Takeaways, Next Steps

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ADSA Initiatives Summary

- At the first ADSA workshop it was recommended to have Grand Challenges (GC); became initiatives
- First was the segmentation initiative
  - Five researchers were funded to adapt their segmentation algos to security like problems
- Next is a reconstruction initiative
- ALERT will be starting this effort in the next month
- We are working on the process forward
- We learned a lot at this workshop to help us going forward with the recon initiative
- The goal is to give the data to anyone even if they are not funded

Recon Comparison

- Started out with the question is iterative reconstruction ‘better’ than FBP as implemented today?
- What is implemented today mean?
  - FBP, as implemented is surrounded by pre and post processing and approximations to handle various issues
- There are pre and post processing and approximations in FBP that could be changed
- Take away the time constraint, FBP maybe ‘good enough’ compared to IR
- The comparison should be IR to analytic (it not just FBP) reconstructions

If you spend money on IR
you should also spend money on analytic techniques

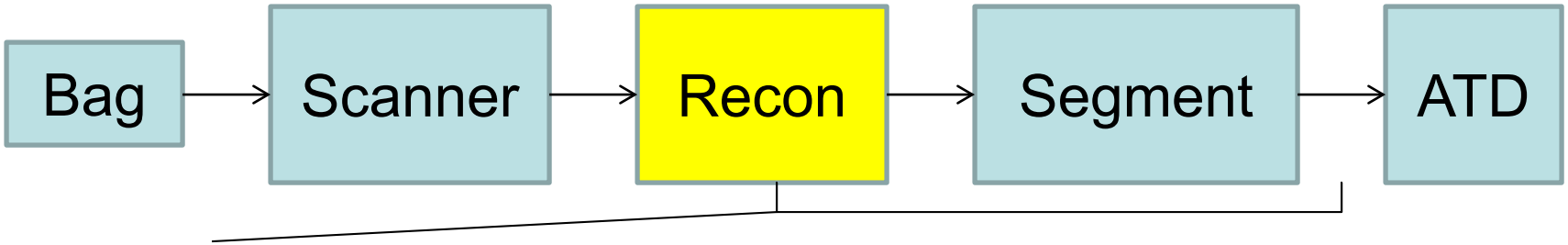
What we heard about metrics at this Workshop

- Metrics
  - Uniformity
  - Precision
  - Boundaries
  - Texture preservation
  - Segmentation and scoring

Recon Steps Forward

- Develop metrics
  - Features
  - Segmentability
- Develop specific cases
- Define scanner
- Simulations: Model scanner and objects
- Acquire scan data
- Generate ground truth
- Distribute simulation, scan and meta-data
- Researchers adapt recon to the data
- Apply metrics

The Recon Initiative



Sub-system Metrics (MTF, Reduced Cloud) vs. System Performance (>PD; <PFA)

Security like vs. Security scanner

Simulated vs. Experimental Data

2D vs. 3D

Few vs. many view scanners

Vendor vs. Researcher Segmentation

Iterative vs. Analytic Recon

Recommendations

- Recon (TBD) and Cloud metrics
- Security Like Scanner
- Simulated and Experimental Data
- Mainly 2D perhaps some 3D data
- Many views reduce to few view to test both
- Use researchers segmentation
- Apply and adapt IR and Analytic Recon algorithms
- Allow anyone to participate

Summary of ADSA07

- ATR
  - Need the whole process performance metric PD; PFA
    - Thin and uniform objects
  - Make it problem specific, e.g., artifacts MAR & appropriate metrics
- Segmentation
  - Independent of recon
  - Coupled with recon
- Low dose recon
  - Could be useful for limited and/or few view scanners
- Advances in dual- and multi-energy methods
  - Can this improve performance
- Posters
  - This was good to get to see our future work force and new ideas

Recommendations

- Come to the dark side: Get a secret clearance and learn about the real problem and get the real data

- BACKUP VGs

- Soup to nuts vs Break up into pieces
- Metrics
- Data
- Representative problems, target cases
- 2D vs 3D
- Metrics for recon using segmentation but not ATD
- Which segmentation code(s) should we use? Vendors, Researcher, Other?

Recon Steps Forward

- There are many ways to change the image. You have to assess this will result in better performance (>PD; <PFA)
- How do you determine when you change the image that it will increase performance?
- Do you need to go through the entire chain, segmentation to ATD?
  - If yes then the metrics are clear PD and PFA
  - However, can you create a data set that is not the real problem but representative of the real problem that PD and PFA are valid
- If no then what steps do you need and what are the metrics?
  - Segmentation only with what algorithm, what metrics?

How far can we go without access to the real problem and data?