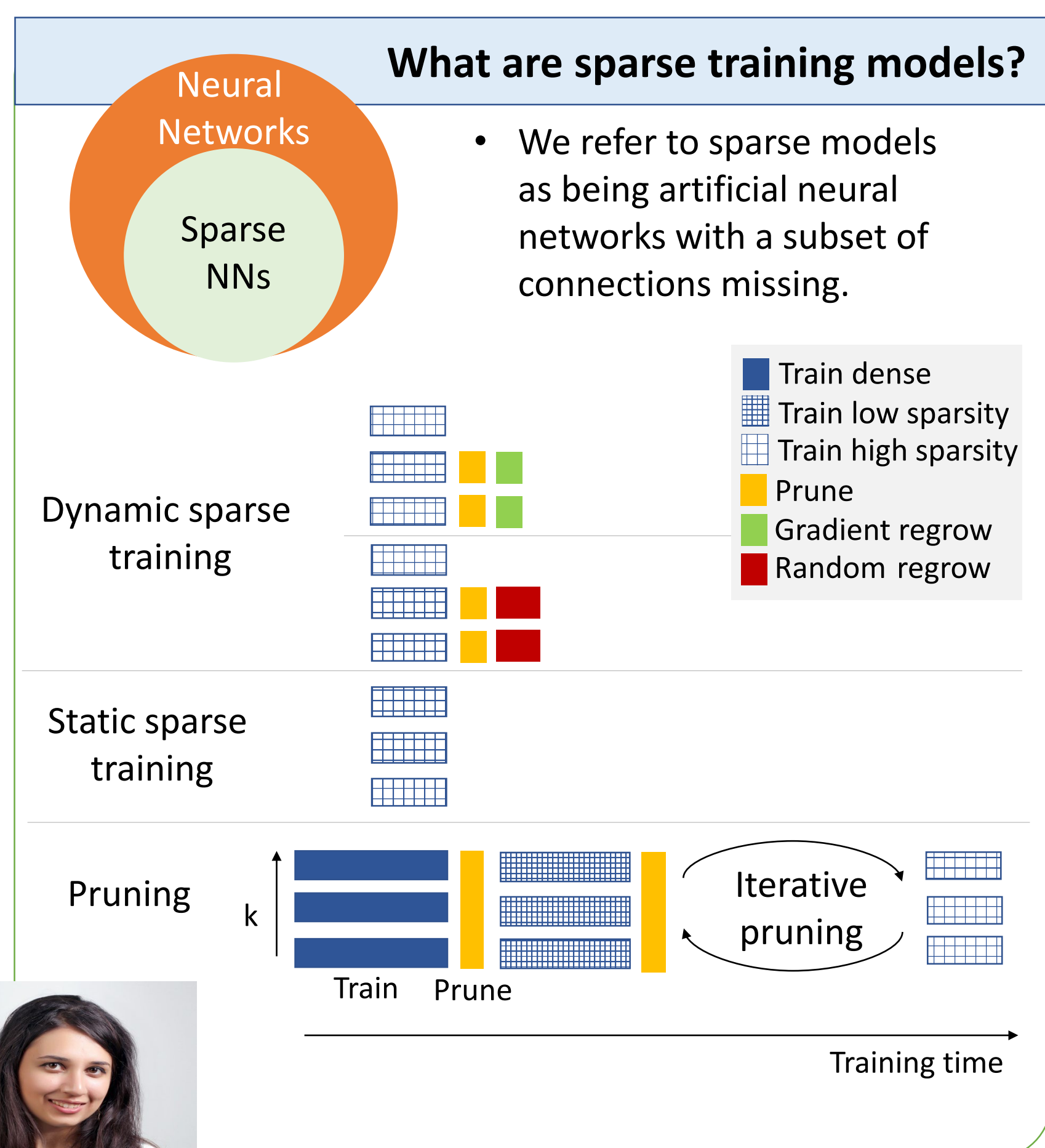
