Transforming Piano Inventory Management with Microsoft Azure and Power Apps

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Track: Innovation, Emerging Technology

ITS

SEMINOLE SHOWCASE

About Me

- Computer science senior
- Passionate about the intersection of technology and business
- Advocate for inclusion and diversity in the workforce
- Information Technology Technician at College of Music
  - Began as an intern through InternFSU program
  - Responsibilities include help desk support and hardware/software troubleshooting
  - Lead developer of the Piano Technology Tracker project

Piano Technology Department

- Led by Li Yeoh and Rich Fell, a team 6 technicians
- Oversees all aspects of the pianos at FSU (approximately 300!) including maintenance, repair, and overall functionality
- Manages 500 concerts annually with pianos used in 80% of them
- Also offers an advance, graduate level academic program

Gazelle Software

- Industry-standard piano inventory management software
- All-in-one business management software for piano technicians
- Designed to help piano service professionals streamline business operations, enhance customer experience, and facilitate business growth effortlessly
- Key Features:
  - Tracks pianos with their information (make, type, year)
  - Assigns pianos to technicians
  - Set tunings for pianos

gazelle

Gazelle Software

- Gazelle provided a conventional and user-friendly experience
- Costs about $100 USD per month
- Limitations:
  - Web application only; lacks a mobile alternative
  - Absence of tuning history
  - Inability to create piano evaluations
  - Lack of functionality for moving pianos by location

The Solution

- My manager tasked me to develop a solution that was cost-effective, fully functional, and user-friendly
- This would replace Gazelle and expand features using available resources
- Mobile App: simplify piano management for technicians using Power Apps, Power Automate, and SQL Server
- Dashboard: organize information in a “master view” with Power BI

Microsoft SQL Server + Power Apps + Power Automate + Power BI

Research

Excel

- Pros: easily accessible and manageable
- Cons: lack of scalability

Dataverse

- Pros: seamless integration with Power Platform
- Cons: complexity due to multiple layers of abstraction

SQL Server

- Pros: relational structure, scalability, and seamless integration with Power Platform
- Cons: initial setup complexity

Microsoft Azure

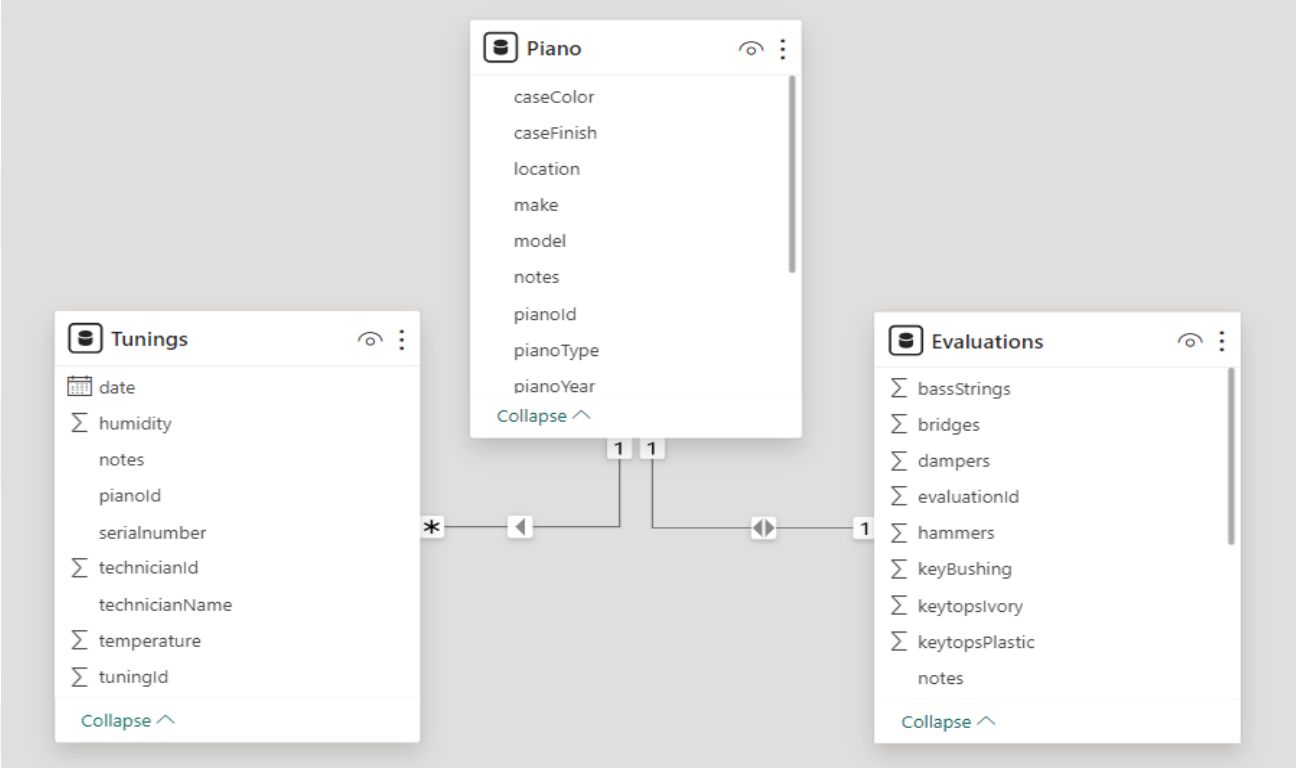
- Microsoft Azure is a cloud computing platform that offers services such as analytics, virtual computing, storage, and networking
- Utilized the most basic Azure plan costing about $4.90 per month to create a SQL Server instance and database
  - Including about 5 DTOs (Data Transfer Objects)
- This way the data was being stored securely on the cloud and did not rely on a physical server

