Oral Progress Report

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THE UNIVERSITY OF WESTERN AUSTRALIA

Structure for this report

Background

Problem Description

Planned method

Progress

Gravitational waves

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- Shown to exist in 1974 using a binary pair of neutron stars
- Detectors built throughout 2000s failed to reach the required sensitivity
- Increased sensitivity from rebuilds in the 2010s brought first direct detection
- New detectors still being brought online!
  - KAGRA
  - LIGO India

Pipelines

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- Summed Parallel Infinite Impulse Response (SPIIR) pipeline

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- Can be used to approximate the shapes of potential gravitational waves

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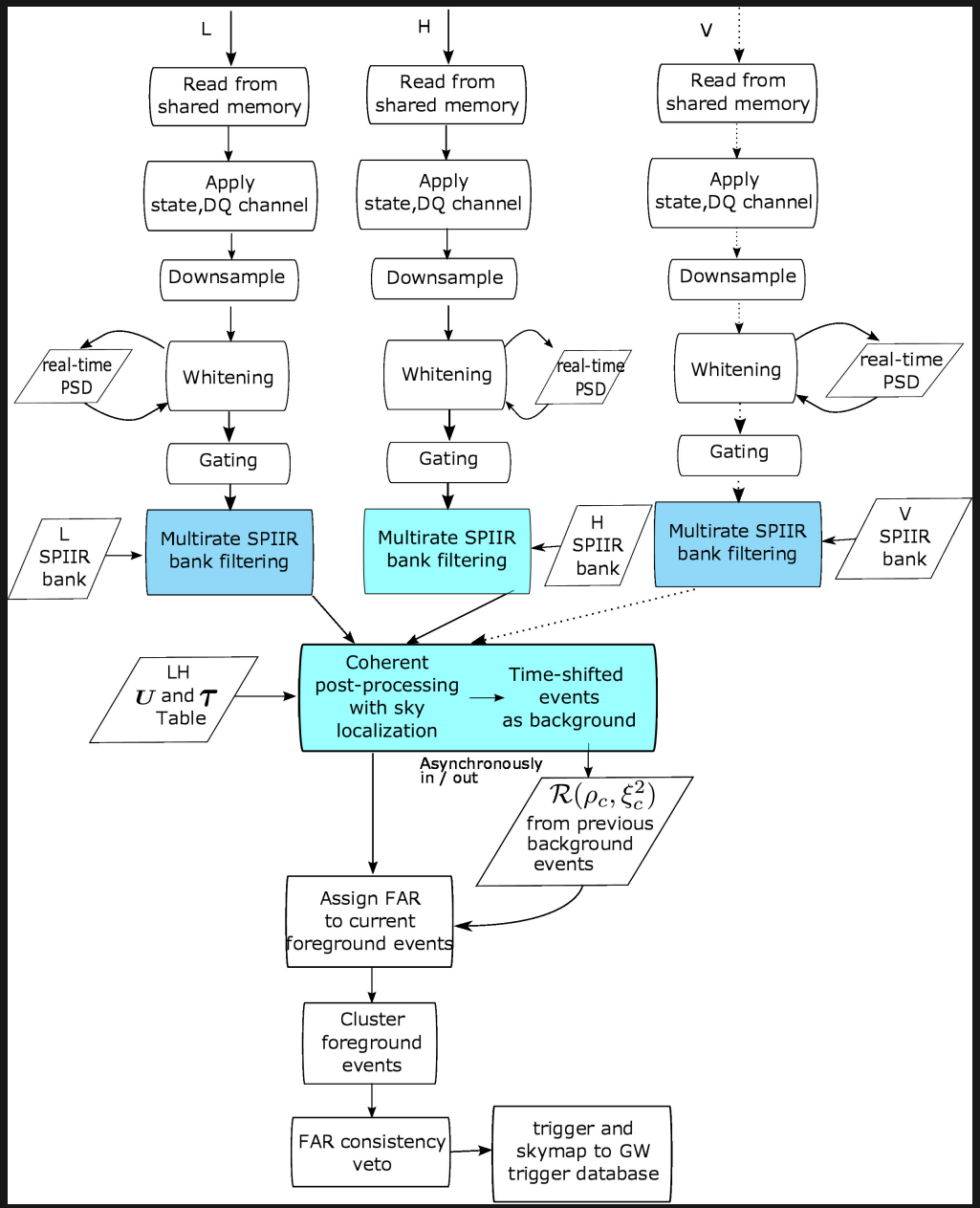
- Can be used to approximate the shapes of potential gravitational waves
- Later development introduced GPU acceleration
- Detection and localization using frequentist coherent search added as post-processing step

