# Viasat UIUX Project
## Alia Ahmed, Callum Gundlach, Joshua Kassman, Naomi Urnes

PURDUE UNIVERSITY

## PROJECT BACKGROUND

**Company Background**
- This project was done in partnership with Viasat, specifically their UIUX team.
- Viasat: a communications company based out of Southern California
- Specializes in high-speed satellite broadband services and secure networking systems

**Prior Project Work**
- Worked on by a few iterations of intern teams and the a corporate partnership team in the past year.
- Backend and anomaly detection models created, + initial front end components and UI.
- Final step was to create a user interface that follows company standards and branding guidelines.

**Anomaly Detection Background**
- To understand this project, a general knowledge of what anomaly detection is and why it is useful is required.
- An anomaly is defined as an abnormality appearing in a set of data.  As shown in Figure 1, an anomaly will normally appear as a dramatic spike or trough in otherwise visually normal data.
- Important to find and classify anomalies as they can represent real life events such as equipment failure, solar outage, or general degradation.
- The ability to accurately classify anomalies allows for Viasat to provide better and faster service to their customers.

**Project Goals**
- The overall goal of this UIUX design project is to create a front end user interface for a preexisting tool designed to detect anomalies from time series data that does not currently have a fully functional user interface.
- This to be done by following an industry standard design process including UX research consisting of stakeholder interviews, user expectation interviews, prototype design and usability testing.
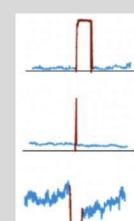
Figure 1: Anomaly peak/trough

## PROTOTYPE DESIGN

- Started with lofi wireframes drawn on a whiteboard
- Created Initial flow diagram shown in Figure 5
  - Detail how users will move between and interact with pages
- Created initial digital mockup using Sketch with Viasat assets
  - Create reusable branded components
  - Create pages using branded components
  - Follow flow diagram while designing pages and interactions
- Uploaded Sketch designs into InVision to create prototype flows
  - Create clickable regions to move between pages
- Updated prototype and flow diagram as feedback was received each review
- Prototype pages are shown in Figure 4 and Figure 6 below.

Figure 5: Initial flow diagram

Figure 4: Jobs Table in Prototype

Figure 6: Job Creation Process in Prototype
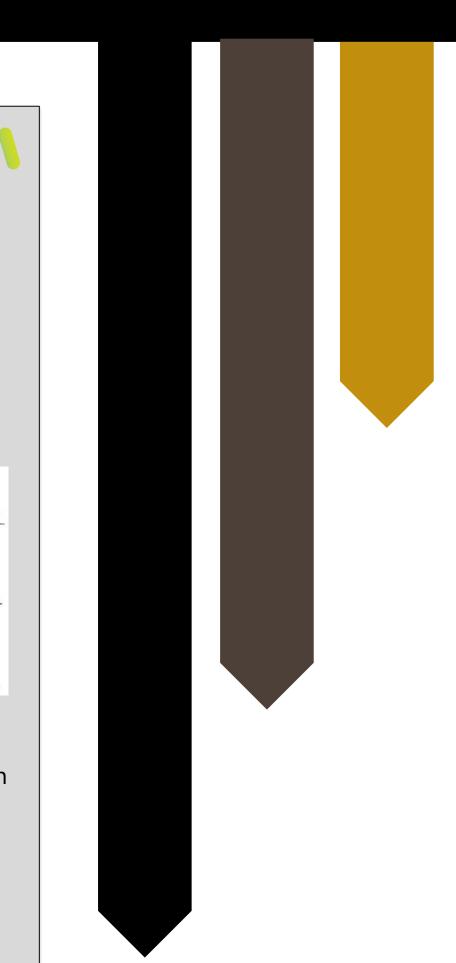
## UX RESEARCH

- After determining the general task for the project UX Research was conducted
- **Heuristic Evaluation**
  - Definition: a method for finding the issues with a user interface design in order to improve upon them in the next iteration of the design
  - Based on 10 Nielsen's Heuristics For Usability shown to the right in Figure 2
  - Results:
    - Potential difficulty navigating the current FADER tool for an inexperienced user
    - Error handling/help and documentation found to be lacking
    - Complex user flows that require prior understanding of the tool
- **Stakeholder Interviews**
  - Stakeholder Definition: Key individuals with vested interest in a project's outcome
  - Purpose: Understand the end goal for the FADER tool and what the front end should support
    - Results:
      - Wanted ability to detect anomalies in real time for data scientists to research and refine algorithms
      - Target audience conflict: Between network analysts who could use anomalies to troubleshoot the network or for data scientists to use for testing
        - Decided to focus on data scientists in the immediate future
      - Graphical representation of the anomaly in time series data was a positive part of past prototypes and should be retained with other improvements
- **Key UX Research Takeaways**
  - While there are lofty end goals for the FADER fool, the main job was to refine the user interface for the immediate use case of data scientists refining and testing algorithms and detecting prior anomalies
  - The ability to mark and track anomalies would be the end goal from there
- **Conclusion**
  - The UX research process allowed for the team to have a better understanding of the project scope and goals, as well as the type of user that was being designed for and proceed in the general design process shown in Figure 3.