Database Design

- Designed the Piano Tracker database with three tables:
  - Pianos
  - Tunings
  - Evaluations
- Implemented a relational structure with a primary key called Piano ID
  - Piano table: stores information about each piano
  - Tunings table: tracks the history of piano tunings, linked to pianos through the Piano ID
  - Evaluations table: records evaluations of pianos, also linked to pianos through the Piano ID

Database Design

- This database diagram shows the relationship between the Piano, Tunings, and Evaluations tables



Data Migration

- Manually migrated 300 records from spreadsheet to database using SQL queries
- Importing data from Excel to a SQL Server database using Export Wizard was too complicated and relied to much on server connections
- Maintained data integrity throughout the process, ensuring accuracy despite the time-intensive nature of the task

```
INSERT INTO Piano (pianoID, pianoType, make, pianoYear, model, serialNumber, location,
statusPiano, caseColor, caseFinish, notes)
VALUES (222, 'upright', 'Yamaha', 2000, 'YU3', 5913057, 'KMU 442B (Practice Room)',
'active', 'ebony', 'polished', 'acquired July 2017 in trade-in deal with Don Bennett at
Piano Works')
```

Challenges: SQL Server

- Learned that ITS blocks SQL Server port 1433 due to the susceptibility to possible external attackers
  - Met with an IT security specialist to address the issue and find a solution
  - Submitted a formal security exception and received authorization to bypass the port blocking
  - This allowed me to access the database on SQL Server Management Studio and make queries (create, insert, update)
- This was my first time using SQL, so there was a big learning curve

