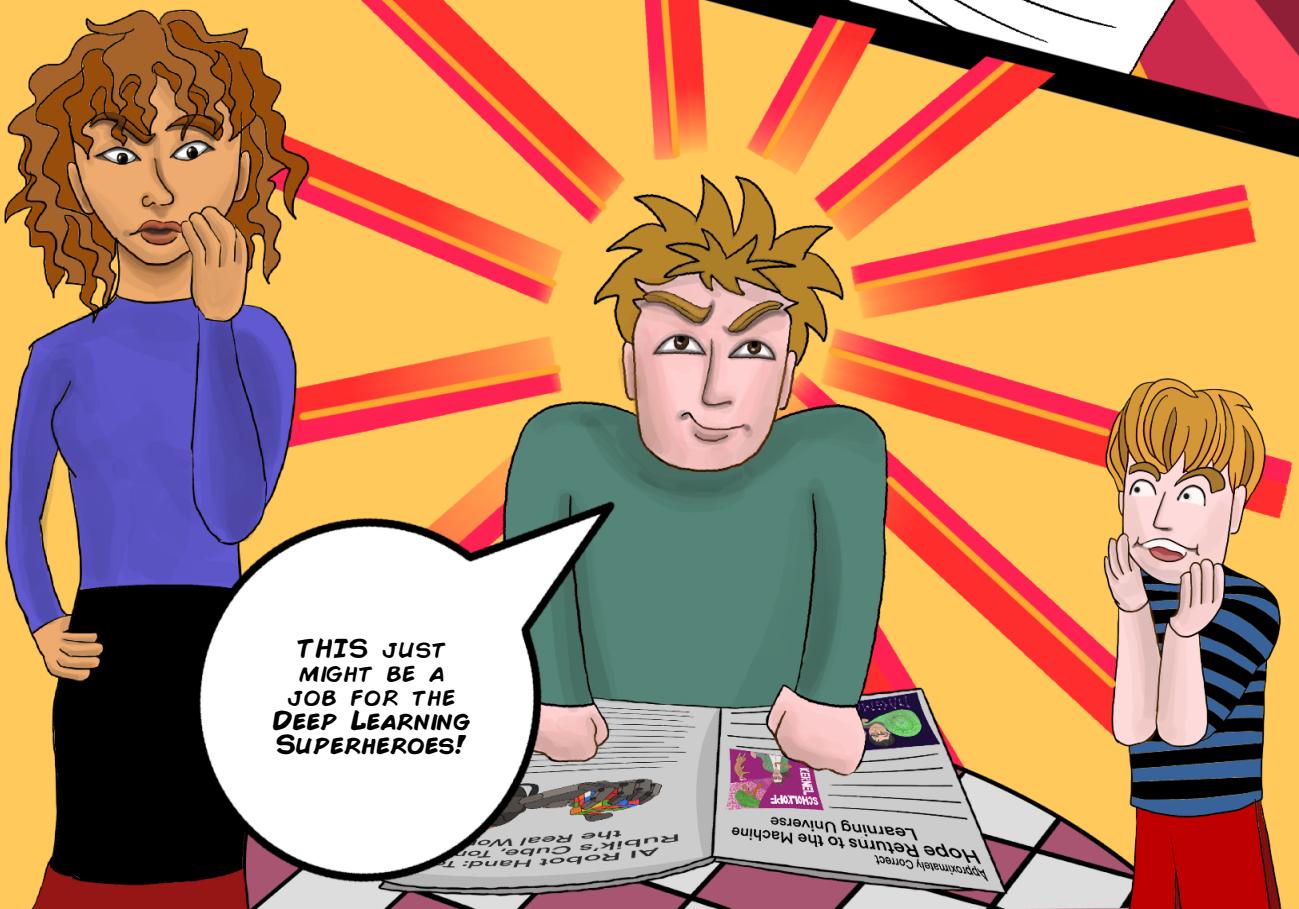
IT'S A LAZY SUNDAY ON EARTH...



OH
Nooooooo!



OH MY!
GRUMPY IS
STUCK IN THE
TREE! WHAT
EVER SHOULD
WE DO?



