GSAW Presentation

Using Big Data Analytical Techniques (to predict component failure)

March, 2017

Introduction

- COSMIAC proudly serves as a Tier-2 Research Center under the School of Engineering at the University of New Mexico
- COSMIAC's role is to promote aerospace innovation through the reliable and responsible use of configurable technology in military and defense systems
- We do 3D, VR/AR, ground stations, nanosatellite development and big data
- US with clearances
- Have begun to create an academic capability for big data analytics with a particular focus on spacecraft data analysis
- Over the past year, three organizations have contributed to the development of the Data Laboratory for Satellite Intelligence (DLSI) at COSMIAC

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Partners

- COSMIAC (Academia), SGT (Large Corporation), and AFRL (Government)

- COSMIAC at UNM
  – Mr. Nick Buonaiuto
  – Mr. Mark Louie
  – Dr. Jim Aarestad
  – Mr. Craig Kief
- Stinger Ghaffarian Technologies (SGT)
  – Mr. Rohit Mital
  – Mr. Dennis Mateik
- AFRL Space Vehicles Directorate
  – Mr. Robert Sivilli
  – Dr. Apoorva Bhopale

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Previous Activities

- Creating capability from nothing
- Hardware Installation – installed servers, hard drives, network connectivity, etc. – Capabilities provide opportunities
- EGS Testlab – COSMIAC has two ground stations operating 24 hours a day downloading mission critical data
    - MC3
    - Unified S-Band and 900MHz – No more amateur band
- Summer 2016 – Students funded – Work began
- AWS – Large initial utilization of AWS for image and data processing – Big Bang comes to NM
- ICESat – used for performing first analysis on failure identification

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Current Activities

- Web Scraping/Data Mining – scanning the Internet for satellite missions based on TLEs
- Satellite Integration Laboratory
- Intellectual Infrastructure
- Tweet
- Social Media
- Weighted sums from training data ported to TX1 for deep learning on a embedded platform

Current Activities

- Hardware – No small feat getting big data laboratory in a closet

- Intern Support – insatiable demand – all new solicitations

- DIGITS – Parsing thousands of images for specific items

- VPN access – How to support 20 outside users/students over the summer

- TX1 is so last year, headed for TX2

- How do you get your hands around TensorRT, DIGITS, Torch, NN, …..   Which by the way is constantly changing

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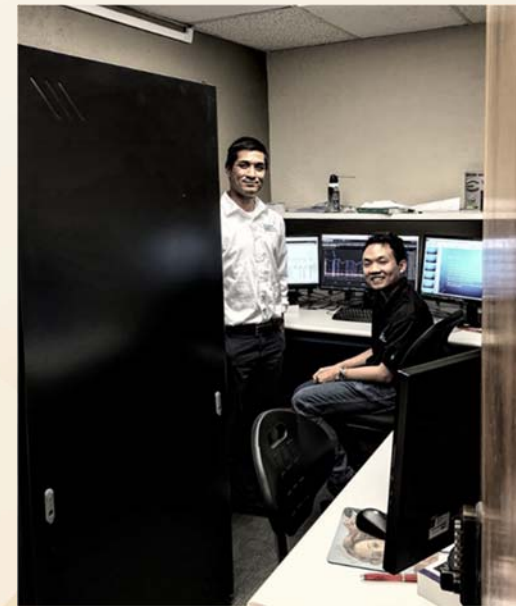
Future Work

- SIL – Is it possible to train future satellite designers to take advantage of big data capabilities during the satellite design phase. Have to change from the mind set of dealing with large data after launch.

- Apps – How to make inputs to big data systems satellite agnostic

- Our ground station -> Testing for EGS

- According to Nick: *Big Data is no big deal; it can happen without much more startup infrastructure than most people already have, and really should be happening as business-as-usual, not a special new thing.*

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Questions

Other than why did you call this a "Using Big Data Analytical Techniques to Predict Satellite Component Failure" presentation

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