MICHIGAN STATE
UNIVERSITY

Project Plan Presentation
Surgical Needle Tracking

The Capstone Experience

Team Stryker IST

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From Students…
…to Professionals

Project Sponsor Overview

- Founded in 1941 and headquartered in Portage, Michigan.
- Global leader in medical technologies, offering innovative products and services used in operating rooms around the world
- Mission: Together with our customers, we are driven to make healthcare better.

stryker®

- MEDICAL AND SURGICAL EQUIPMENT
- ORTHOPAEDICS
- NEUROTECHNOLOGY
- SERVICE
- CARE SETTINGS
- TRAINING AND EDUCATION

Project Functional Specifications

- Surgeons utilize many instruments throughout a procedure including needles which are accidentally being left inside patients

- Creating SurgiCount Gen 3

- Includes a needle detection, tracking, and documentation solution that should prevent lost needles and streamline procedures

- Medical professionals can utilize this software through the accessibility of an iOS application
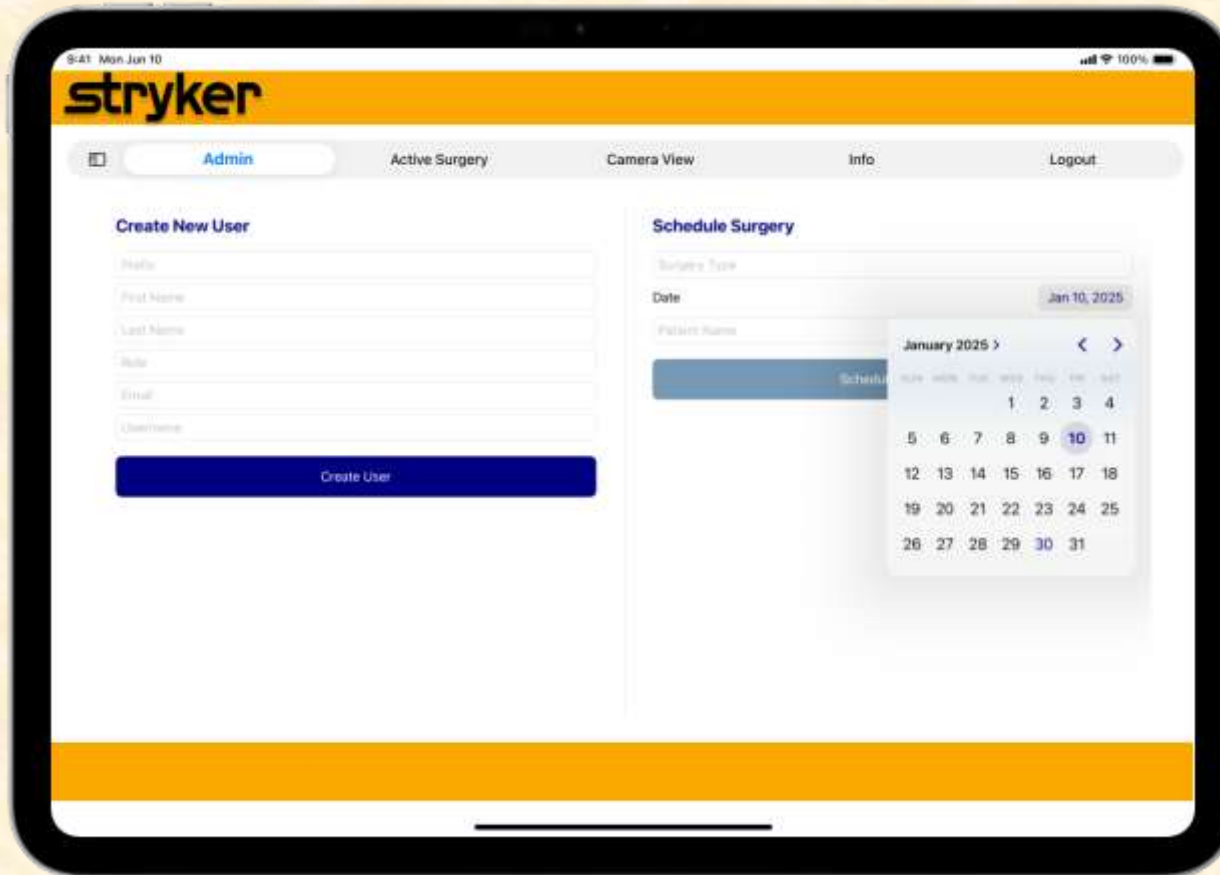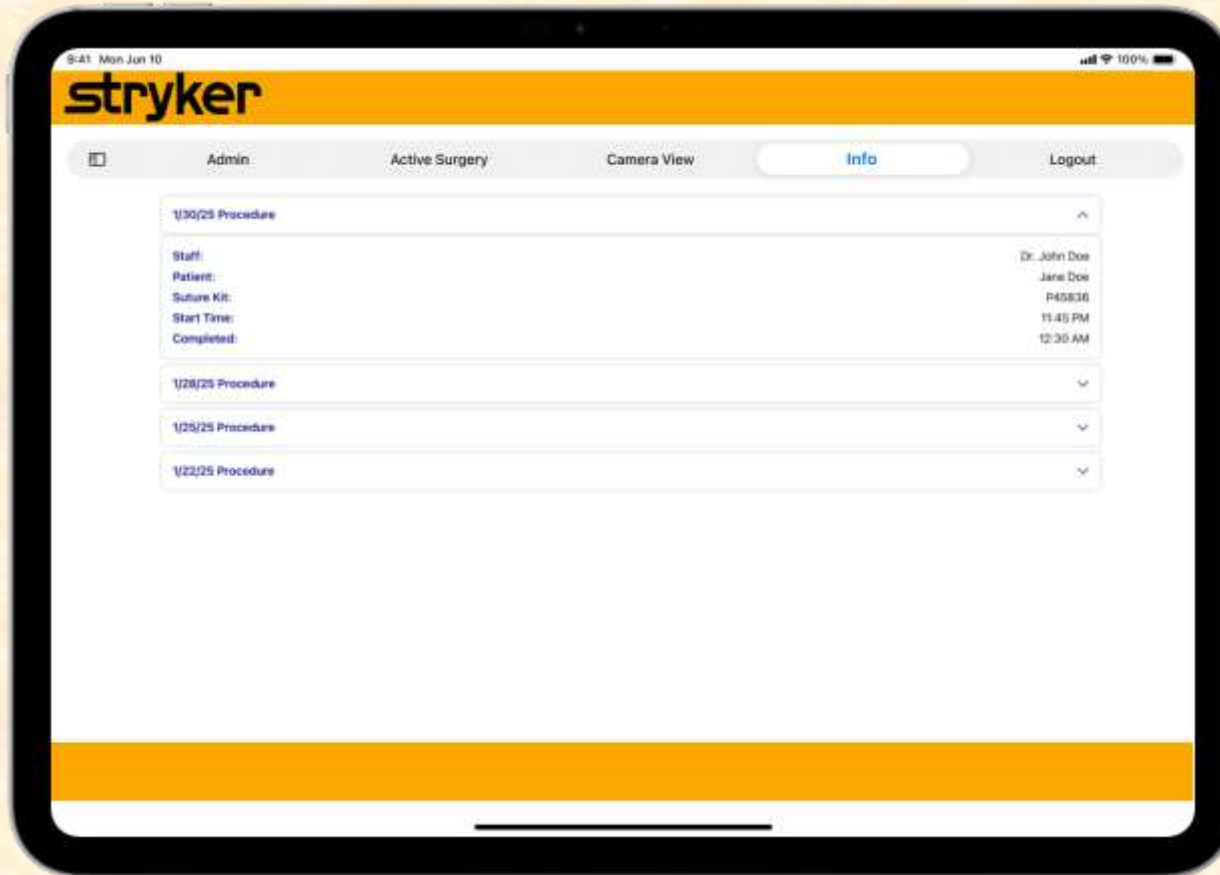
Project Design Specifications

- Admin – Document procedures, staff, and instruments used
- Active Surgery – Customizable camera view that employs needle detection during a procedure
- Notifications – Warnings that prevent needles left behind
- Info – View previous procedures patient, instruments used, time used

