Project 77: Milimeter Wave Radar based Human Activity Recognition

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ENGINEERING
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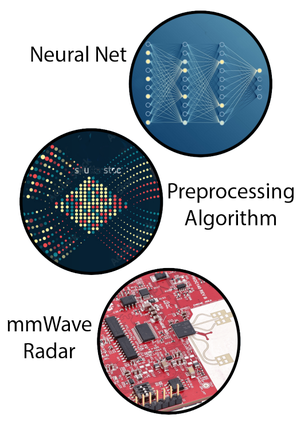
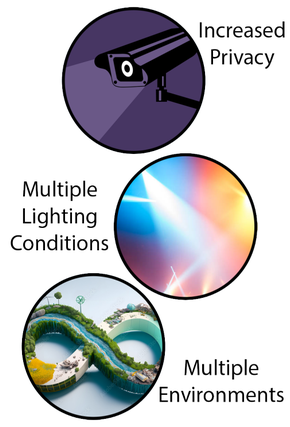
Background

- 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.
- The focus of our research is the classification of multi-activity sequences. These are behaviours that constitute a unique action while being comprised of several individual activities. Achieving sequence recognition would be a significant step forward for HAR, allowing for more complex and practical implementations.
- The most significant roadblocks to sequence recognition are accurately detecting when a sequence occurs, and dealing with unpredictable time frames.
- Our system utilises a frame selection algorithm to identify patterns in the data and remove the temporal component of classification.

Applications of HAR



mmWave Technology

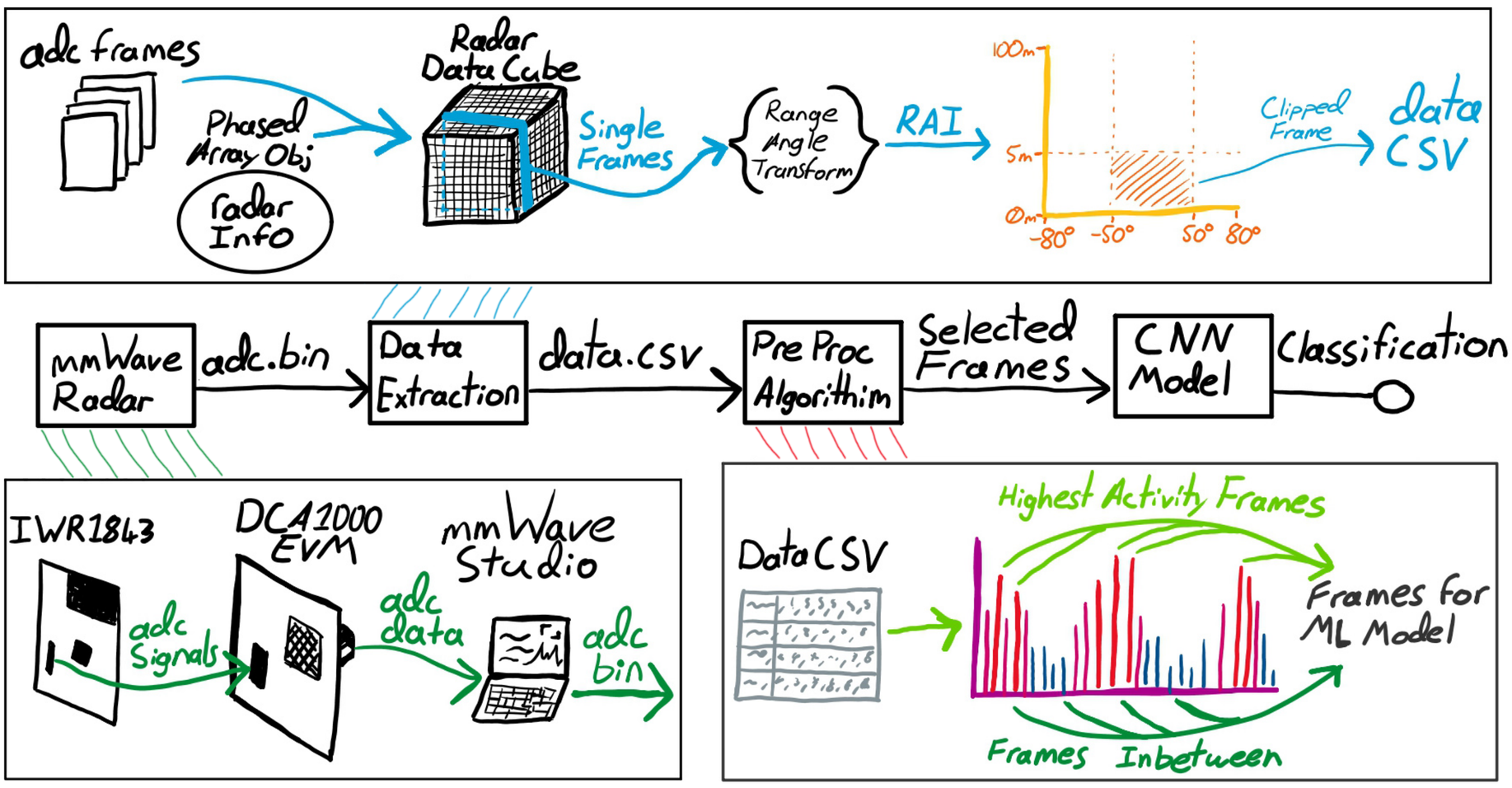


Benefits of mmWave HAR

Methodology

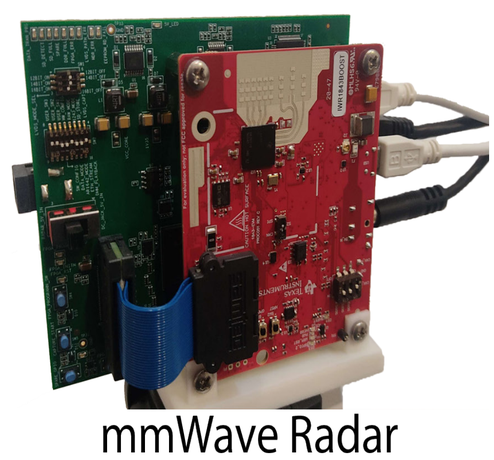
The lifecycle of our project involved familiarising ourselves with the various new technologies related to the project and developing each stage of our pipeline.

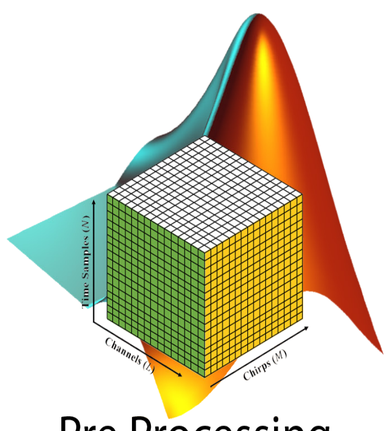
1. We developed the Data Extraction script that parsed the radar data
2. We developed the Pre-Processing algorithm that selects frames for the Neural Net
3. We created the Neural Net model to classify the actions



Frame Selection

Talk about the frame selection algorithim and the sliding window stuff


mmWave Radar



Pre Processing


Neural Network

Data Processing

Talk about how the radars work and how the post proc works

also start calling post proc data extranction

also the image above will be Range-Angle Image frames and maybe a picture of the physical radar