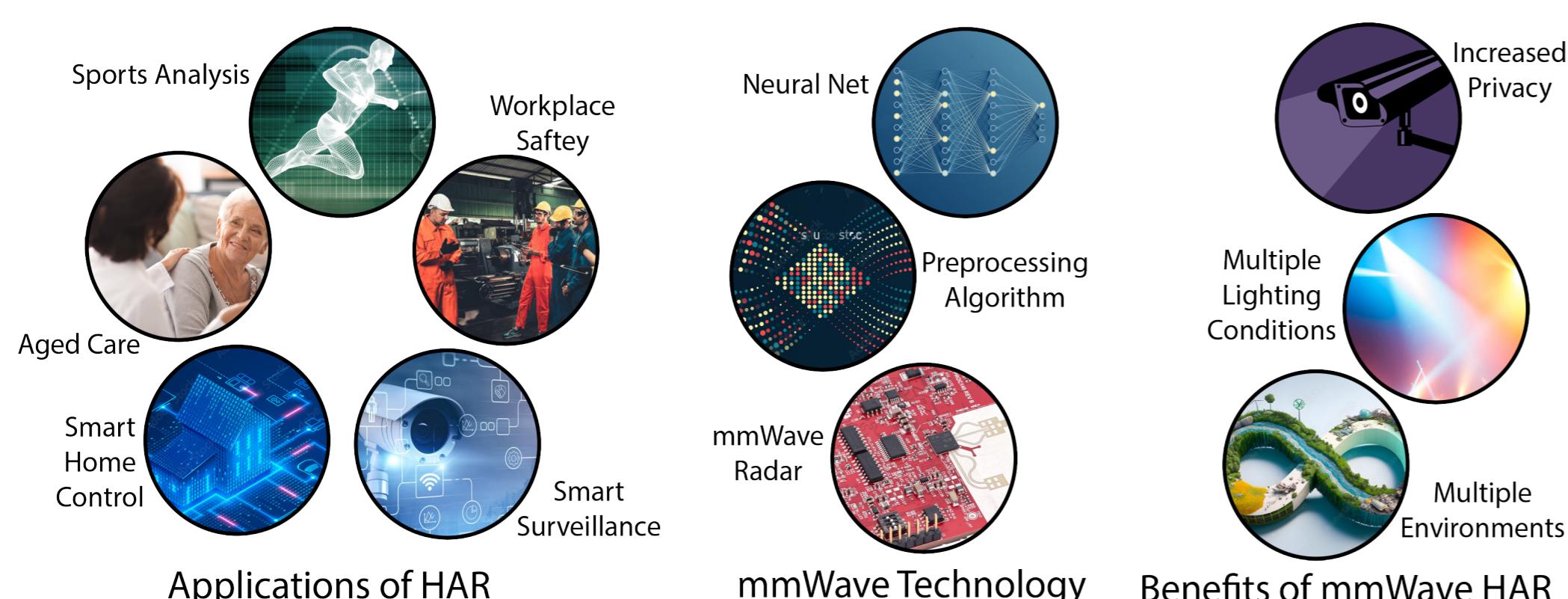


Background

Human activity recognition is an exciting area of development that allows systems to identify and respond to human actions and behaviour.

mmWave radar promises to improve this field with more robust and privacy-focused tech.

Our system takes raw data from the radar and passes it through a preprocessing algorithm before classifying the data using an innovative neural network approach.



Goals & Objectives

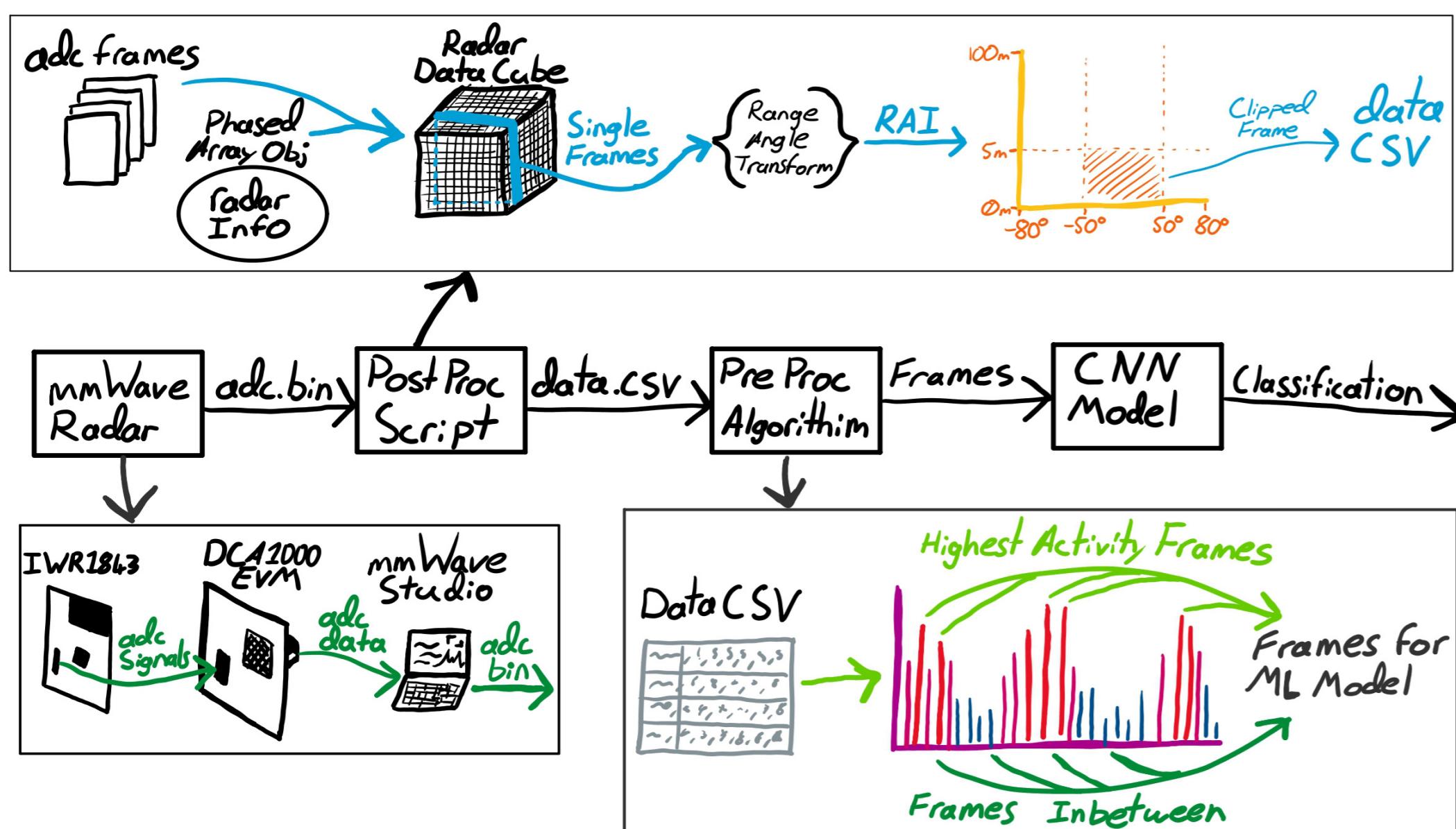
Our research focused on the detection and classification of multi-activity sequences. These are behaviours that represent their own unique action while being comprised of several individual actions.

