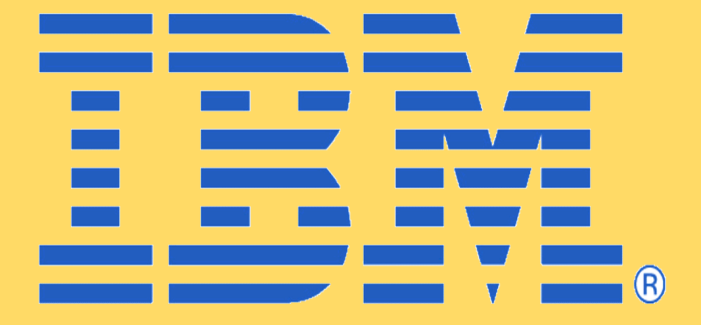




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DANIEL : A Deep Architecture for Automatic Analysis and Retrieval of Building Floor Plans



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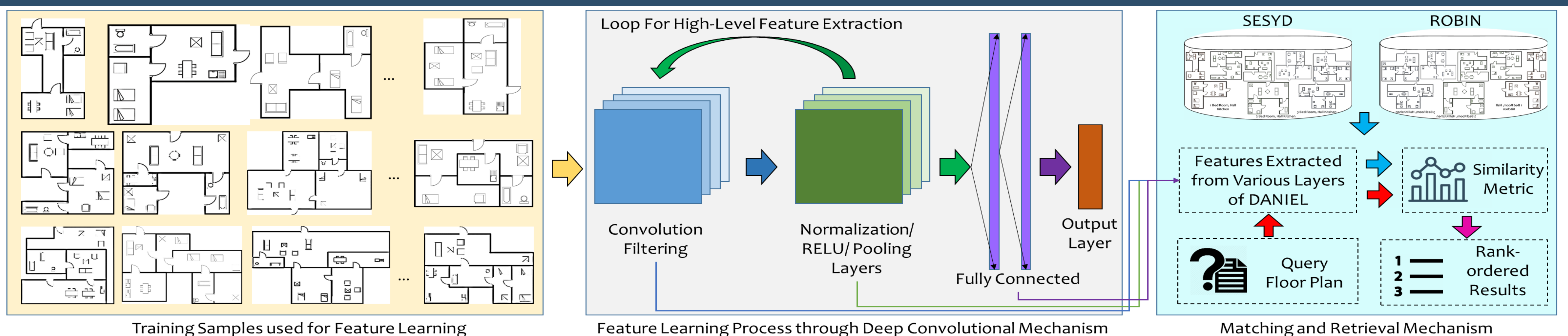
Motivation

- Provide automatic lookup to retrieve similar past architectural projects to aid architects.
- Help property buyers to select floor plans with more specificity in terms of both room décor and layout.
- Analyse deep learning techniques for the task of floor plan retrieval to bypass the need of extracting a few selected hand-crafted features.

Contribution

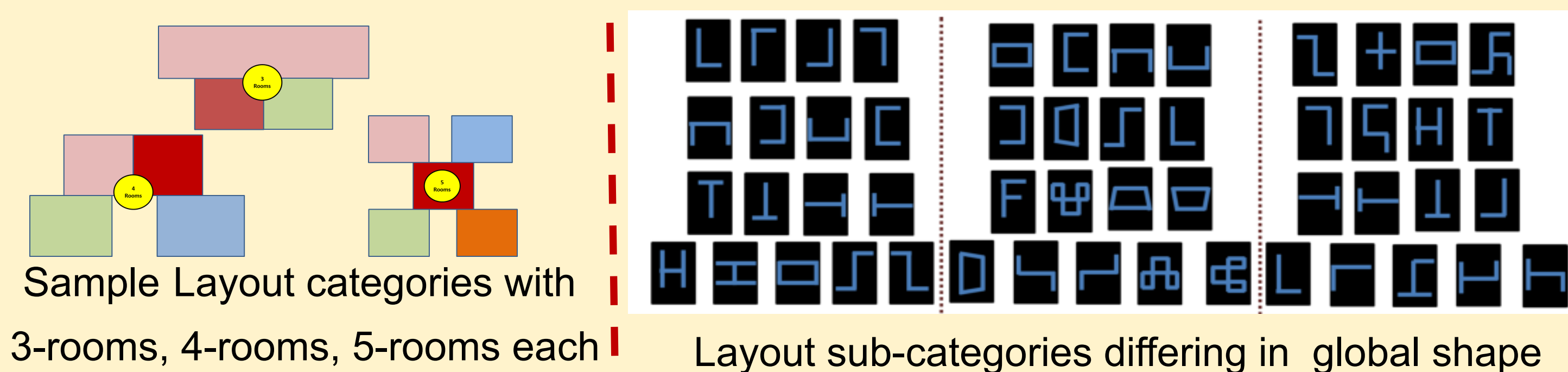
- Proposal of a distinct, versatile dataset ROBIN (Repository Of Building plans), dedicated to the task of floor plan retrieval.
- A deep learning framework for extraction of both low and high level features for the task of fine-grained retrieval.
- Analysis of the effect of individual deep convolutional hidden layers on retrieval results and knowledge transfer from ROBIN to SESYD dataset.