HELLO THERE,
HUMANS! I
HEARD YOU
WERE IN SOME
KIND OF
TROUBLE

SOME OF MY
STUDENTS AND
I THOUGHT
WE'D STOP BY
TO LEND A
HAND

MOOC



PLEASE
ARTICULATE THE
NATURE OF
YOUR TASK!



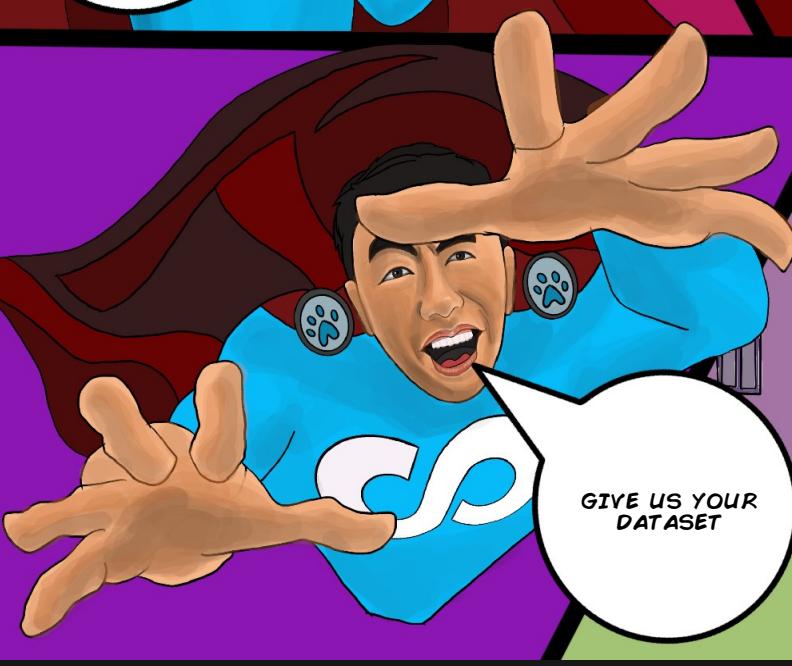
OUR BELOVED
GRUMPY CHASED A
SQUIRREL UP THE
OAK TREE, AND
CAN'T GET DOWN
BY HERSELF!



REMEMBER KIDS,
MOST HUMANS
AREN'T FLUENT IN
THE ML LINGO.
YOU NEED TO ASK
THE RIGHT
QUESTIONS TO GET
TO THE HEART OF
THE PROBLEM



WHAT ARE YOUR
INPUTS? WHAT ARE
YOUR OUTPUTS?
WHAT IS THE LOSS
FUNCTION? STATE
YOUR INDUCTIVE
BIASES!



GIVE US YOUR
DATASET



DATASET?



THE SITUATION IS
EVEN WORSE THAN
I THOUGHT.
LOOKS LIKE WE'RE
GOING TO HAVE
TO FORMULATE
THE PROBLEM
OURSELVES



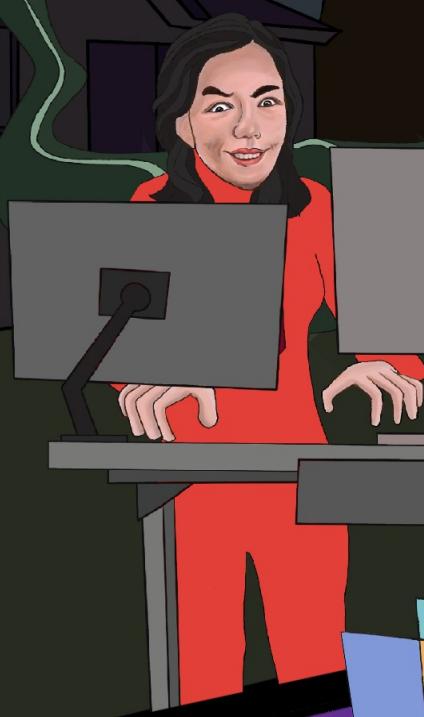
OK, THE FIRST
THING WE ARE
GOING TO NEED
IS A DATASET!

