MICHIGAN STATE UNIVERSITY

Project Plan Presentation
Modernizing Robotic-Surgery Education

The Capstone Experience

Team Henry Ford Innovations RSE

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From Students…
…to Professionals

Project Sponsor Overview

HENRY FORD HEALTH
Innovations

- Henry Ford Health is one of the nation's largest and most respected healthcare providers located in Detroit, MI.
- With a focus on research, medical professionals and expert researchers work together to develop and adopt new healthcare technologies.
- We'll be working with Dr. Nalamati who is the director of the residency training program for robotic surgery and his team.

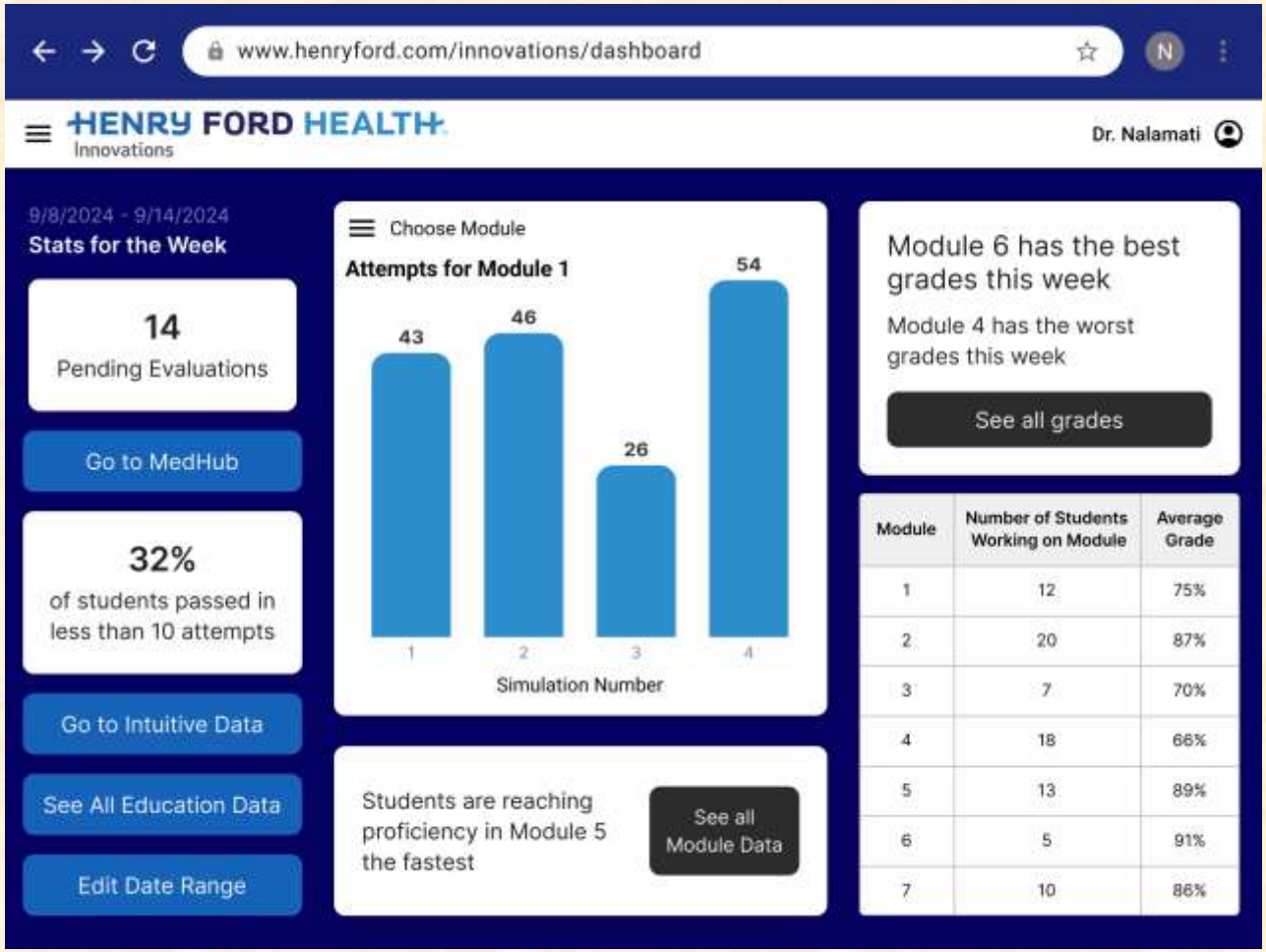
Project Functional Specifications

- Provide statistics and suggestions to aid medical educators to make data-driven decisions.
- Reduce training time for surgeons using robotic surgery training data automatically.
- Create a dashboard that analyzes training module data from MedHub and simulation and medical tool data from Intuitive to find the most important/effective modules to be used for training.