- Actions are variable lengths of time
- Hard to identify action until the entire action is complete
- Examples include "Push-up Jump" Exercise

Methodology

The lifecycle of our project involved familiarising ourselves with the various new technologies related to the project and developing each stage of our pipeline.

1. We became comfortable with the physical radar and associated software
2. We applied for ethics approval, allowing us to record training data from a wide range of participants
3. We developed the Post-Processing script that parsed the radar data
4. We developed the Pre-Processing algorithm that selects frames for the Neural Net
5. We created the Neural Net model to classify the actions



Radar Setup

Our Radar Tech involves two different PCB Boards working alongside Computer Software.

- IWR1843BOOST - mmWave Radar Board takes ADC readings from radio antennas
- DCA1000EVM - High-Speed Data Transfer Board directly transmits raw ADC data
- mmWave Studio - Computer Software from Texas Instruments to control the radar

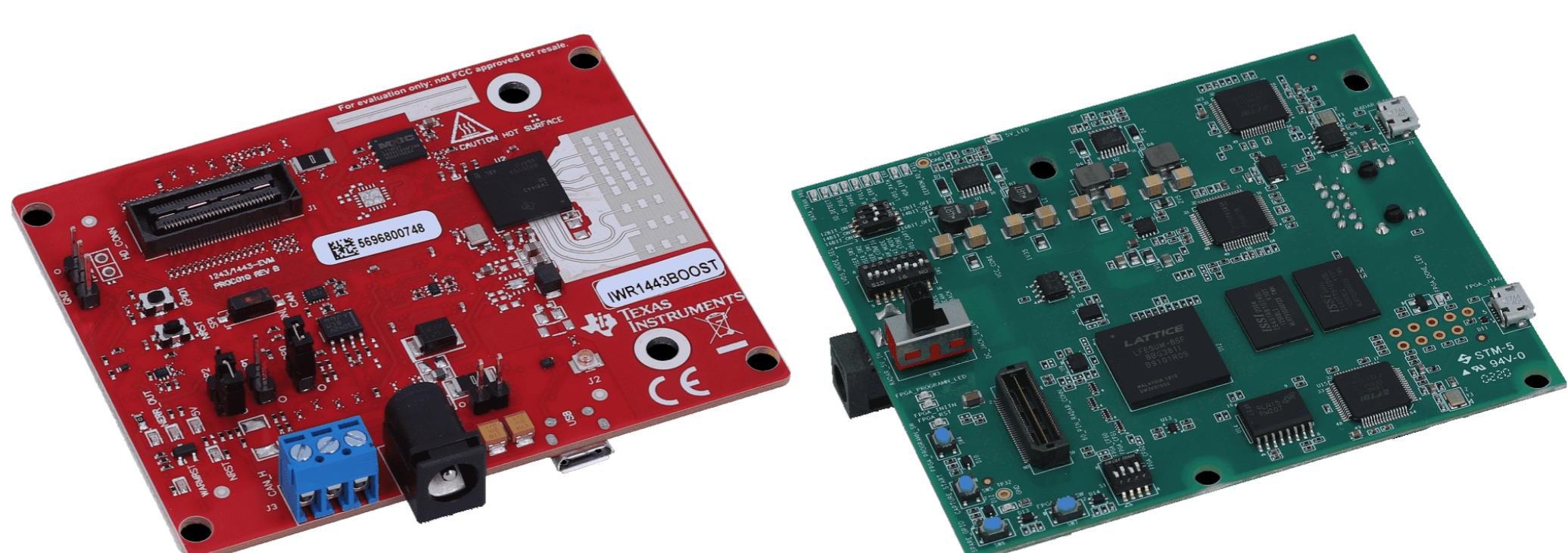
While the IWR1843 can transmit data, its transmission speeds are too slow to transmit the raw ADC data. The DCA1000 is essential to provide high-speed transmission of the raw ADC values via an Ethernet cable.

Project 77: Millimeter Wave Radar based Human Activity Recognition

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Data Processing

Sample Text



Model Development

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Results

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Future Works

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