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Math179 SU22
Midterm Proposal

1 (**Midterm Project Proposal**) Neural Flow for MIMIC III data.

Ordinary Differential Equations (ODEs) provide a general way of modelling dynamic processes, and have been extensively studied. Neural ODEs borrows concepts from regular neural networks by treating them as complete ODEs and approximating solutions using established ODE solver algorithms. This technique has gained success in modeling sequential data, especially irregularly-timed data which is often the case with real, imperfect measurements.

Neural Flows, as introduced by Bilos et al., provides an alternative way to model ODEs with neural techniques. By "directly modeling the solution curves — the flow of an ODE," the new method saves computation by avoiding repeated evaluation of the ODE and back-propagation runs [BSR+21]. For the midterm project, we aim to replicate the implementation and results of Bilos et al. on the MIMIC III dataset. The specific extension, as required by the final project, will depend on a better understanding of Neural Flows and our success in the midterm project.

References

[BSR+21] Marin Bilos, Johanna Sommer, Syama Sundar Rangapuram, Tim Januschowski, and Stephan Günnemann. Neural flows: Efficient alternative to neural odes. *CoRR*, abs/2110.13040, 2021.

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