Screen Mockup: Admin

Screen Mockup: Info

Screen Mockup: Active Surgery
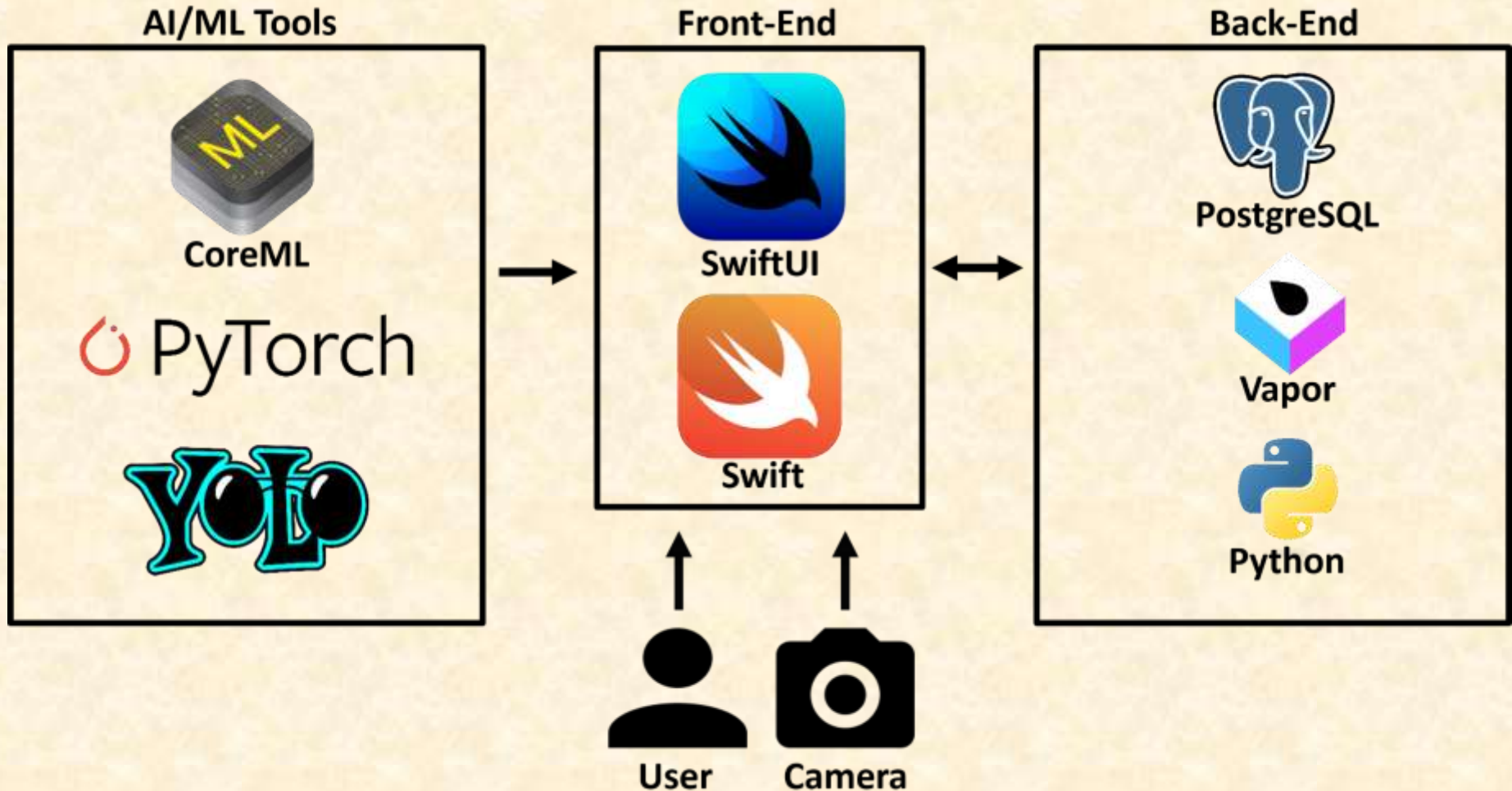
Screen Mockup: Notifications

Project Technical Specifications

- The iOS Mobile Application (User Interface & Data Display)

- The Machine Learning API (Real-Time Object Detection & Tracking)

- The Cloud Backend (Data Storage & Processing)

Project System Architecture

Project System Components

- Hardware Platforms
  - iPad
  - Camera
- Software Platforms / Technologies
  - Swift and SwiftUI
  - CoreML, PyTorch, and Yolo
  - PostgreSQL, Vapor, and Python

Project Risks

- Risk 1
  - Lack of training data
  - Work with clients to develop our own training data
- Risk 2
  - Lack of mobile app development experience
  - Online resources and practice
- Risk 3
  - Connecting camera with iOS app and YOLO
  - Trial and error testing with physical devices
- Risk 4
  - Interference in the operating room
  - Experimenting with camera positioning, lighting, and types

Questions?