The SPIIR Pipeline



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- All detectors must be used for all parts of post-processing

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- Separation of detection and localization

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- Refactor the pipeline
- Measure performance differences

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- Developed tools to assist with analysis
- Can be useful for other people wishing to analyse similar codebases

Progress

```
tommoa:~/Documents/research# [master] python3 -m utils --help
usage: utils [-h] {combine,co,iir,dot,pipeline} ...

Utilities to help with Tom Almeida's GENG5551 research.

optional arguments:
  -h, --help            show this help message and exit

subcommands:
  {combine,co,iir,dot,pipeline}
                        subcommand help
tommoa:~/Documents/research# [master]
```

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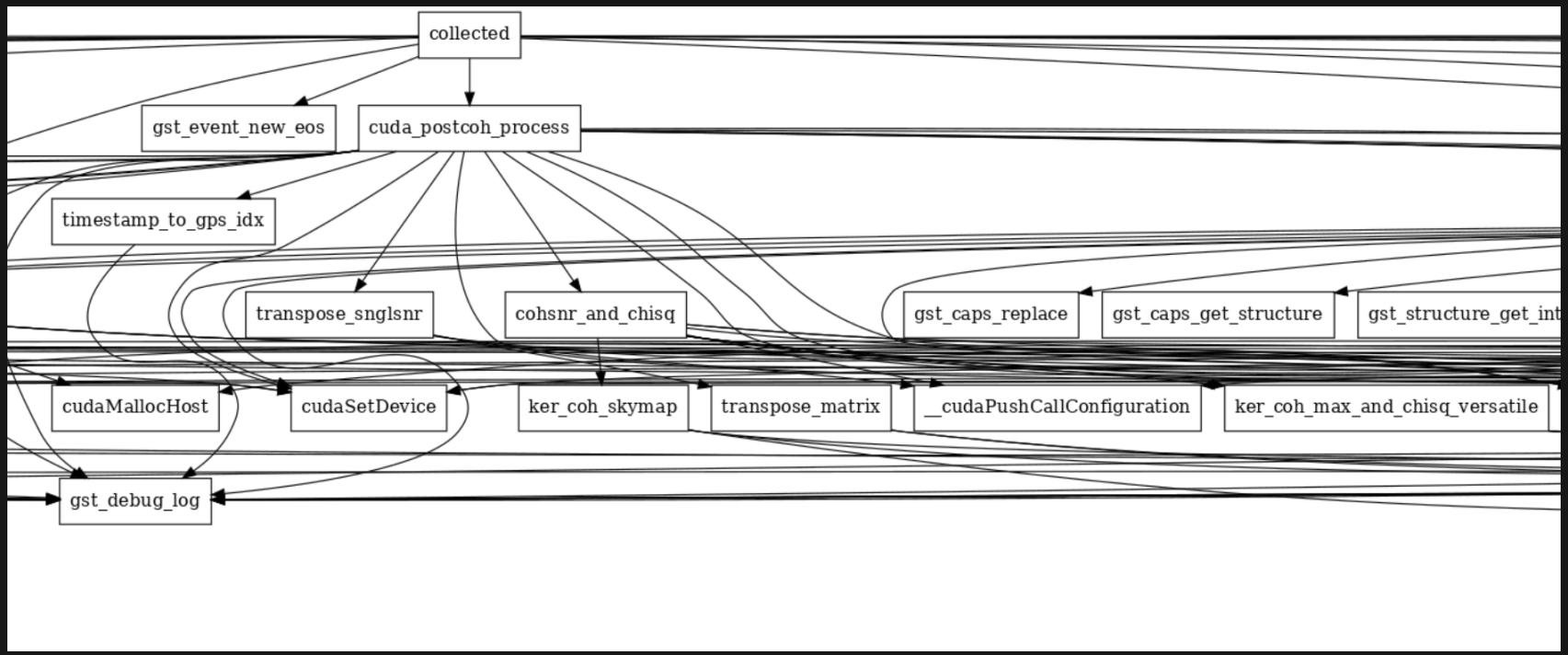
collected
gst_event_new_eos
cuda_postcoh_process
timestamp_to_gps_idx
transpose_snglsnr
cohsnr_and_chisq
gst_caps_replace
gst_caps_get_structure
gst_structure_get_int
cudaMallocHost
cudaSetDevice
ker_coh_skymap
transpose_matrix
__cudaPushCallConfiguration
ker_coh_max_and_chisq_versatile
gst_debug_log

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- There are some constant term optimizations to be made!

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- Start on refactoring mid-July

Thank you!

Questions?