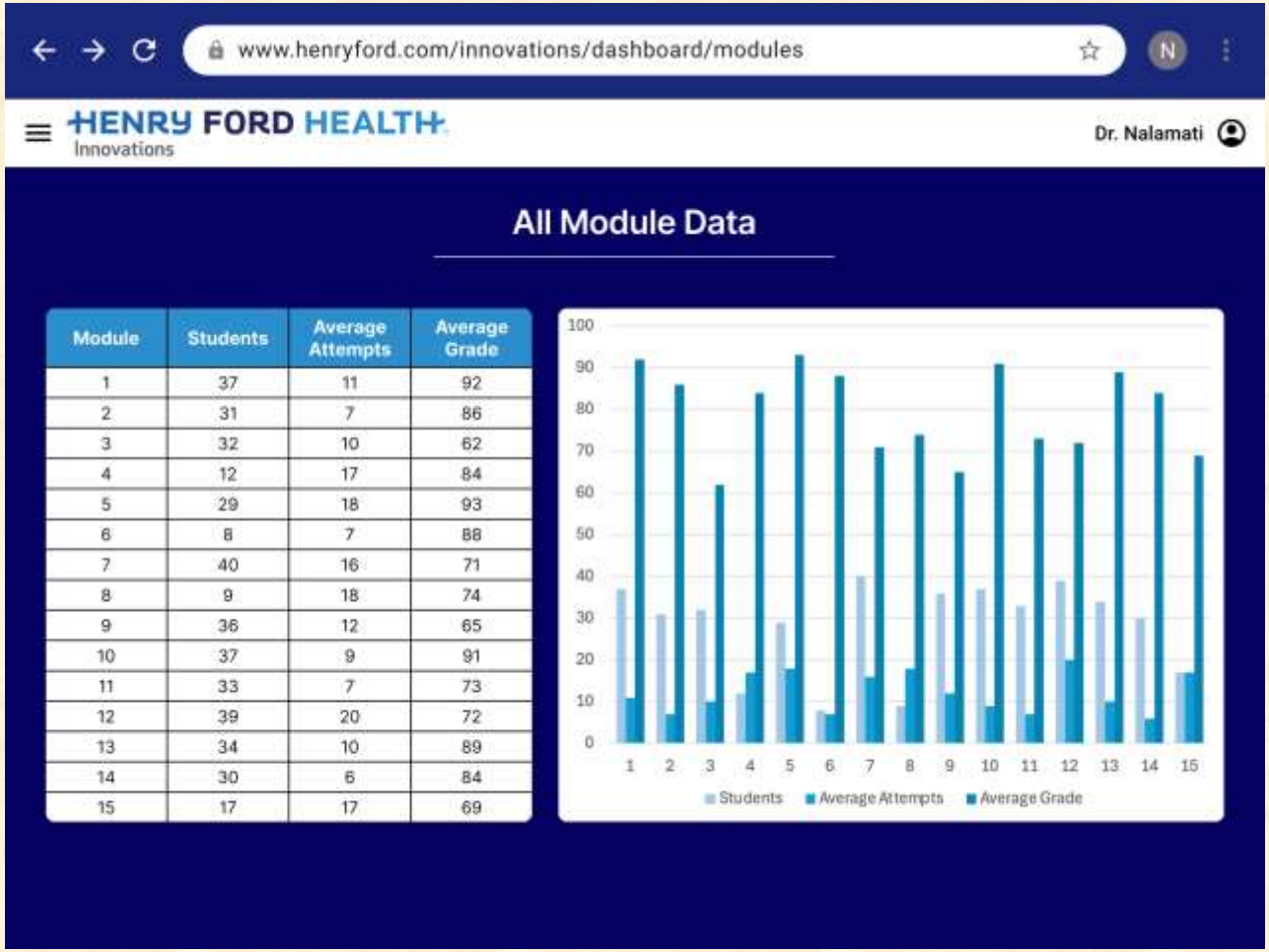
Project Design Specifications

- Use machine learning for statistical analysis of data.
- Use visual tools to visualize data from MedHub and Intuitive.
- Create dashboard that serves as an optimization tool for surgical education, improving both training efficiency and proficiency attainment.
- Connect data by finding a relationship to create an outcome display for our clients to make decisions.