CRACK



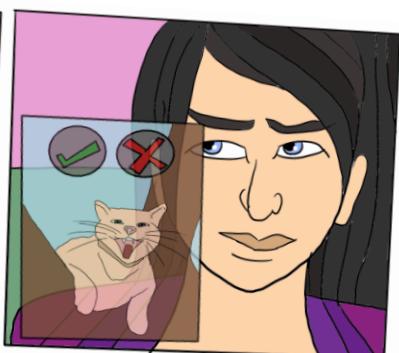
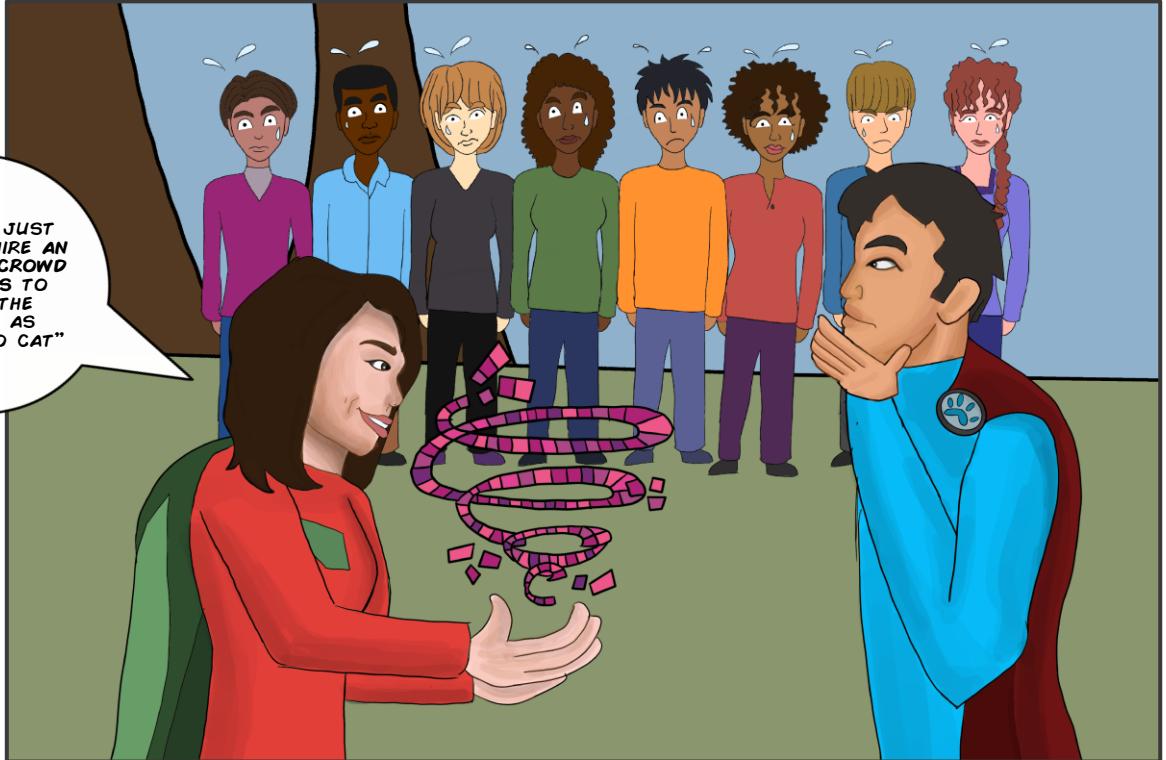


FORTUNATELY, ALL THE DATA YOU NEED IS ALREADY ON THE INTERNET, IF ONLY YOU KNOW WHERE TO LOOK.

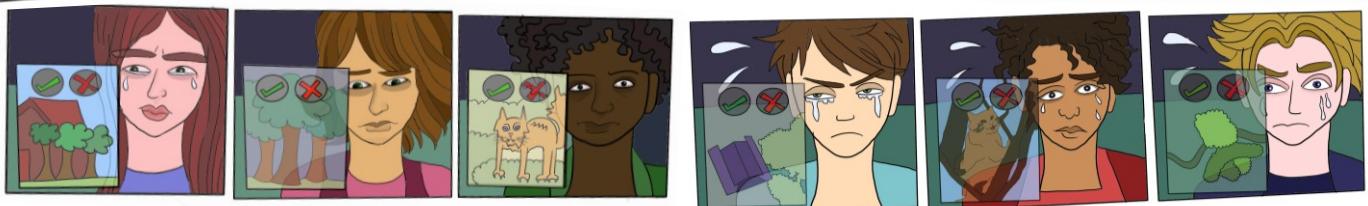


THERE! I'VE PULLED EVERY SATELLITE PHOTOGRAPH OF THIS TREE SINCE THE COVERT BEGINNINGS OF ORBITAL SURVEILLANCE DURING THE KENNEDY ADMINISTRATION.

