

MICHIGAN STATE

UNIVERSITY

Project Plan Presentation

Adaptive Assessment Generator for Tech-Ops
Training

The Capstone Experience

Team United Airlines Training

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*From Students...
...to Professionals*

Project Sponsor Overview

- Major American Airline, ranked one of the best airlines in the world
- Headquartered in Willis Tower, Chicago with 8 main hubs across the US
- Founding member of the Star Alliance: one of the worlds largest airline alliances
- Fleet size consists of 841 aircrafts with another 544 in production or ordered



Project Functional Specifications

- Problem:
 - Manual creation of questions from aircraft training manuals
- Solution:
 - Web application to provide assessments and training content
 - Multi-layer account system
 - AI generated questions
- Utility:
 - Reduce time, money, and human resources spent
 - Enhance student experience and comprehension

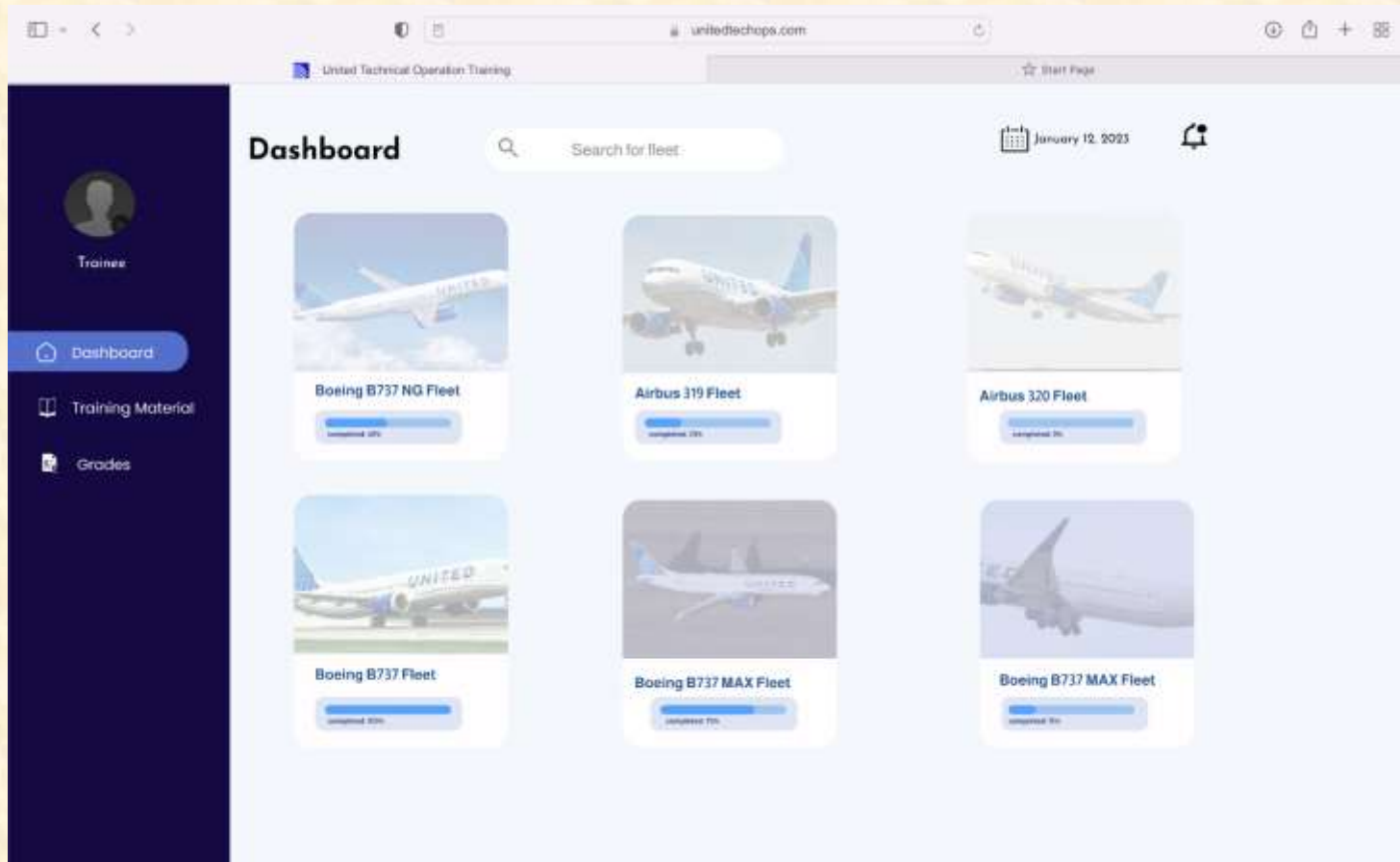


Project Design Specifications

- Has separate viewpoints for a trainee and an instructor
- Trainees can look through training materials and take assessments
- Instructor can add assessments and questions
- Instructor can manually input questions and generate questions using Machine Learning



