



# Overview On Model Complexity In Deep Learning

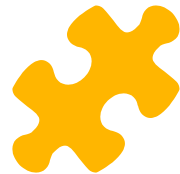
Name : Jagruti Mohanty

Survey link :

<https://arxiv.org/pdf/2103.05127.pdf>

**What is model complexity in deep learning?**





## What are the two types of model complexity?

***Expressive model capacity*** describes the upper boundary of complexity that the model can handle or in other words it defines the hypothesis space that guarantees learnability of the model and deriving generalization boundaries.

***Effective model complexity*** reflects the complexity of the model with respect to the parameters of the deep learning model. It helps in improving the model strategy for optimization, selection process, compression aspects of the model.

Let us consider the quadratic function  $f(x) = ax^2 + bx + c$  to understand which is expressive model capacity and effective model complexity



*Study of model complexity of Deep Learning helps in understanding and improving the performance, generalization capability and optimizing the models.*



## **What are the ways in which study of the model complexity can help?**

- Model Generalization Capability
- Optimization in Model Complexity
- Model Selection and Design in Model Complexity



## Expressive Capacity

- Depth Efficiency
- Width Efficiency
- Expressible Functional Space
- VC Dimension and Rademacher Complexity



## Effective Complexity

- Piecewise Linear Property
- High-Capacity Low-Reality Phenomenon
- Other Measure Metrics



## What are other state of art studies for model complexity?

- *Model framework*
- *Model size*
- *Optimization process*
- *Data complexity*





Other observations and future research areas



# Thanks!

Any questions?

You can find me at - [jagruti.mohanty@sjsu.edu](mailto:jagruti.mohanty@sjsu.edu)