Framework Diagram



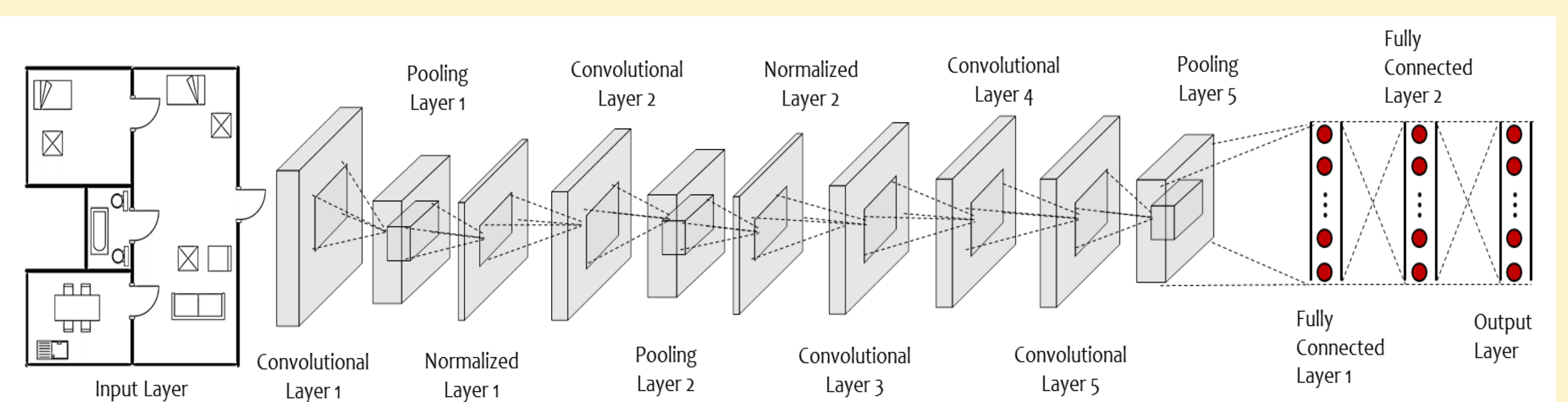
Dataset Details

- ROBIN dataset contains 510 floor plans.
- 3 categories, 17 sub-categories and 10 samples/ sub-category.