Screen Mockup: Trainee Dashboard



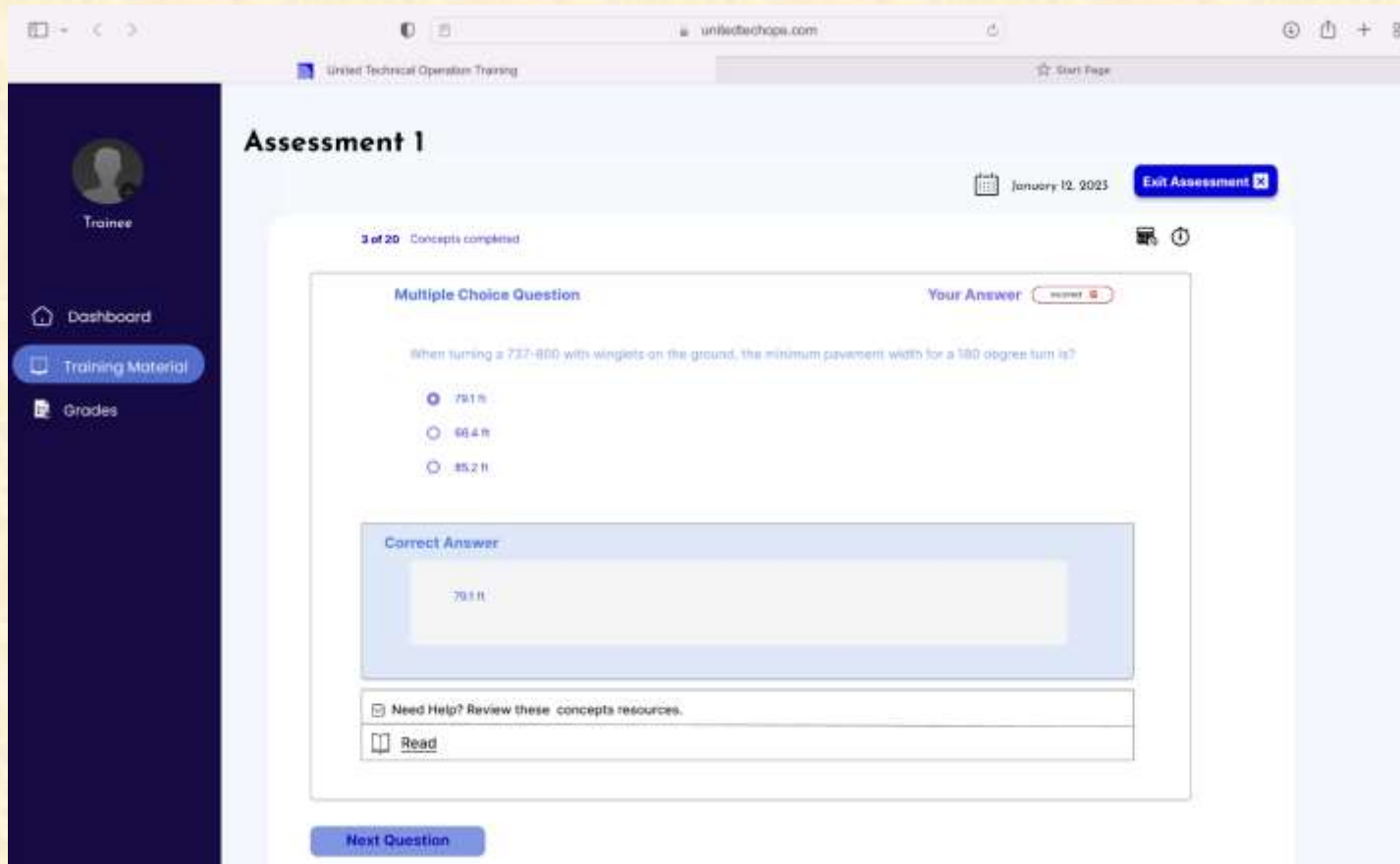
Screen Mockup: Trainee Assessments

The screenshot displays a web application interface for trainee assessments. The interface is viewed through a browser window with the URL `unitedtechops.com`. The page title is "United Technical Operation Training" and the current page is "Start