**ML**

Visualising the loss surface:

losssurface

<https://arxiv.org/abs/1712.09913>

An Introduction to Convolutional Neural Network

CNN

<https://arxiv.org/pdf/1511.08458.pdf>

Object Detection With Deep Learning: A Review

Deep\_learning\_review

<https://ieeexplore.ieee.org/document/8627998>

Dropout:

Dropout

dropout2

[**https://jmlr.org/papers/volume15/srivastava14a/srivastava14a.pdf**](https://jmlr.org/papers/volume15/srivastava14a/srivastava14a.pdf)

<https://www.sciencedirect.com/science/article/pii/S2212671614000146>

Kernal shape, padding, stride, pooling

CNN2

<https://ui.adsabs.harvard.edu/abs/2016arXiv160307285D/abstract>

Early stopping

early\_stopping

<https://scholar.google.co.uk/scholar?q=Yao+Y.,+Rosasco+L.,+Caponnetto+A.,+2007,+Constructive+Approximation,+26,+289&hl=en&as_sdt=0&as_vis=1&oi=scholart>

Faces:

CNN\_for\_face\_recognitio

<https://www.sciencedirect.com/science/article/pii/B9780444894885501640>

Original Architecture design:

Neocognitron

<https://www.scopus.com/record/display.uri?eid=2-s2.0-0019152630&origin=resultslist>

<http://www.scholarpedia.org/article/Neocognitron>

Inspired by the biological neurons of a cat: <https://www.scopus.com/record/display.uri?eid=2-s2.0-33645410496&origin=reflist>

Artificial neuron:

Biological\_calculus

<https://link.springer.com/article/10.1007%2FBF02478259>

Approximation by superpositions of a non-linear function:

Sigmoid\_approx

non\_linear\_approx

<https://link.springer.com/article/10.1007/BF02551274>

<https://link.springer.com/article/10.1007/BF01188988>

ADAM:

ADAM

<https://arxiv.org/abs/1412.6980>

Backpropagation

Back\_prop\_theory

<https://ieeexplore.ieee.org/document/118638>

Gradient Descent

SGD

<https://www.sciencedirect.com/science/article/abs/pii/092523129390006O>

TensorFlow: A System for Large-Scale Machine Learning:

TensorFlow

<https://www.usenix.org/conference/osdi16/technical-sessions/presentation/abadi>

Batch Normalization:

BatchNormalization

<http://proceedings.mlr.press/v37/ioffe15.html>

Batch Normalization allows us to use much higher learning rates and be less careful about initialization, and in some cases eliminates the need for Dropout.

Numerical optimisation:

NumericalOptimization

<http://www.apmath.spbu.ru/cnsa/pdf/monograf/Numerical_Optimization2006.pdf>

GANs

GAN\_Ian

GAN2

<https://arxiv.org/abs/1406.2661>

<https://arxiv.org/abs/1506.05751>

<https://arxiv.org/abs/1511.06434>

<https://arxiv.org/abs/1802.05957>

<https://arxiv.org/abs/1809.11096>

<https://openaccess.thecvf.com/content_CVPR_2019/html/Karras_A_Style-Based_Generator_Architecture_for_Generative_Adversarial_Networks_CVPR_2019_paper.html>

<https://ieeexplore.ieee.org/document/8253599>

<https://arxiv.org/abs/1411.5928>

DCGANs

<https://arxiv.org/pdf/1511.06434.pdf>

<https://www.techscience.com/cmc/v57n1/22963>

**ML Applications in astronomy**

Supernova detection with CNNs

Supernova

[**https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=7727206**](https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=7727206)

Galaxy classification with Deep learning

Galaxy

[**https://ui.adsabs.harvard.edu/abs/2017IAUS..325..217L/abstract**](https://ui.adsabs.harvard.edu/abs/2017IAUS..325..217L/abstract)

Radio source classification

radio

[**https://arxiv.org/pdf/1801.04861.pdf**](https://arxiv.org/pdf/1801.04861.pdf)

Radio Galaxy Zoo: compact and extended radio source classification with deep learning

<https://ui.adsabs.harvard.edu/abs/2018MNRAS.476..246L/abstract>

SNRs

[**https://iopscience.iop.org/article/10.1088/1674-4527/19/3/42/pdf**](https://iopscience.iop.org/article/10.1088/1674-4527/19/3/42/pdf)

Exoplanets

<https://fse.studenttheses.ub.rug.nl/17826/1/thesis.pdf>

Radio Galaxies

<https://iopscience.iop.org/article/10.3847/1538-4365/aa7333/meta>

<https://ui.adsabs.harvard.edu/abs/2019EPSC...13..751W/abstract>

<https://ui.adsabs.harvard.edu/abs/2018MNRAS.480.2085A/abstract>

Extraterrestrial Intelligence!

