INNDiE:
An Integrated Neural Network Development Environment

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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 colocates the necessary dependencies and work-flows 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!

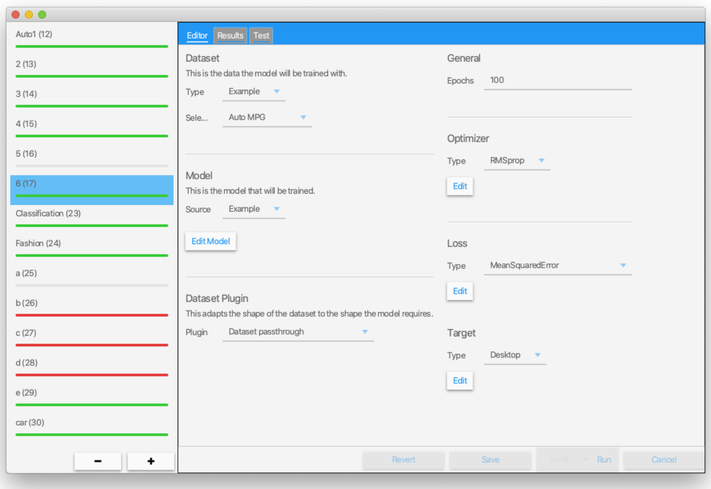


Figure 1. The job editor with the job list on the left side.

User Interface – Wizard

Create jobs for ML problems with limited ML knowledge.

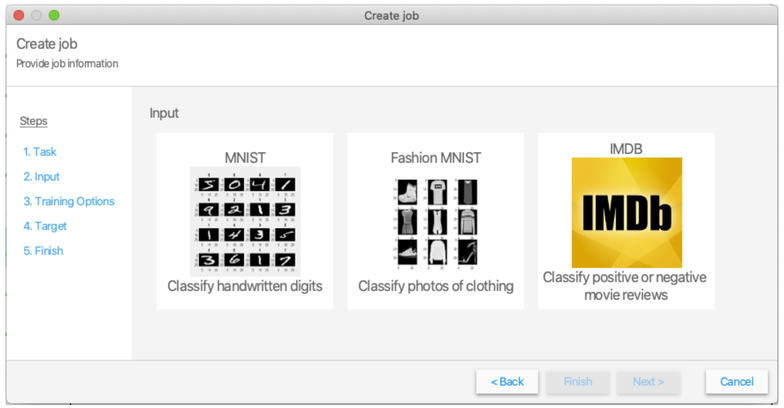


Figure 2. The wizard input page with a selection of supported datasets.

User Interface – Results View

See training results graphically. Test trained models (not pictured).

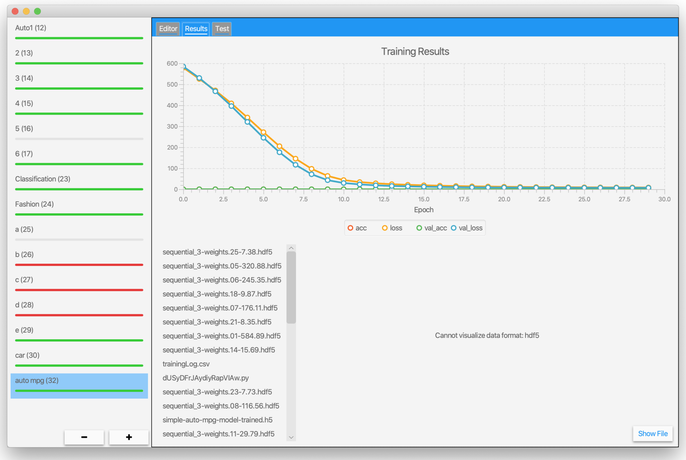
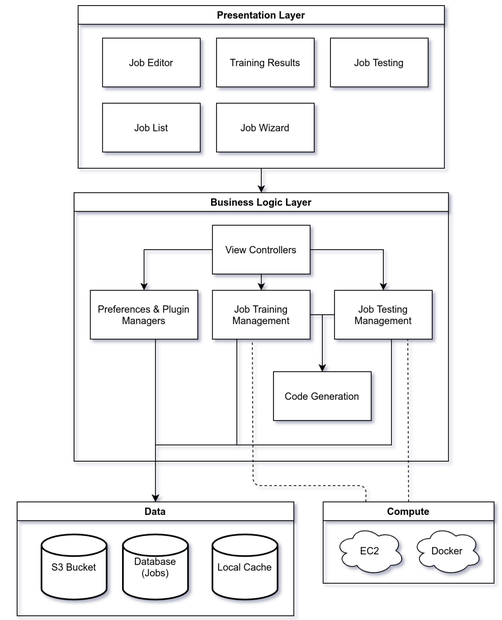


Figure 3. The results page: displays training results & all output files.

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