AUTO MACHINE LEARNING

Hyper parameter tuning

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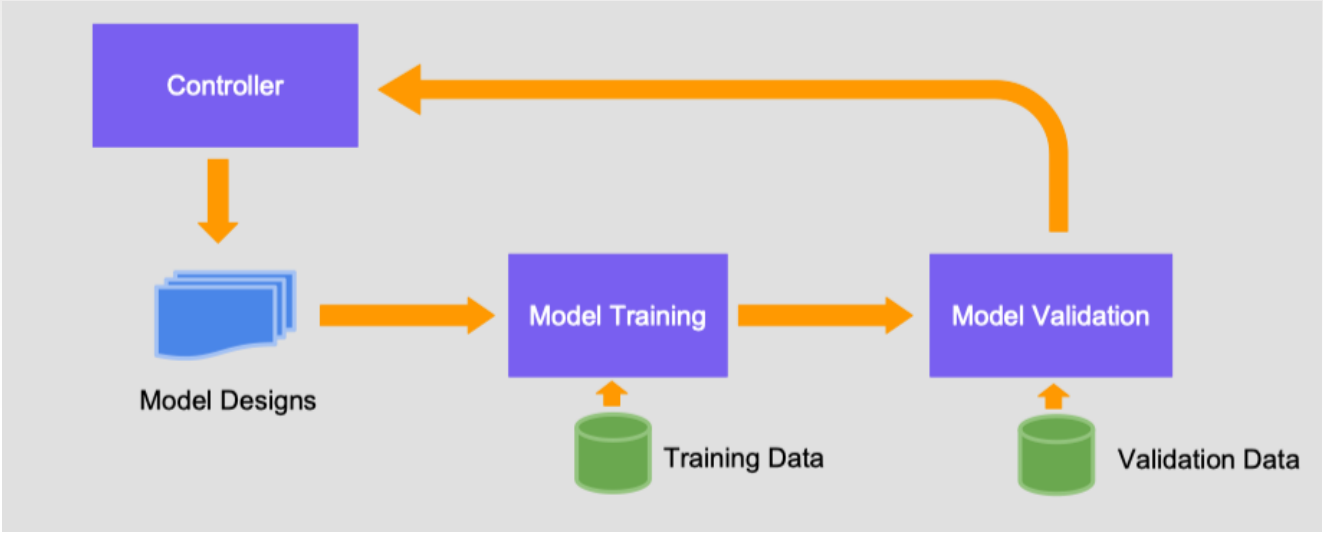
WHAT IS IT?



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Data Preprocessing

- Techniques for automated data cleaning
  - Levenstein, DTW
- Automated handling of missing data
  - Distribution fitting
  - MICE
- Normalization and transformation strategies
  - Z-score
  - Scaling
  - Log transformation, polynomial

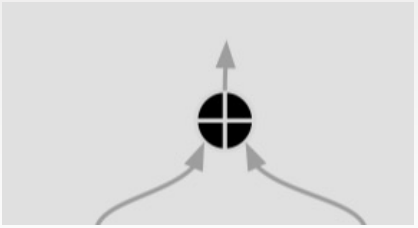
Feature Engineering

- Feature generation – autoFE
  - Seq2seq DL
  - RL
  - Genetic algorithms
  - Optimization in the continuous space
- Methods for automated feature selection
  - Backwards and forward
- Techniques for feature transformation
  - Part of autoFE

- AutoFE
  - Generate sequence of operations and features
    - Can be nested
  - DIFFER
    - Embed sequences to continuous space
      - Auto-encoder
    - Optimization in continuous space
      - Decode good sequences

Representing new features

- Can be represented as a tree
  - Source nodes are (current features)
  - Inner nodes correspond to operations
  - Single sink node



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- Tree represented by RPN
  - Reverse Polish Notation