Page". The main content area is titled "Airbus 320 Fleet" and features a search bar and a calendar icon showing "January 21, 2023".

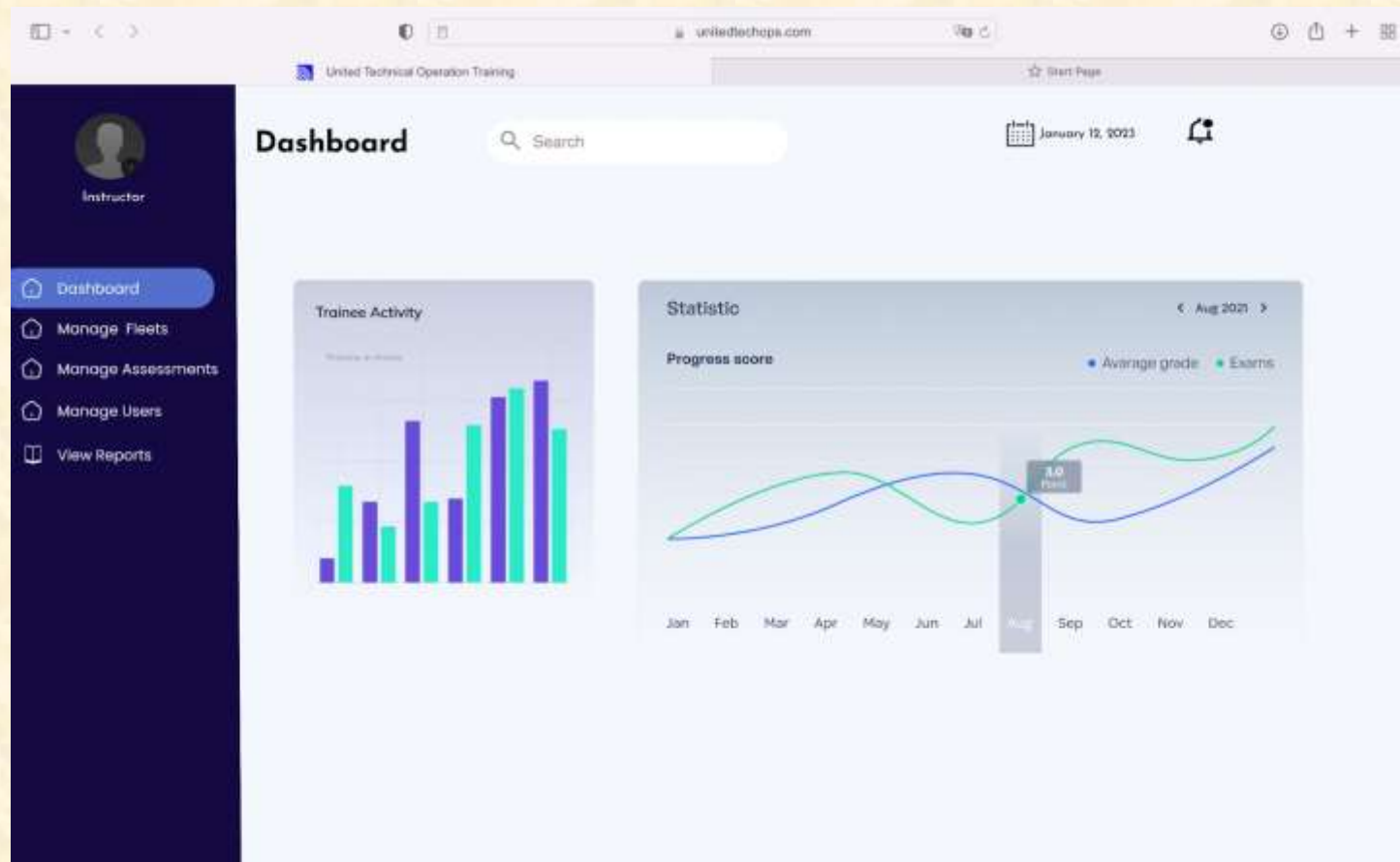
The main content area displays a table of assessments. The table has the following columns: Assessment, Topic, Date Created, Content, and Take Quiz. The table contains six rows of data:

