School of Electronic Engineering

CB54: Machine Learning Algorithms for EM Wave Scattering Problems

Appendix D: Project Design & Implementation

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Contents

Project Design & Implementation

[CHECK: As code is provided via Github, this section will contain flowcharts and model diagrams as well as key code highlights. Show whether that each item in the design plan was achieved.]

Code Validation

CHECK: Bessel-Function Approach

Model Architecture Description

CHECK: Include both diagrams here noting the visual keras one does not show skip connections.

SovlerEMF2 Flow Diagram

CHECK: Make a simple flow diagram like in the paper.

Checklist of achievements

CHECK: There is a list in the Project Design Proposal, comment on each one or mark them off.

Bibliography

[1] C. Brennan and K. McGuinness, "Site-specific Deep Learning Path Loss Models based on the Method of Moments." arXiv, Feb. 02, 2023. doi: 10.48550/arXiv.2302.01052.

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[3] P. M. van den Berg, *Forward and inverse scattering algorithms based on contrast source integral equations*. Hoboken, NJ: Wiley, 2020. [Online]. Available: https://onlinelibrary.wiley.com/doi/book/10.1002/9781119741602

[4] Q. Ren, Y. Wang, Y. Li, and S. Qi, *Sophisticated Electromagnetic Forward Scattering Solver via Deep Learning*. Singapore: Springer, 2022. doi: 10.1007/978-981-16-6261-4.

[5] J. Lim and D. Psaltis, "MaxwellNet: Physics-driven deep neural network training based on Maxwell's equations," *APL Photonics*, vol. 7, no. 1, p. 011301, Jan. 2022, doi: 10.1063/5.0071616.

[6] A. P. M. Li, M. Li, and M. Salucci, *Applications of Deep Learning in Electromagnetics: Teaching Maxwell's Equations to Machines*. Institution of Engineering & Technology, 2023.