NOW WE JUST
NEED TO HIRE AN
ARMY OF CROWD
WORKERS TO
LABEL THE
IMAGES AS
"CAT / NO CAT"



IS THERE A CAT IN THIS PICTURE?





THERE YOU GO!
ONE MILLION
IMAGES OF THIS
TREE WITH
GROUND TRUTH
CAT LABELS FOR
EACH!





OK STUDENTS,
NOW'S YOUR
TIME TO SHINE!

DROP
THAT
LOSS



```
from pytorch import favorite_cnn
x_train = ...
y_train = ...

for e in epoch:
    for batch in load(x_train, ytrain):
        favorite_cnn.drop_that_loss(batch)
```



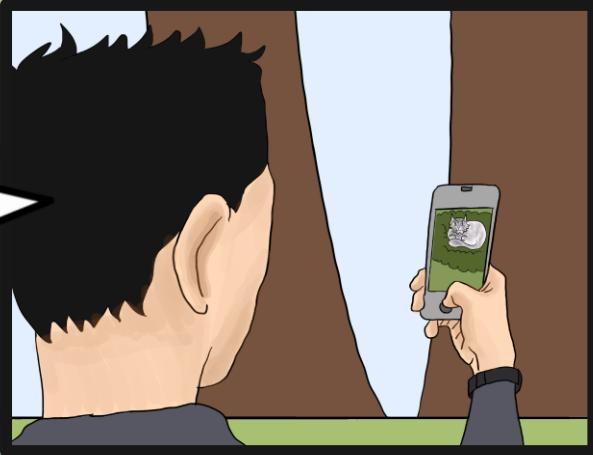
LEADERBOARD:

THEALCHEMIST
2DEEP
GOLDMIND
CATNEURON
MICROSOFTMAX
HINTON4PRES
CLOSEDAI
HYPERNOOBZ
REALALEXLAMB
REDDITBRO95

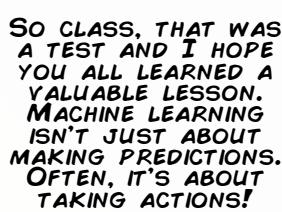


AND THE WINNER
-WITH 94.7%
ACCURACY-
IS THEALCHEMIST!

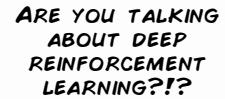
OK, LET'S SEE
WHAT THIS
TECHNOLOGY
CAN DO!







SO CLASS, THAT WAS A TEST AND I HOPE YOU ALL LEARNED A VALUABLE LESSON. MACHINE LEARNING ISN'T JUST ABOUT MAKING PREDICTIONS. OFTEN, IT'S ABOUT TAKING ACTIONS!



ARE YOU TALKING ABOUT DEEP REINFORCEMENT LEARNING?!?

APPROACHING FROM THE EAST...