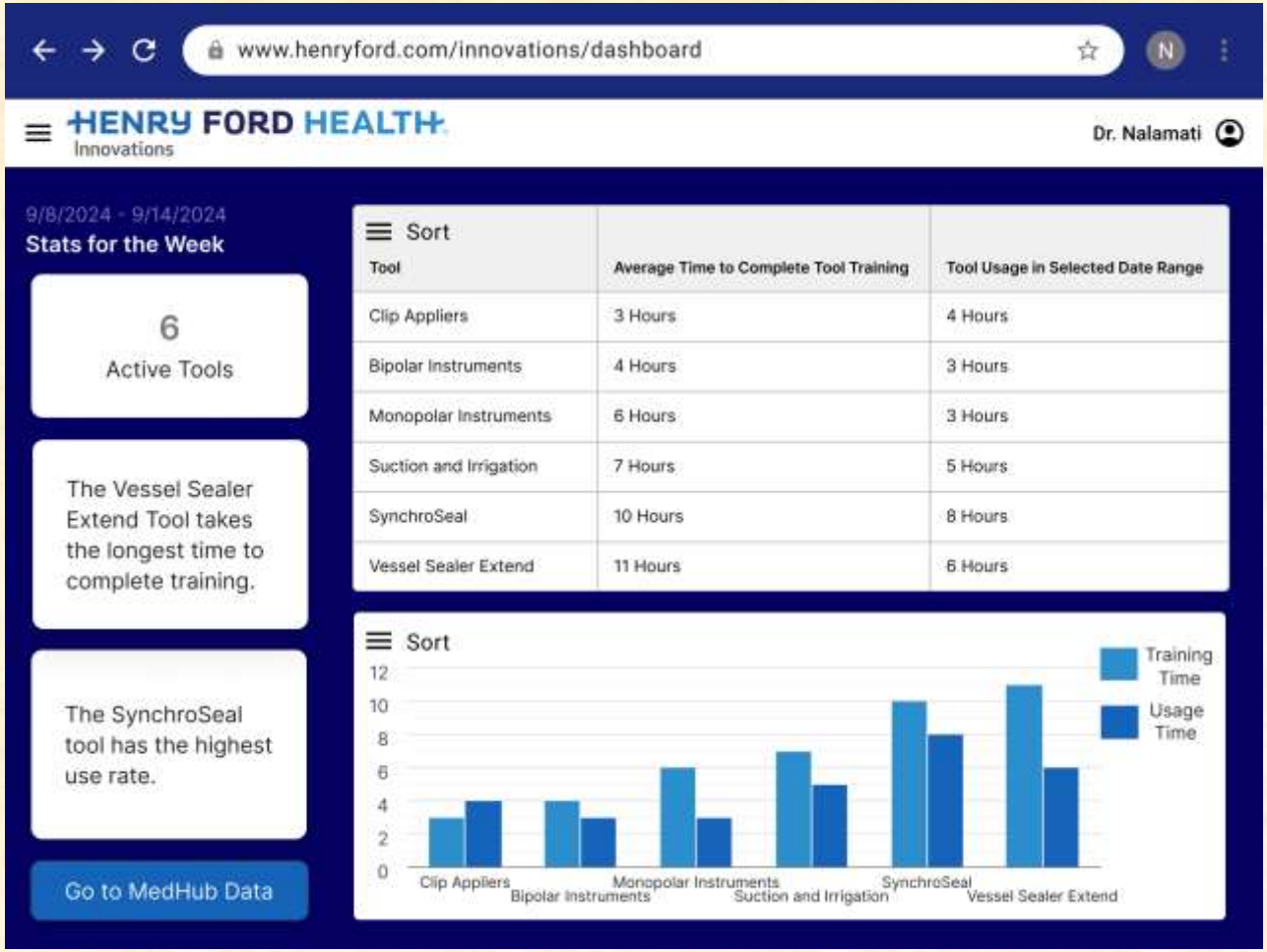
Screen Mockup: MedHub Dashboard



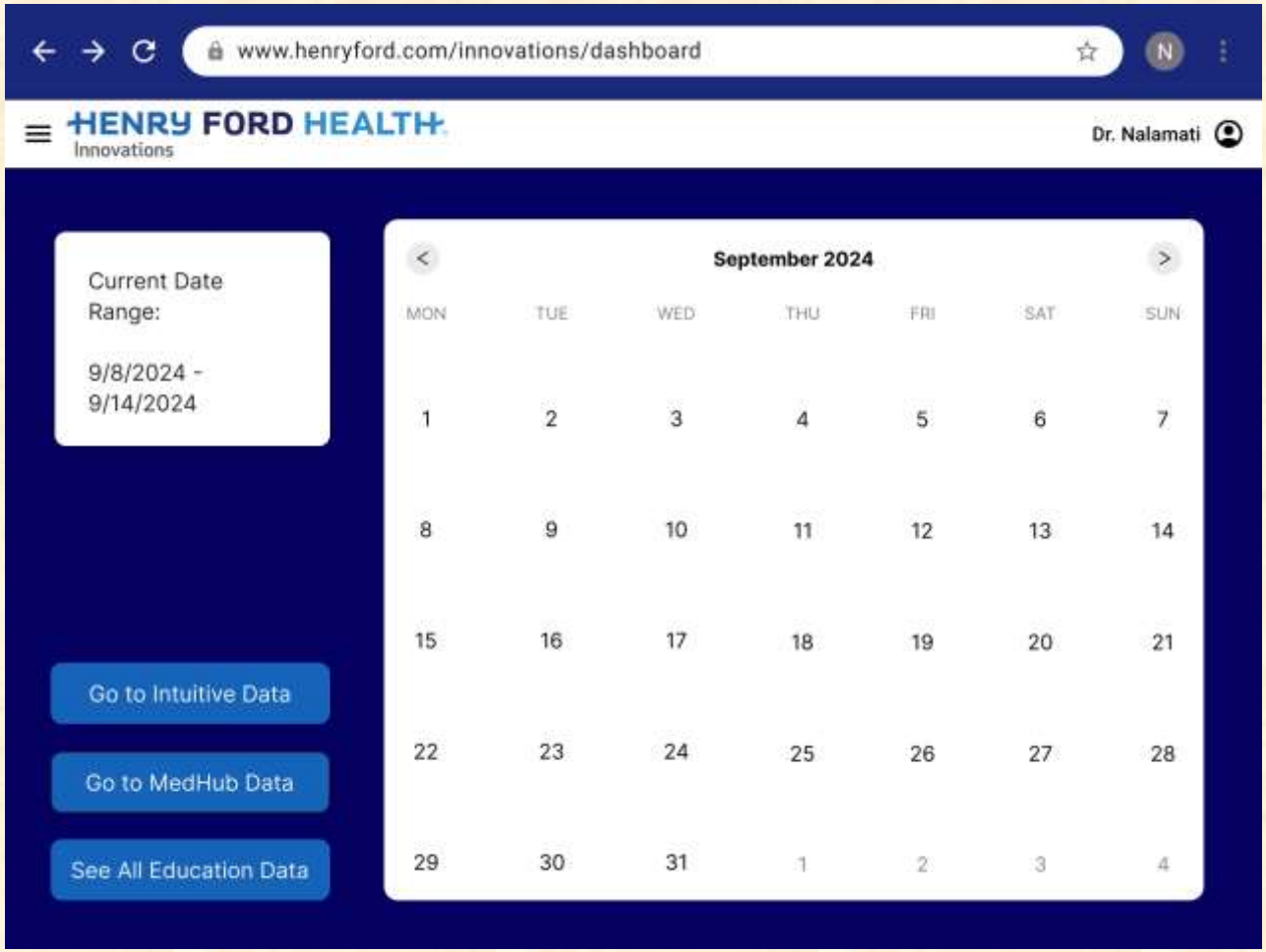
Screen Mockup: Module Data Page



Screen Mockup: Intuitive Dashboard



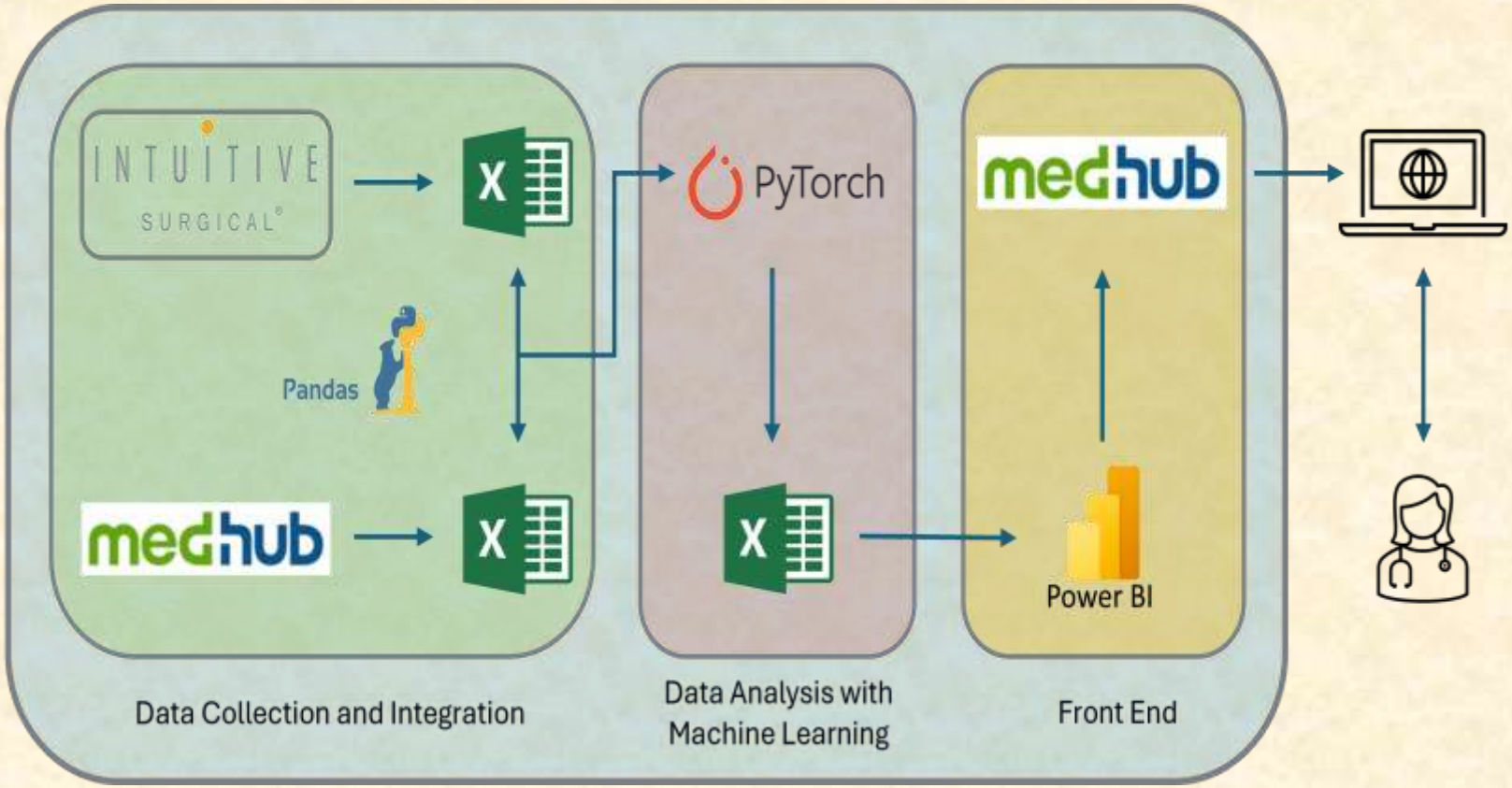
Screen Mockup: Select Date Range Page



Project Technical Specifications

- Data comes in from the surgery tools into Intuitive.
- Training data is stored in MedHub.
- Use Python Pandas to combine the data into Excel.
- Use machine learning to analyze the data with PyTorch.
- Import that data to PowerBI to create the dashboard.

Project System Architecture



Project System Components

- Hardware Platforms
  - Robotic surgical tools from Intuitive.
- Software Platforms / Technologies
  - Microsoft PowerBI - Will create interactive dashboard.
  - Microsoft Excel - Where all the data is held and imported into the dashboard.
  - PyTorch (Machine Learning) - Used for statistical analysis.
  - Intuitive - Holds the simulation and surgical tool data.
  - MedHub - Holds all the training module data.
    - API - Data to be imported directly into PowerBI.

Project Risks

- **Connecting MedHub and Intuitive Data**
  - Description: Unknown if there are connecting variables within the data sets we receive.
  - Mitigation: Using machine learning to find relationship between variables within the data sources to connect them.
- **Identifying Relevant Features**
  - Description: We do not have background knowledge of the medical field or robotic surgery to make recommendations.
  - Mitigation: Working with the clients to identify what modules/features are essential to be included on the dashboard.
- **Managing the Amount of Data for PowerBI to Handle**
  - Description: Too much data being fed into PowerBI to handle. Will result in slow responses and results.
  - Mitigation: Restructure parts of data into smaller groups that would make them feed into PowerBI faster.
- **Changing Data Structure Connected to PowerBI**
  - Description: Changing structure of data sources while data is connected to PowerBI.
  - Mitigation: Test with smaller amount of data to see how PowerBI responds to the changes.

Questions?