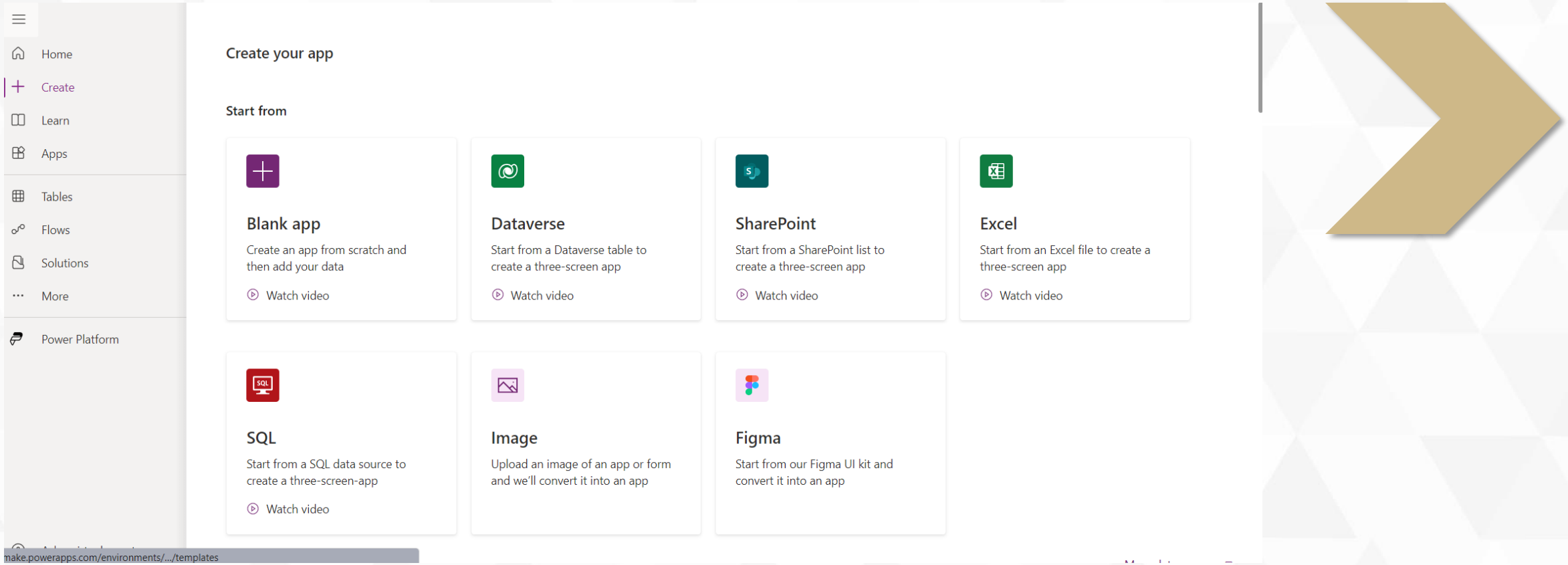
Power Apps

- Now that the data was stored, I could start developing the app that would perform all the actions
- Microsoft Power Apps is a suite of cloud-based software services that enables you to create, customize, and share business apps
- It allows you to connect to various data sources, including SharePoint, Dynamics 365, Office 365, SQL Server, and many others
- With its low-code nature, it helps organizations quickly develop solutions to streamline processes

Power Apps

- It has methods to incorporate text, images, buttons, galleries, forms, layouts, and functions and formulas
- Power Apps offers pre-built templates that only need to be connected to a data source, such as a budget tracker, cost estimator, and an employee engagement survey
- However, I built my app from scratch so that I could customize every aspect, from layout and branding to functionality and user experience

Power Apps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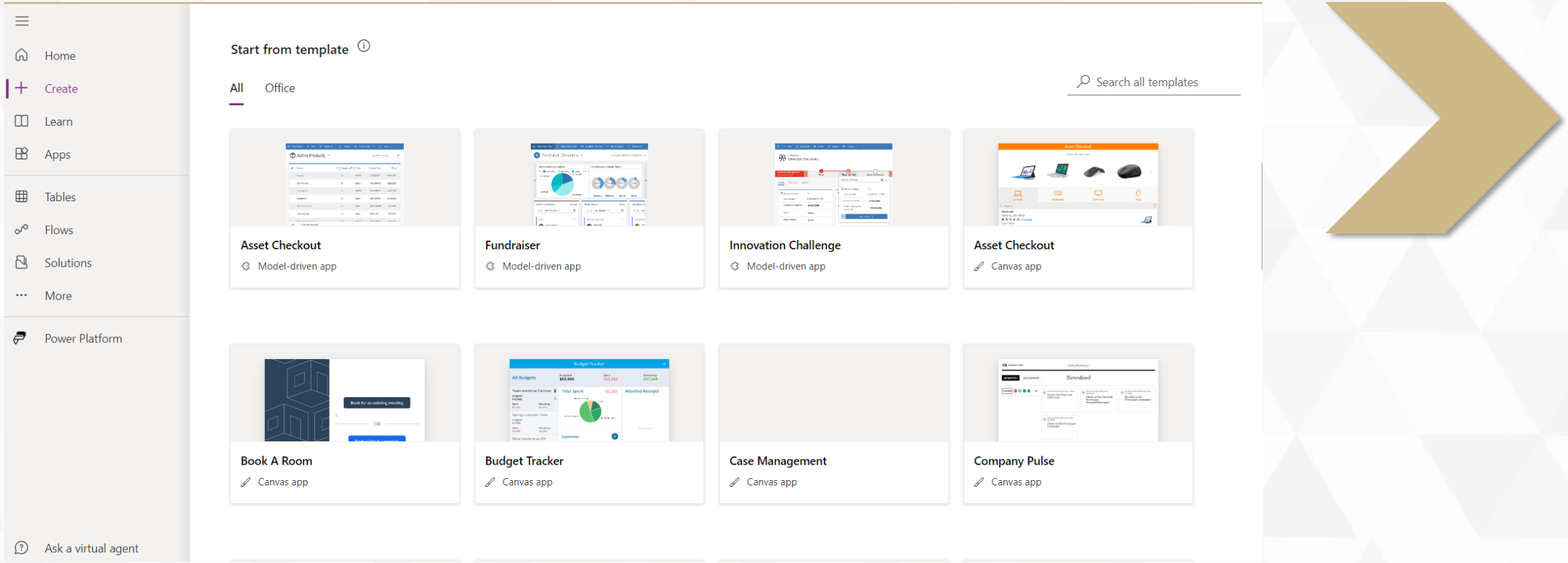
Apps
Tables
Flows
Solutions
More
Power Platform
Create your app
Start from
Blank app
Create an app from scratch and then add your data
Watch video
Dataverse
Start from a Dataverse table to create a three-screen app
Watch video
SharePoint
Start from a SharePoint list to create a three-screen app
Watch video
Excel
Start from an Excel file to create a three-screen app
Watch video
SQL
Start from a SQL data source to create a three-screen-app
Watch video
Image
Upload an image of an app or form and we'll convert it into an app
Figma
Start from our Figma UI kit and convert it into an app
make.powerapps.com/environments/.../templates