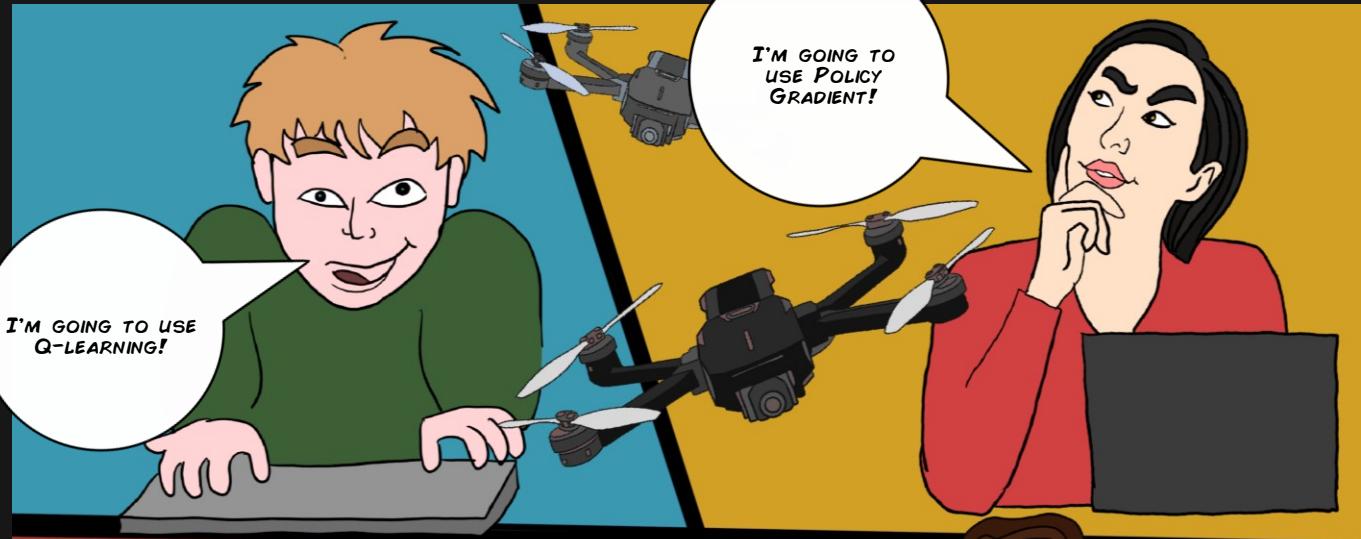
Q-EVILVER





THAT'S RIGHT,
KIDS! WITH THE
COMBINED POWERS
OF DYNAMIC
PROGRAMMING
AND FUNCTION
APPROXIMATION,
WE ARE GOING TO
SAVE GRUMPY!





1 MILLION POINTS FOR
RESCUING THE CAT!

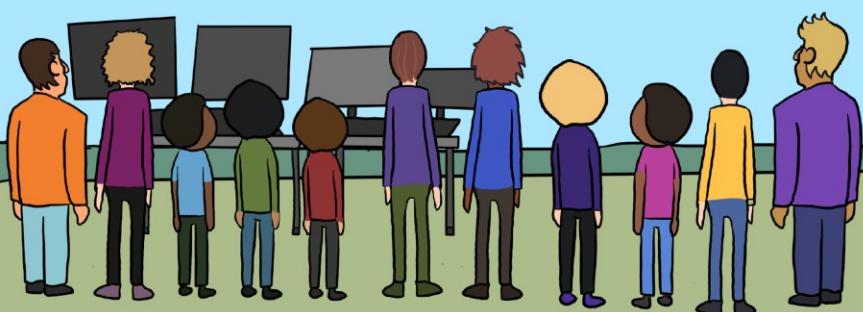
1 POINT FOR EVERY
SECOND IN THE AIR

-10,000 POINTS FOR
CRASHING



ALRIGHT TEAM,

SHOW ME WHAT YOU GOT!





WHERE ARE
THEY ALL
GOING?!?

...MAYBE
THEY'RE
EXPLORING?





WHEN WE BUILT THE FIRST VERSION OF ALPHAGO, WE BENEFITED FROM TRAINING PREDICTIVE MODELS TO GUESS THE NEXT MOVE BASED ON MILLIONS OF PROFESSIONAL HUMAN GAMES

I'VE HEARD OF THIS... IMITATION LEARNING, RIGHT?

THAT'S RIGHT, KIDS. WHY LEARN FROM SCRATCH WHEN WE CAN KICK-START OUR MODELS WITH TRAJECTORIES SAMPLED FROM EXPERT DEMONSTRATIONS?

BUT, WHERE ARE WE GOING TO GET THE DATA?



TIME IS OF THE ESSENCE! HERE'S THE PLAN. EACH TEAM MUST FIND ANOTHER CAT STUCK IN A TREE AND RESCUE IT MANUALLY BY PILOTING YOUR DRONES

DON'T FORGET TO RECORD THE COMPLETE SEQUENCE OF VIDEO OBSERVATIONS AND ACTIONS TAKEN.
LET'S GO!