Assessment	Topic	Date Created	Content	Take Quiz
ATA 31 Instruments	Systems Avionic Reliability	March 25, 2023	00-ABSARD-Rev1.0.0-2020001.pdf	Quiz
ATA 29 Hydraulic Power	Systems Avionic Reliability	March 25, 2023	00-ABSARD-Rev1.0.0-2020001.pdf	Quiz
ATA 29 Hydraulic Power	Systems Avionic Reliability	March 25, 2023	00-ABSARD-Rev1.0.0-2020001.pdf	Quiz
ATA 32 Landing Gear	Systems Avionics Reliability	March 25, 2023	00-ABSARD-Rev1.0.0-2020001.pdf	Quiz
ATA 28 Fuel Systems	Systems Avionics Reliability	March 25, 2023	00-ABSARD-Rev1.0.0-2020001.pdf	Quiz
ATA 47 Fuel Tank Inerting	Systems Avionics Reliability	March 25, 2023	00-ABSARD-Rev1.0.0-2020001.pdf	Quiz

Screen Mockup: Question Wrong



Screen Mockup: Instructor Dashboard



Screen Mockup: Add Assessment

The screenshot shows a web application interface for managing assessments. The browser address bar displays "unitedtechops.com". The page title is "Assessments". A search bar is present with the placeholder text "Search for assessment". The date "January 12, 2023" is displayed in the top right corner. A sidebar on the left contains navigation links: "Dashboard", "Manage Fleets", "Manage Assessments" (highlighted), "Manage Users", and "View Reports". The main content area features an "Edit Assessment" button and a form with the following fields: "Code" (ATA 31 Instruments), "Title" (Systems Avionic Reliability), "Fleet" (Airbus A320), and "PDF" (30-MSAARL-Rev0.0-202002.pdf). Below this is the "Add Question" section, which includes a "Type" dropdown (True / False), a "Question" text input, a "Correct Answer" dropdown (Select), and a "Weight" text input. A "Submit" button is located below the "Weight" field. The "View Questions" section includes a "Filter" section with "Type" (True/False), "Quantity" (10), "Weight" (50-100), and "Source" (AI) dropdowns. The "Results" section shows a "Question" (Sample Question here), "Answer" (True), "Weight" (50), and "Source" (AI) dropdowns, along with an "Add to Quiz" button.