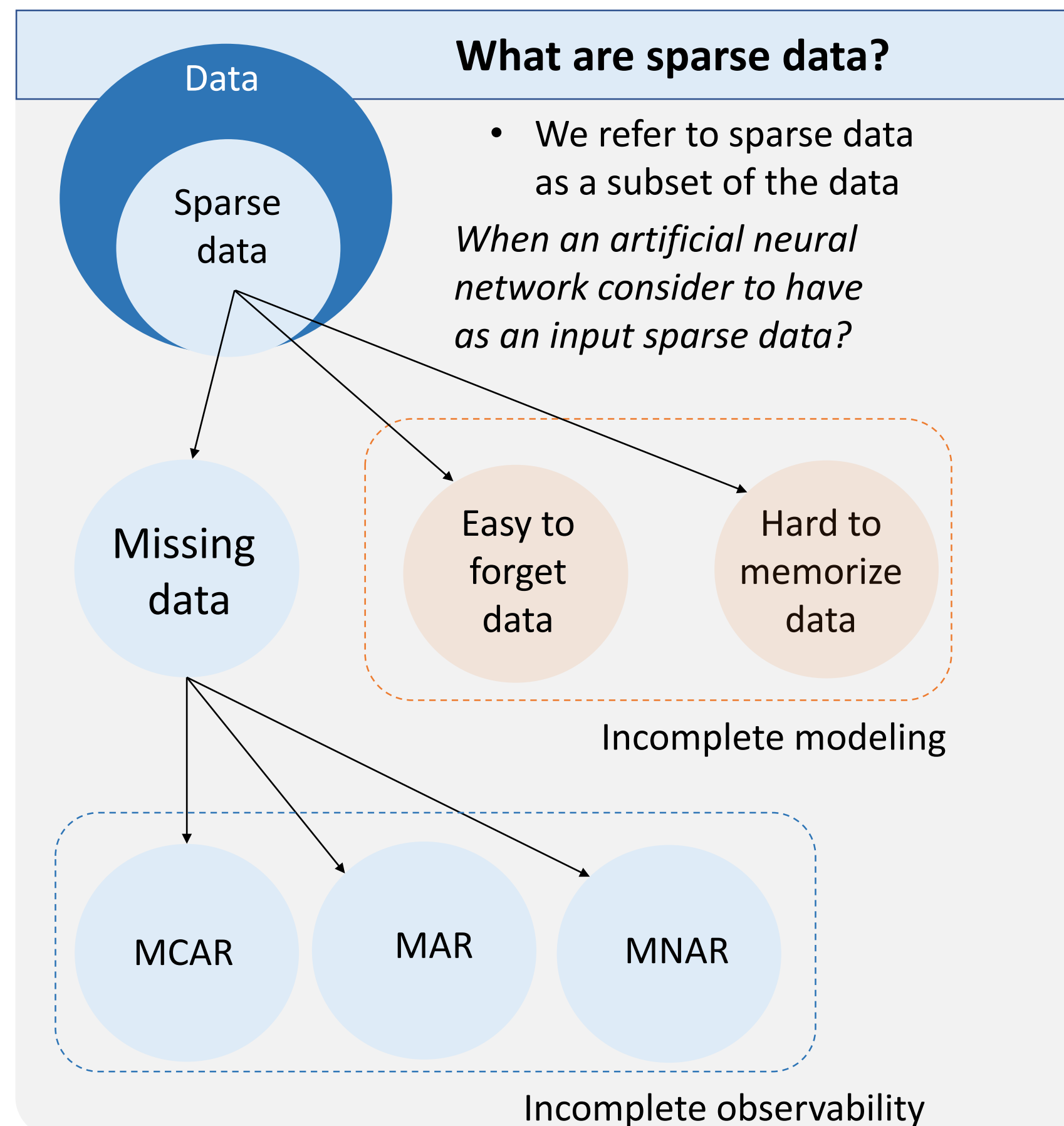


