INNDiE: An Integrated Neural Network Development Environment
Ryan G. Benasutti (CS), Austin C. Shalit (RBE & CS)
Professor Brad Miller (RBE), Professor Carlo Pinciroli (RBE & CS)

Motivation
- Modern machine learning methods are capable of tackling problems that are traditionally difficult or impossible for computers to solve
- The learning curve is very steep for beginners
- Training a neural network requires considerable computing resources

Approach
Create a single tool that collocates the necessary dependencies and workflows for neural network development.
- Develop neural networks without any programming
- Guide users through the machine learning workflow
- Seamlessly lift the computational burden of training a neural network into the cloud

User Interface – Editor View
Configure hyperparameters and training service. No programming!

User Interface – Wizard
Create jobs for ML problems with limited ML knowledge.

User Interface – Results View
See training results graphically. Test trained models (not pictured).

Architecture
Build System
- Built on the JVM: a very stable and well-supported platform
- Written in Kotlin for its first-class asynchronous programming, null-safe type system, and succinctness
- Uses the modern build system Gradle to incorporate tools for static analysis, code coverage, and mutation testing
- Automated unit & integration tests for all non-UI code
- CI builds on Windows, MacOS, and Linux using Azure Pipelines

Lessons Learned
- Effective teamwork requires constant communication
- Don’t commit to a technology without fully understanding its weaknesses