**SPROJ\_EECE\_7398\_MXX\_V01\_Milestone\_1**

Hello, everyone. Welcome to this guided project tutorial for our small data machine learning course. Today, we're going to explore a real-world research project that demonstrates how to tackle machine learning problems when you have limited data available. Before we dive into the technical details, I want to show you a practical demonstration of what we'll be building today.

As you can see, the model is accurately detecting key anatomical points on the infant's body, even though the poses are quite different from the adult poses. This is impressive considering how little infant pose data was available for training. What's remarkable about this model is that it achieves this level of accuracy, despite being trained on a very small data set for real infant images. The researchers achieved this by leveraging knowledge from other pools data sets, which are abundant, and developing special domain adaptation techniques to transfer that knowledge to infant poses.

The project we'll be working with is called Fine-tuned Domain-adapted Infant Pose, or FiDIP. This project comes from the Augmented Cognition Lab at Northeastern University and addresses a fascinating challenge-- how to build effective pose estimation models for infant when there is very limited infant pose data available. Why is this great example for our course?

Because it demonstrates several key, small data techniques-- domain adaptation from a data-rich source, which are other poses to a data-scarce target, which are infant poses. Synthetic data generation supplements limited real data. Fine-tuning strategies make the most of small data sets. By the end of this tutorial series, you'll understand how to navigate and set up a research repository, prepare the environment and data for a deep learning project, train models in a small data regime, evaluate results and compare them with benchmarks.

Understand the techniques that makes learning from small data possible. What makes this project particularly interesting for our small data machine learning course is its real-world application. Infant pose estimation has important clinical application, including early detection of motor development issues, assessment of neurological conditions, monitoring physical therapy progress, research on infant movement patterns.

However, collecting large data sets of infant poses is challenging to ethical considerations, difficulty in data collection, and the variability in infant movement. This is a perfect example for a domain where small data techniques are not just helpful, but necessary. In our next lesson, we'll dive into the GitHub repository structure and get everything set up for our project. I'll see you there.