Experimental Setup

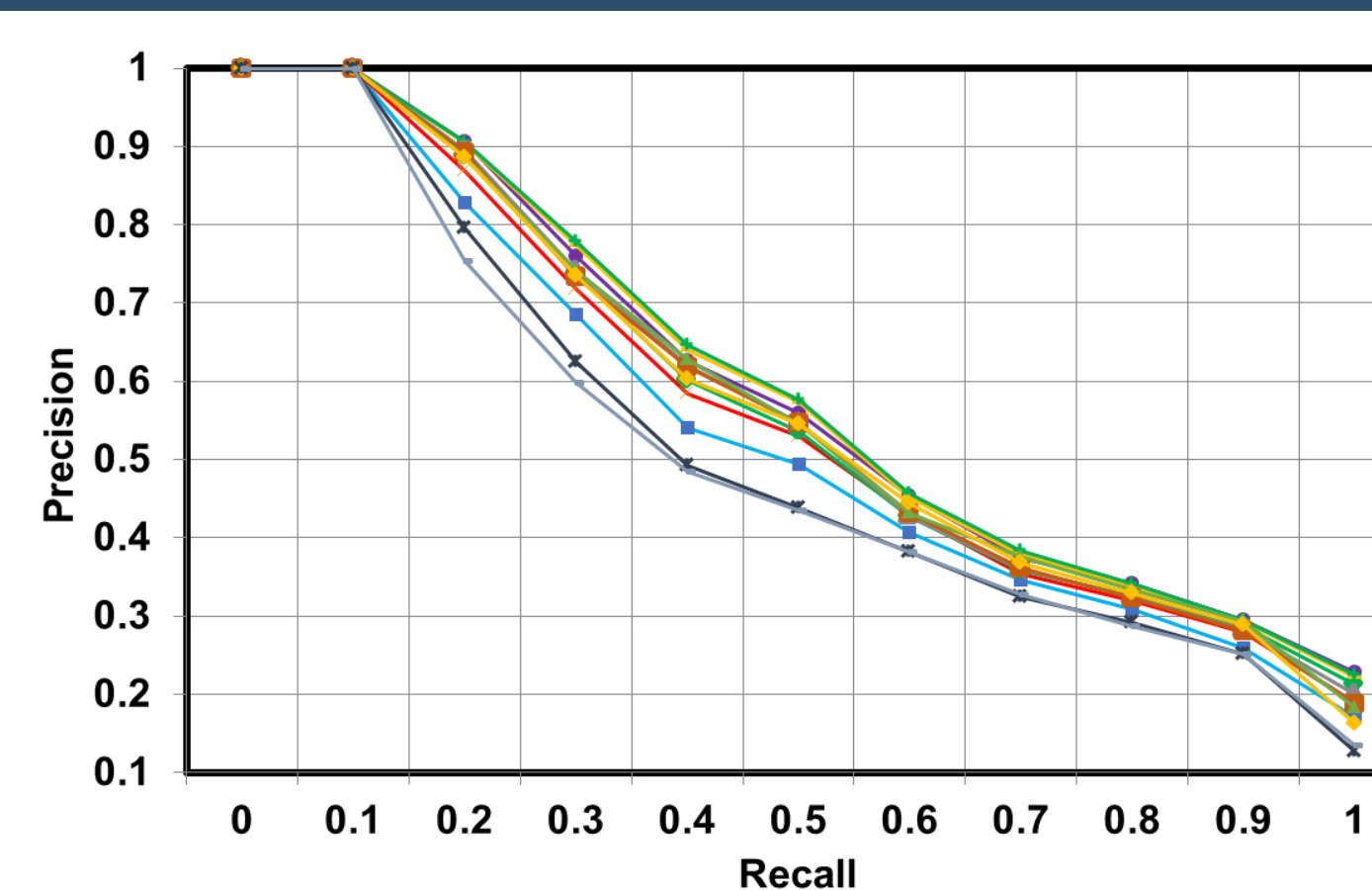
- ROBIN is split into train set : 70% samples ; test set : 30% samples