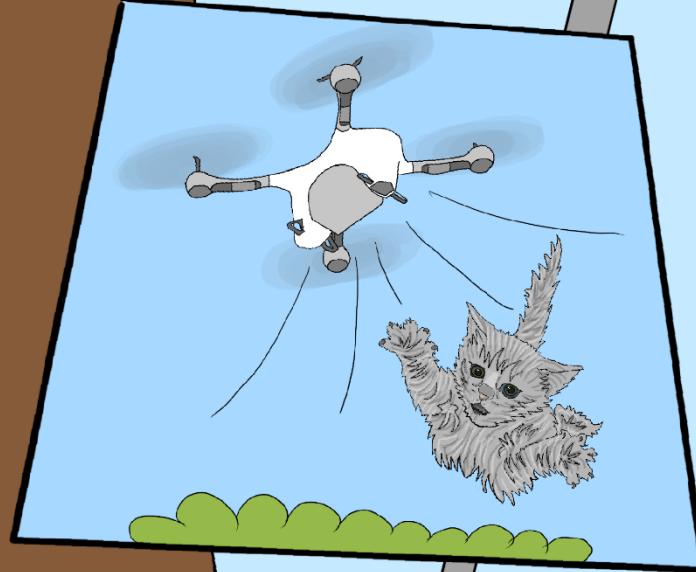
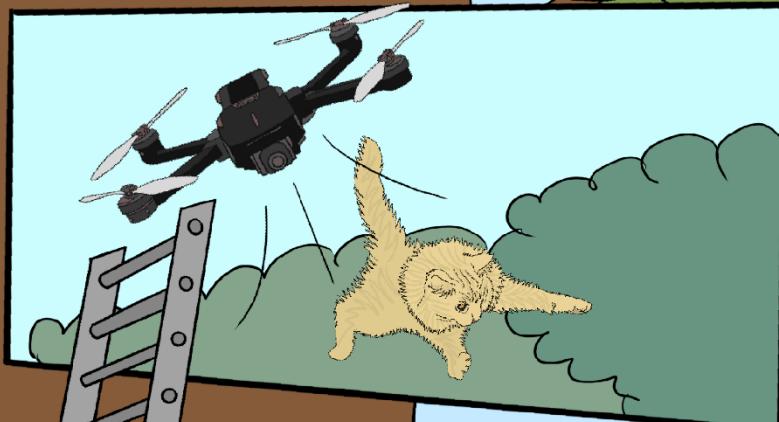


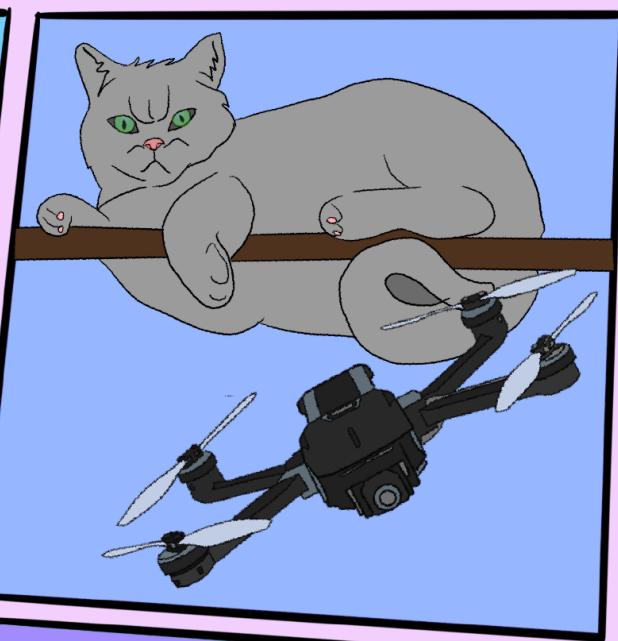
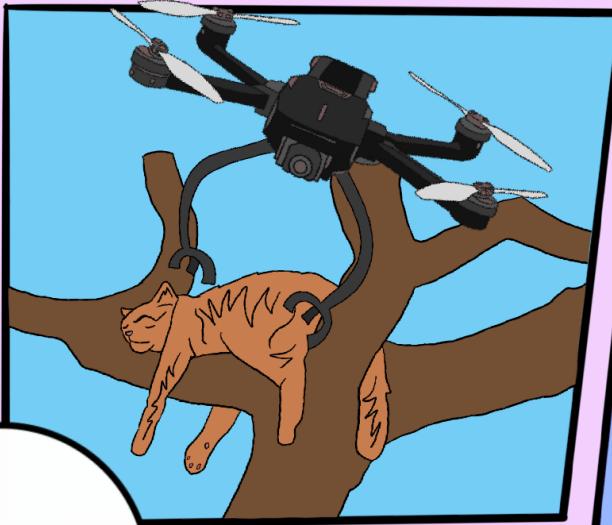
**WAIT! IF YOU'RE
CAPABLE OF SAYING
CATS BY MANUALLY
PILOTING THE
QUADCOPTERS, WHY
DON'T YOU SAY
GRUMPY NOW?**