(10+7) x 8
10 7 + 8 x

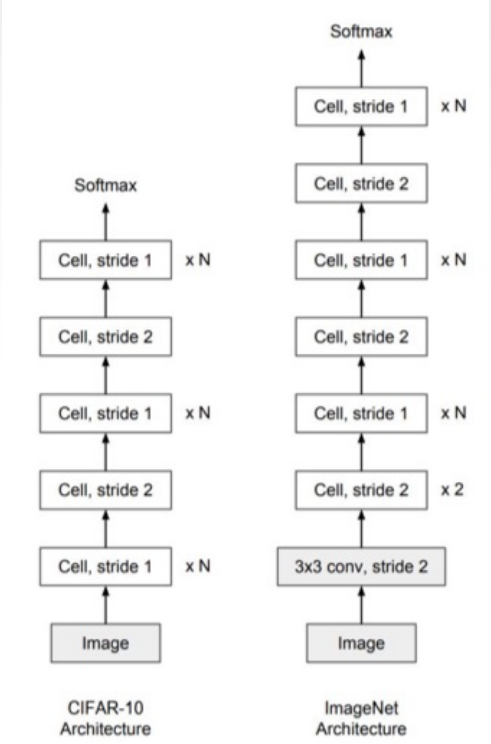
Operands operator
Same as using stack data structure

Hyper parameter optimization

- Understanding hyperparameters in ML
  - Numeric values
  - Categorical values
  - Constraints linking them
- Grid Search, Random Search, Bayesian Optimization, Genetic Algorithms
  - Random search works better than grid search
- Recent advancements in hyperparameter optimization
  - Hyperband – stop training if not promising
    - Perhaps return later if nothing better found

Neural Architecture Search (NAS)

- Find
  - Number of layers, neurons per layer
  - Filter sizes
  - Sliding window size
- Generate values one by one
  - Natural order based on domain
- Algorithms
  - RL, genetic algorithms



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NAS

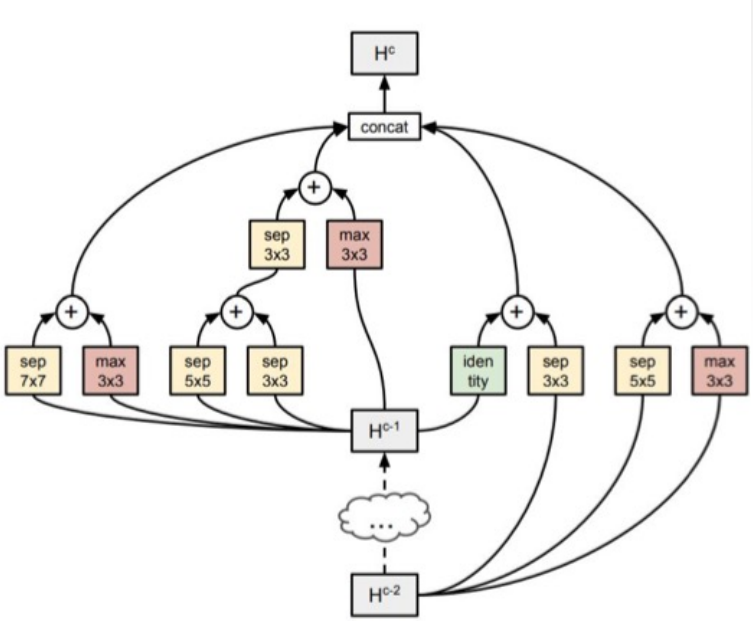
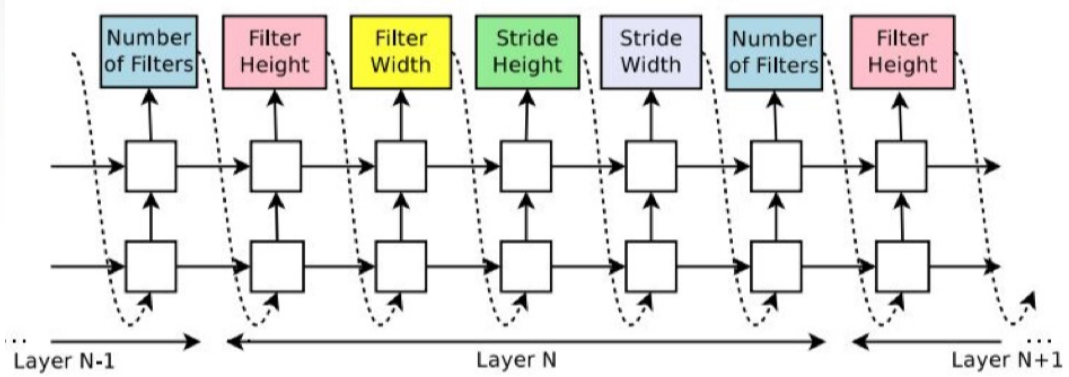


Figure 6. Cell structure used in PNASNet-5.



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