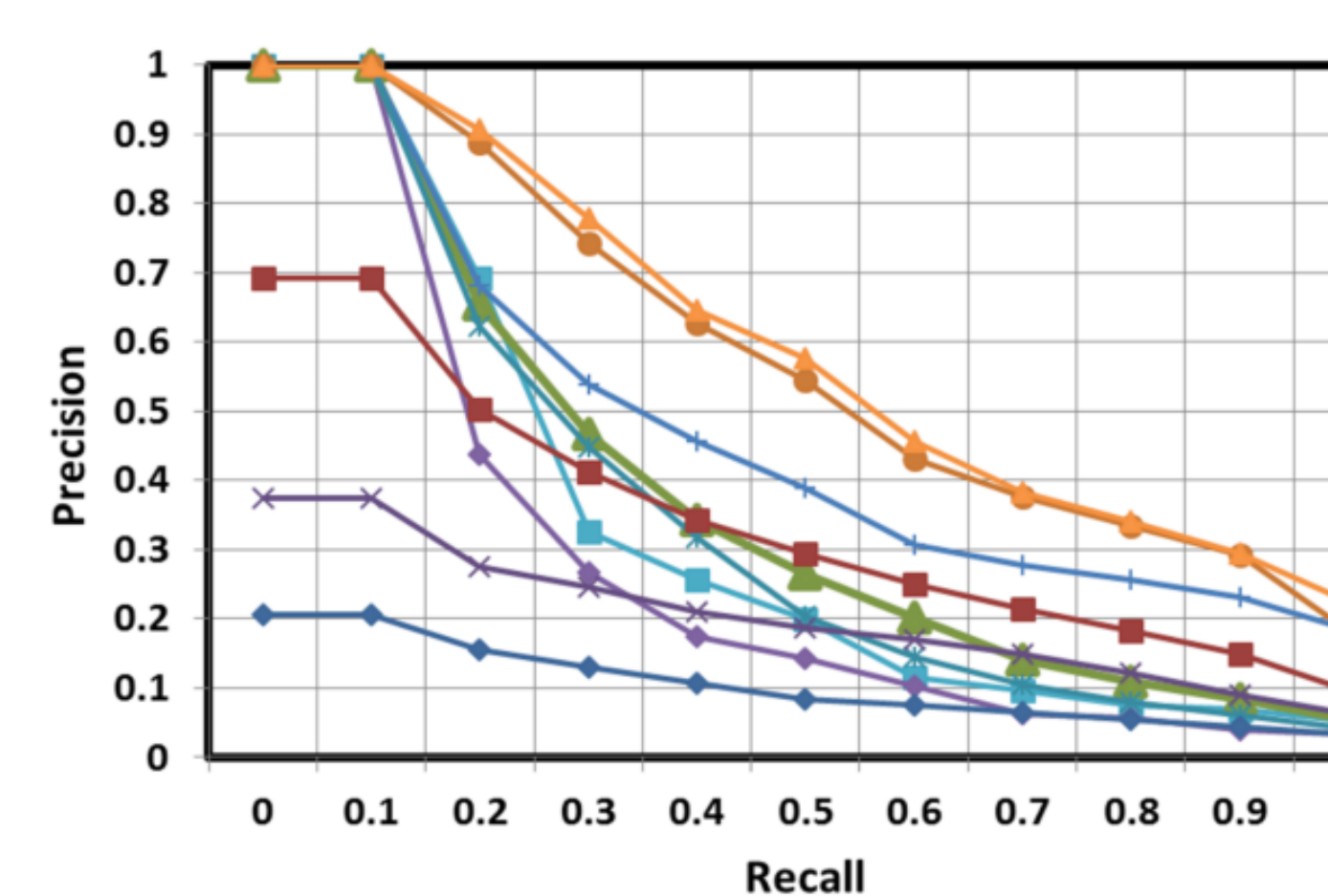
Qualitative Results



Quantitative Results



Layers	conv1	pool1	norm1	conv2
Ours	0.503	0.527	0.554	0.537
Layers	pool2	norm2	conv3	conv4
Ours	0.557	0.561	0.539	0.537
Layers	conv5	pool5	fc6	fc7
Ours	0.541	0.536	0.472	0.465



Techniques	Results on ROBIN
CVPR	0.29
ICPR	0.23
HOG based CBIR	0.40
SIFT based CBIR	0.33
RLH based CBIR	0.30
OASIS with HOG	0.31
OASIS with BOW	0.19
OASIS with RLH	0.01
Ours (norm2)	0.56

Key References

- Symbol spotting in graphical documents: Dutta et al. 2011, 2013
- Sketch based retrieval of architectural floor plans: Weber et al. 2013
- Room detection in architectural floor plans: Ahmed et al. 2012
- Generic Image Retrieval : Dalal et al. 2005, Chechick et al. 2009
- Deep Learning : Krizhevsky et al. 2012, Jia et al. 2014

Conclusions

- An end-to-end novel deep learning framework that captures semantic features and retrieves floor plans.
- Extensive experiments on ROBIN dataset yielded approximately twice the better mean average precision than state-of-art retrieval techniques.

Acknowledgement

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