<https://ui.adsabs.harvard.edu/abs/2019arXiv190202426H/abstract>

Solar Radio Bursts

<https://ui.adsabs.harvard.edu/abs/2019EGUGA..21.4470W/abstract>

**Filaments**

**Distance to sgr a\***

**https://ui.adsabs.harvard.edu/abs/2019A%26A...625L..10G/abstract**

Many sources in here:

tidal\_destruction

Non-thermal filaments from the tidal destruction of clouds in the Galactic centre

<https://arxiv.org/pdf/2010.13790.pdf>

Multifrequency Radio Studies of G359.1-00.2

Bfield

Linear polarization, (for the snake) rotation measure 5500 rad m-2 1400 rad m-2, thermal electron density of 10 cm-3 line-of-sight magnetic field strength of 7 μG along a path of length ∼100 pc

The Origin of the Galactic Center Nonthermal Radio Filaments: Young Stellar Clusters

shockwaves

The Linear Filaments of the Radio Arc near the Galactic Center

YZradioark

5500 rad/sq m, poloidal b field

The Nature of Nonthermal X-ray Filaments Near the Galactic Center

Yusef\_Zadeh\_2005Bfield

synchrotron emitting, b field ~0.08 mG

A filamentary radio source near the Galactic Centre

Fils\_GC

Filament morphology

THE GALACTIC CENTER

ENVIRONMENT

CentralMolecularZone

CMZ region size 200pc large densities, large velocity dispersions, high temperatures, and apparently strong magnetic fields

Unusual threads of radio emission near the galactic center

originaldetection

Size and morphology

Evidence of a Weak Galactic Center Magnetic Field from Diffuse Low-Frequency Nonthermal Radio Emission

Larosa\_Bfield

B field strength

A Radio Polarimetric Study of the Galactic Center Threads

rotation\_measure

Rotation measure

Age of the filament dominated by electron diffusion timescale. Filament of length 30 pc gives a timescale of 1.5e4yr 1mG/B\_eq

The Snake: A Reconnecting Coil in a Twisted Magnetic Flux Tube

bicknell\_bfield

B field

then electrons have been diffusing in the Snake for about 3 × 105 yr, comparable to the timescale at which magnetic energy is annihilated in the major kink.

Inflation of 430-parsec bipolar radio bubbles in the Galactic Centre by an energetic event

Central\_molecular\_zone2

The inner 200-parsec region is characterized by large amounts of warm molecular gas5, a high cosmic-ray ionization rate6, unusual gas chemistry, enhanced synchrotron emission7,8, and a multitude of radio-emitting magnetized filaments9, the origin of which has not been established.

Radio studies of the galactic centre. II. The arc, threads and related features at 90 cm (330 MHz).

<https://ui.adsabs.harvard.edu/abs/1991MNRAS.249..262A/abstract>

A Nonthermal Radio Filament Connected to the Galactic Black Hole?

<https://ui.adsabs.harvard.edu/abs/2017ApJ...850L..23M/abstract>

New gen radio astronomy

<https://arxiv.org/pdf/1202.4500.pdf>

<https://ui.adsabs.harvard.edu/abs/2018PASA...35...11H/abstract>

Non- Interaction between an NTF & HII Region, Distance from GC bounds for NTF region

<https://ui.adsabs.harvard.edu/abs/2003A%26A...403..917R/abstract>

Filfinder paper

<https://arxiv.org/pdf/1507.02289.pdf>

cloud-cloud collision complex triggering the formation of filaments, cores, and a stellar cluster

<https://ui.adsabs.harvard.edu/abs/2020MNRAS.499.3620I/abstract>

Galactic Center threads as nuclear magnetohydrodynamic waves

<https://ui.adsabs.harvard.edu/abs/2020PASJ...72L...4S/abstract>

streams of high-energy particles escaping from ram pressure confined pulsar wind nebulae (PWNe)

<https://ui.adsabs.harvard.edu/abs/2019MNRAS.489L..28B/abstract>

1984 Yusef-Zadeh Paper

<https://ui.adsabs.harvard.edu/abs/1984Natur.310..557Y/abstract>

Using Filaments to infer the local B field

<https://ui.adsabs.harvard.edu/abs/2000IAUJD..14E..25L/abstract>

<https://ui.adsabs.harvard.edu/abs/1995ApJ...448..164G/abstract>

<https://ui.adsabs.harvard.edu/abs/2004ApJ...607..302L/abstract>

Filament Intensities

<https://ui.adsabs.harvard.edu/abs/1998AAS...192.5410L/abstract>