# The mutually reinforcing of sparse data and sparse training models<sup>[1]</sup>



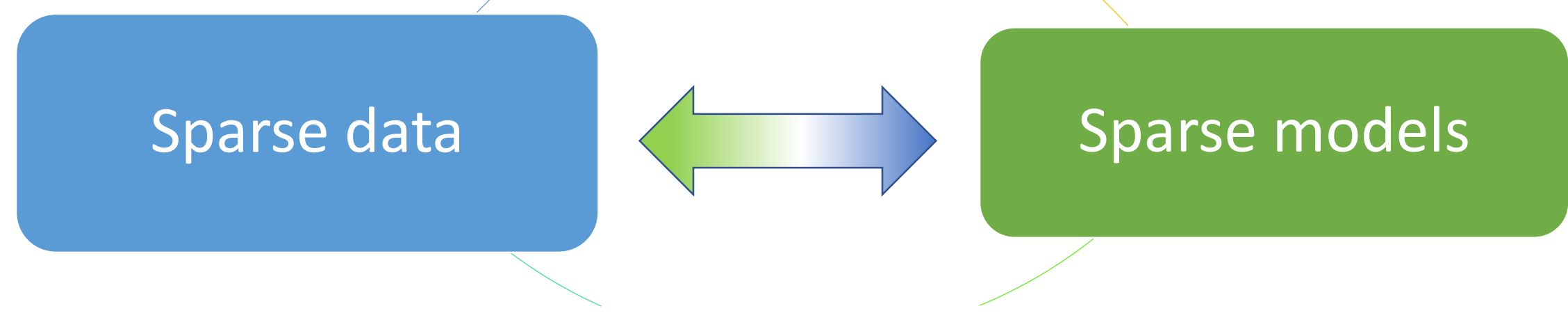
Işıl Baysal Erez

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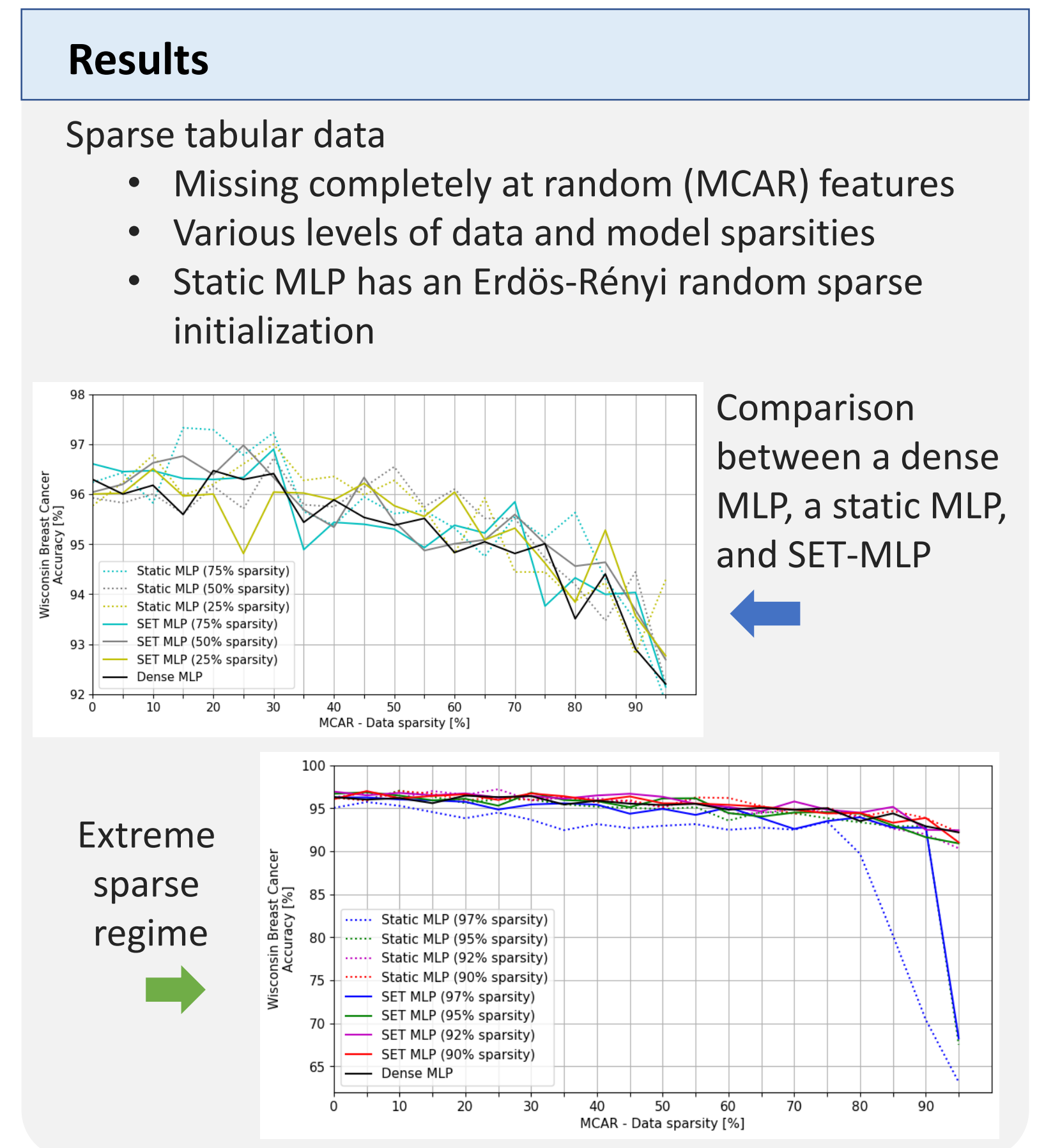
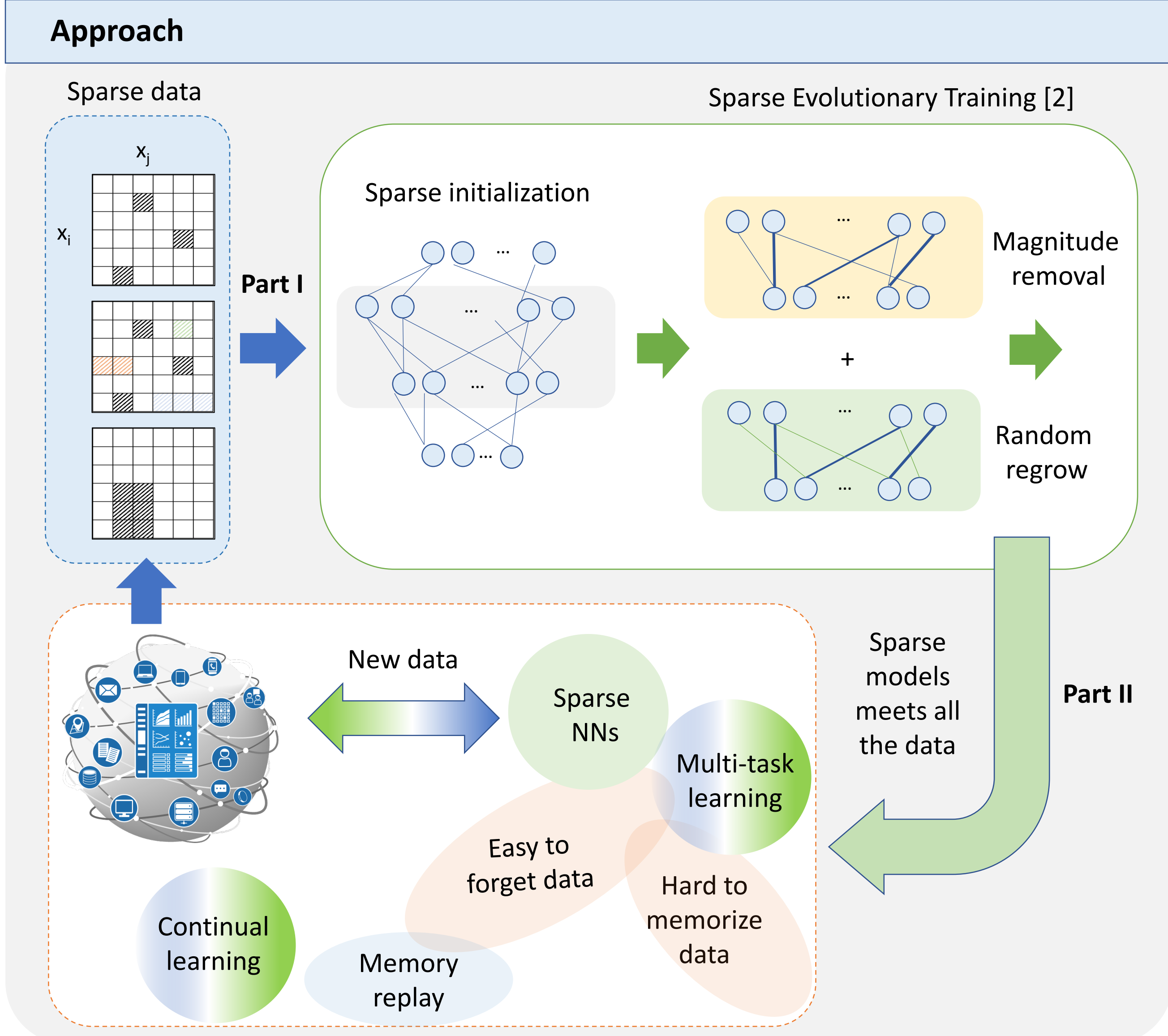
**Part I**

Can sparse training benefit from a data-efficient solution? How should the **sparse training models** & **sparse data** interact? Can they possibly be simultaneously used to drive training efficiency to the next level?



**Part II**

Are the dynamic sparse training algorithms able to accommodate the hard-to-memorize and easy-to-forget samples? To what extent can we find a subset of data that allows us to overcome the catastrophic forgetting problem in sparse neural networks?



### Conclusions

- Our initial results using data in an incomplete observability environment showed a great potential towards an impressive computational reduction and an increase in the accuracy.
- These results are yet limited to one dynamic sparse training algorithm (i.e., Sparse Evolutionary Training [1]) and one dataset where the missing completely at random features have been simulated (Breast Cancer Wisconsin).
- Further theoretical considerations and empirical results are currently under development to generalize these results and support these impactful claims.

### References

[1] I. Baysal Erez, The mutually reinforcing of sparse data and sparse training models, SIAM International Conference on Data Mining (SDM22), Doctoral Consortium, 28-30 April, 2022.

[2] D. C. Mocanu, E. Mocanu, P. Stone, P.H. Nguyen, M. Gibescu, A. Liotta, Scalable training of artificial neural networks with adaptive sparse connectivity inspired by network science, Nature Communications, 9(1), 1-12, 2018.