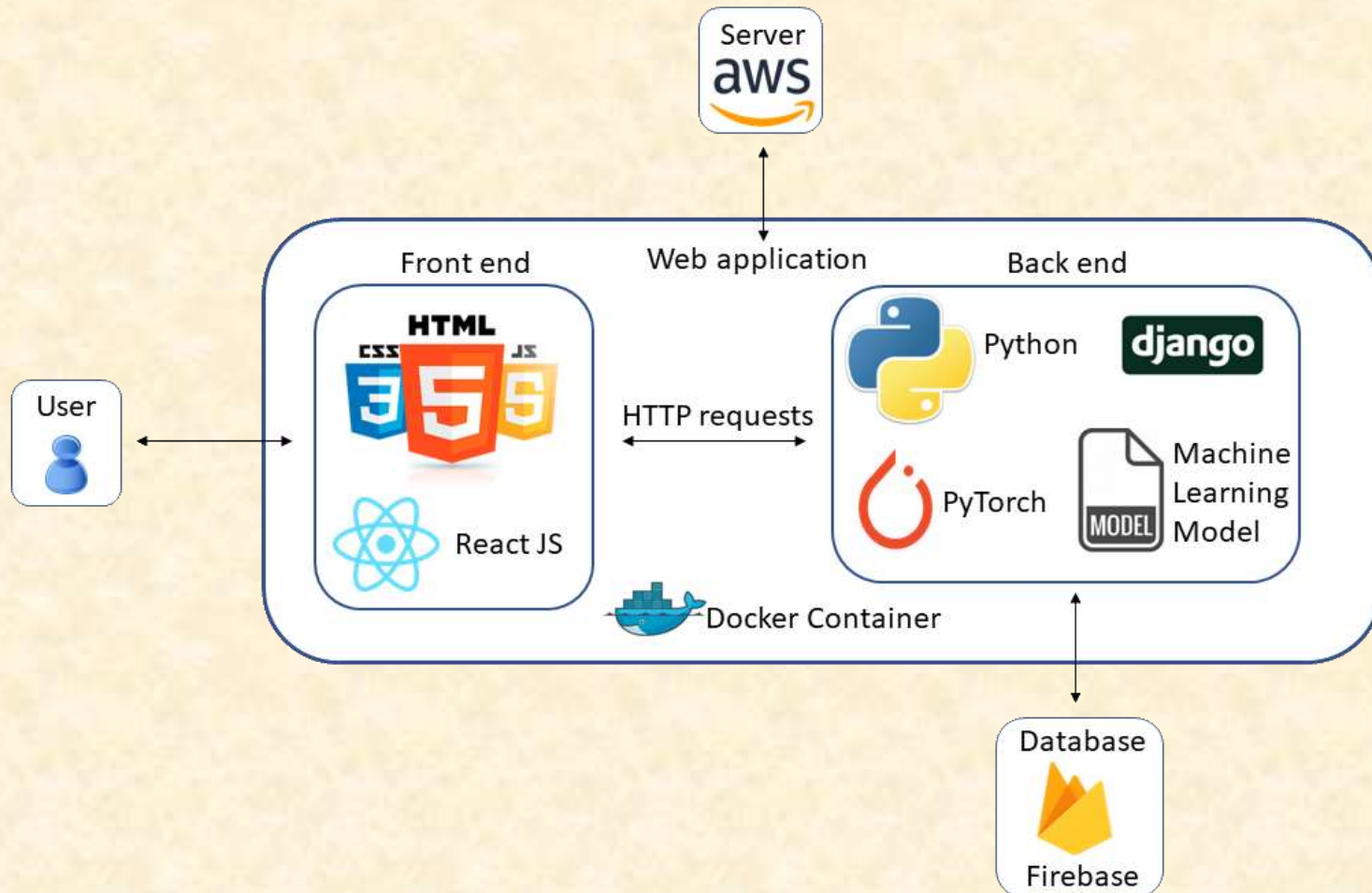


Project Technical Specifications

- Front end using React JS along with HTML and CSS
- REST API using Django Python library
- Firebase Realtime Database(JSON)
- PyTorch for Machine Learning



Project System Architecture



Project System Components

- Hardware Platforms
 - AWS
 - iPad/Desktop
- Software Platforms / Technologies
 - React JS, HTML, JavaScript, CSS, Axios
 - Python, Django, PyTorch, Requests
 - Firebase and Cloud Store
 - Postman
 - Docker, AWS



Project Risks

- Visual Data
 - Visual data is often unstructured and requires lots of processing power
 - Focus on text data and use Natural Language Processing techniques
- Authentication
 - Unauthorized access to sensitive information due to weakness in the authentication process
 - Strong password policies, access keys, two-factor authentication, hashing and salting
- Generating “valid” questions
 - Machine Learning model generating questions that do not enhance user training
 - Using data and input from instructors to modify model parameters
- Runtime
 - Long runtime to generate questions
 - Machine learning pipeline, experimenting with different algorithms



Questions?

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