HUMANS...

THERE DON'T
SEEM TO BE ANY
OTHER CATS IN
TREES... HOW DO
WE GATHER
TRAINING DATA?

I KNOW! LET'S
USE THE
QUADCOPTERS TO
FIRST PUT THE
CATS **IN** THE
TREES!





5 HOURS LATER...



ANYONE DARE TO
GUESS WHAT WENT
WRONG HERE?

ALL OF OUR
TRAINING DATA WAS
COLLECTED DURING
THE DAY... BUT WE
DEPLOYED OUR
MODEL AT NIGHT?
DOESN'T THAT
VIOLATE THE I.I.D.
ASSUMPTION?

THAT'S
RIGHT!

YOU SEE STUDENTS,
MACHINE LEARNING
ISN'T ABOUT
REPLACING HUMANS.
IT'S ABOUT
COMPLEMENTING
THEIR ABILITIES!
LET'S DEMONSTRATE
WHAT HUMANS AND
AI CAN ACHIEVE
TOGETHER!

THAT'S IT... I'M
CALLING THE FIRE
DEPARTMENT NOW!

I JUST DON'T SEE
HOW IT'S POSSIBLE
THAT THE NEWS
COULD HAVE
OVERSTATED THE
CAPABILITIES OF
TODAY'S AI

THE FIRE DEPARTMENT FINALLY ARRIVES...





LATER...



THE FOLLOWING IS A CONVERSATION WITH MOOC, BENCHMARK, AND Q-SILVER, FAMED SUPERHEROES OF DEEP LEARNING, COMPUTER VISION, AND REINFORCEMENT LEARNING.

A QUICK SUMMARY OF THE ADS. THIS EPISODE IS BROUGHT TO YOU BY HARDBANK, STASHAPP, AND AHOYLENT. IF YOU ENJOY THIS THING, SUBSCRIBE ON YOUTUBE, REVIEW IT WITH 5 STARS ON APPLE PODCASTS, FOLLOW ON SPOTIFY, SUPPORT IT ON PATREON, OR CONNECT WITH ME ON TWITTER (IF YOU CAN)



EVEN LATER...

YO GRUMPY - YOU AIN'T LUMPY
STUCK IN THAT TREE, NOWHERE TO PEE
YOU LIT IT UP GIRL, BURNING
YEARNING FOR MACHINE LEARNING

EYES TURNING, TO THE SKY, FOR DRONES
THIS CAT MOANS FOR THE AI REVOLUTION
THE SOLUTION, MY ABSOLUTION, IS
CONVOLUTION

MY ALGORITHMS FLY,
MY RHYTHM SO SLY

DON'T MEAN TO RUB
IT IN YO FACES
BUT MY COMPLICATED
HILBERT SPACES,
ARE FOR THE AGES.

THEY'RE THE RAGES.
START TAKING NOTES,
YOU'LL NEED PAGES

HELLO WORLD,
IT'S ME!

WORD2VEC, INPUT IN,
DOT PRODUCT, ACTIVATE,
DO IT 1NCE, DO IT 2WICE,

INPUT OUT,
ERRORS DONE

I DON'T NEED
A LABEL,
I JUST
LEARNT TO DO
IT WITHOUT 1

SOLVE AI OR
DIE TRYIN'



FIN.