### NIELSEN'S HEURISTICS FOR USABILITY

1. Visibility of system status
2. Match between system and the real world
3. User control and freedom
4. Consistency and standards
5. Error prevention
6. Recognition rather than recall
7. Flexibility and efficiency of use
8. Aesthetic and minimalist design
9. Help users recognize, diagnose and recover from errors
10. Help and documentation

Figure 2: Heuristic Evaluation Criteria

Evaluate Current Iteration of Prototype
Interview Users About New Prototype
Interview Project Stakeholders
Design/ Develop New Prototype
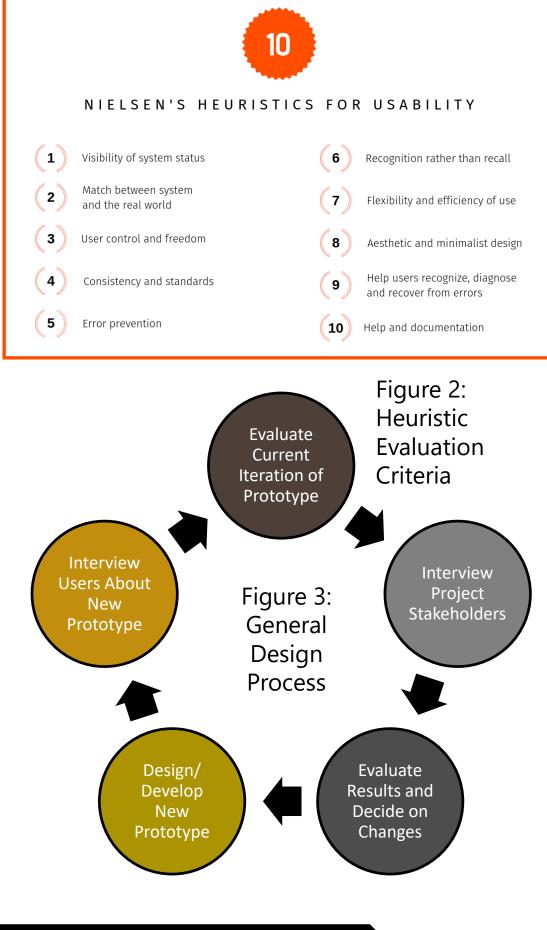Evaluate Results and Decide on Changes

Figure 3: General Design Process

2. Create a cron job
(Steps: From the New Job page, click Cron Job and click Next. Click on the date selector, click Next. Select data set (not functional), click Next. Select detector, click Next. Click through Tune Detector Parameters. Click SUBMIT.)
(Success criteria: Having clicked SUBMIT, the user sees aware and satisfied that they have launched the cron job.)
(Completion: )
(Efficiency: )
(Understandability: )

3. View the details of a job with the name HTM Test
(Steps: From the Jobs overview, filter by name, click on the link of the returned job)
  o  Label the anomaly 124 associated with that job
    (Steps: From the job details page, expand the Anomalies box. Click on anomaly 124. Click Label Anomaly, click on the time series plot, click SAVE CHANGES)
    (Success criteria: User labels anomaly and saves changes)
    (Completion: )
    (Efficiency: )
    (Understandability: )
  o  Mark the anomaly non-anomalous
    (Steps: Repeat above steps if they happen to navigate away, click Label, click LABEL NONANOMALOUS)
    (Success criteria: Having clicked LABEL NONANOMALOUS, the user understands that they have completed the task)
    (Completion: )
    (Efficiency: )
    (Understandability: )

4. View the details of a job that was completed on this date: 20 December 2019
(Steps: From the Jobs overview, filter by date, click on the link to job 124)
(Success criteria: User confirms that they are seeing the desired information)
(Completion: )
(Efficiency: )
(Understandability: )

5. [Task to navigate directly to a certain anomaly and label it; the flow for this is not currently functional]

Figure 7: Usability Testing Script

## USABILITY TESTS

- Outlined goals for testing (main features such as navigation)
- Devised scenarios users would likely encounter: create a job, label an anomaly shown in Figure 7
- Series of sessions with potential users (Viasat data scientists)
- One person moderated while others took notes
- Guided each participant through the scenarios – noted their reactions without biasing them
- Answering questions in a way that would bias the user in any way was to be avoided
- Gave prompt, then continued to ask for the user's thoughts and feedback as they proceeded
- Later, team went through notes from all sessions to select issues the users had discovered
- Used virtual sticky note board to categorize and prioritize issues shown in Figure 8
- Presented findings along with suggested revisions
- Revised prototype
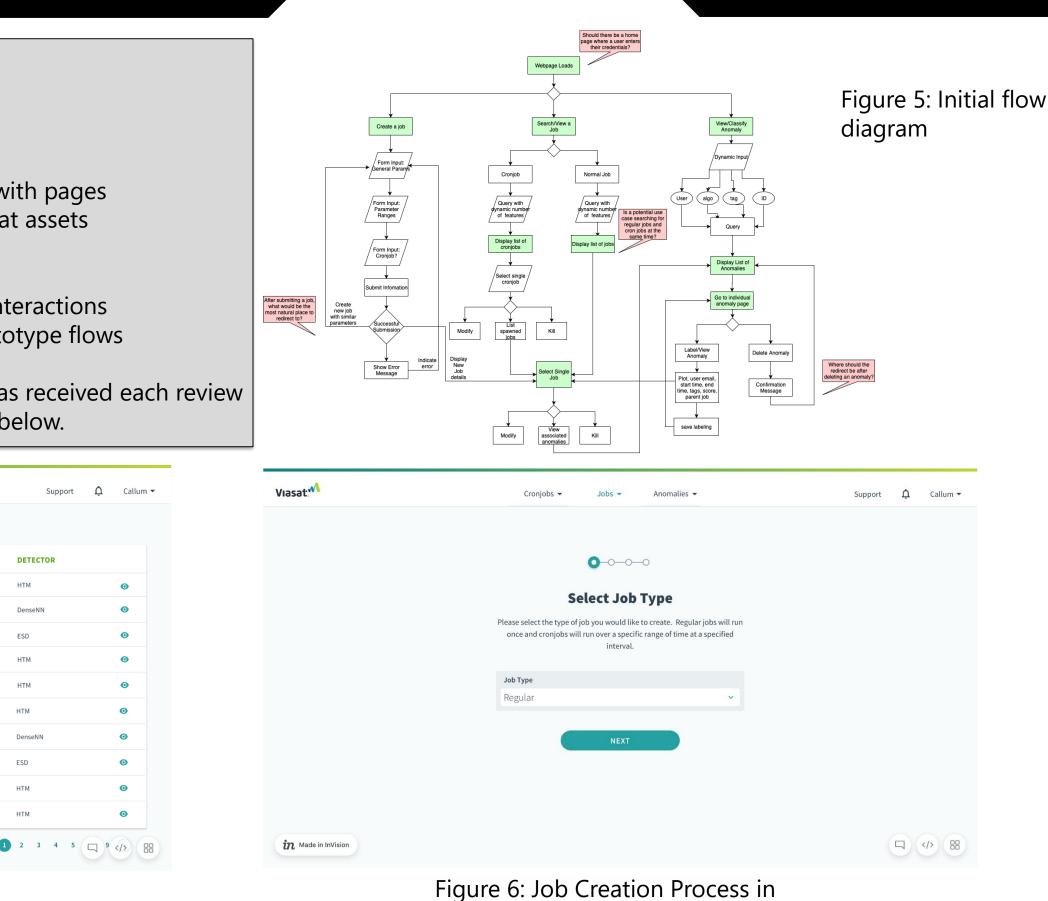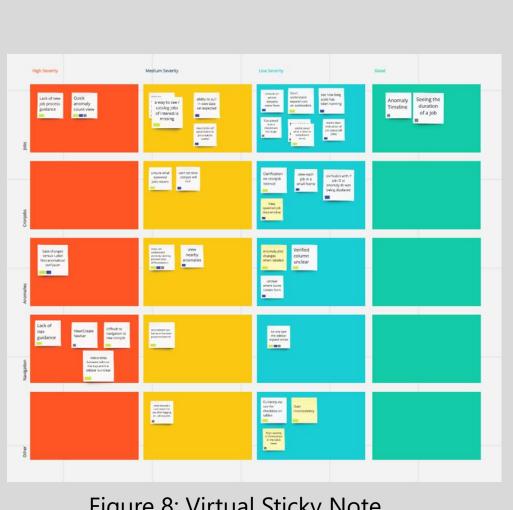
Figure 8: Virtual Sticky Note Board

## CONCLUSIONS AND FUTURE GOALS
- Gained knowledge  and experience in participating in the UIUX design process
- Valuable experience interviewing and designing
- Currently working on React implementation; until the end of the semester
  - Goal to launch application and contribute to Viasat data science efforts

## REFERENCES AND ACKNOWLEDGEMENTS

# Data Mine Corporate Partners Symposium 2020