Power Apps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Fundraiser
Model-driven app
Innovation Challenge
Model-driven app
Asset Checkout
Canvas app
Book A Room
Canvas app
Budget Tracker
Canvas app
Case Management
Canvas app
Company Pulse
Canvas app

Power Automate

- Power Automate is a Microsoft cloud-based service that allows users to automate workflows across various applications and services
- With Power Automate, for example, when a file is uploaded to a specified OneDrive folder, a flow can be set up to automatically create a corresponding task in Microsoft Planner for team review and assign it to the designated team member
- Once I had finished designing the front end, I used flows as “functions” to add, edit, read, and delete piano records

Power BI

- Power BI is a business analytics tool that enables users to create interactive reports, dashboards, and visualizations from various data sources
- Established a connection with the database to ensure real-time access to the data
- Used the visualization capabilities to display the three tables with their attributes

Power BI

FSU College of Music Piano Technology Tracker

Piano Table

Refresh dataset

Search

Serial Number | Status | Location | Technician | Make

Technician	Serial Number	Status	Location	Make	Model	Type	Year	Case Color	Case Finish	Notes
Min	H1502836	active	LON 211	Yamaha	U3	upright	1972		polished	
Rich	A86188	active	KMU442E	Kawai	CX-21D	upright			polished	
Jodie	A4306291	active	HMU 007	Yamaha	U3	upright	1986		polished	
Rich	95086	trade	HMU 049	Hailun	H-5P	upright			satin	Key fronts rebushed 4/5/18
	93337	trade	KRB 113	Baldwin	M-5'2	grand	1941	mahogany	satin	Piano donated by Ellen Taffe Zwilli Piano was traded fall 2023 as part
Rich	92320	active	OMH Upper Lobby	Steinway	All	grand	1898	brown	satin	
	91315	active	KMU 328A	Mason & Hamlin	50	upright	2001			HMU 045 also contains 2 grands, l sympathetically, resulting in difficu
FSU	88367	active	WES Lobby	Steinway	A	grand	1896		satin	
	86188	active	KMU442E	Kawai	CX-21D	upright	1998	ebony		
Kok Tong	79910	active	KMU 446G	Kawai	K-15E	upright	2013		satin	
Kok Tong	6551887	active	KMU 438B	Yamaha	U1	upright	2022	ebony	satin	Grinnell 46350->Yamaha June 202
Min	6551860	active	KMU 426D	Yamaha	U1	upright	2022	ebony	polished	Grinnell 45525->Yamaha June 202

Power BI

Tunings Table

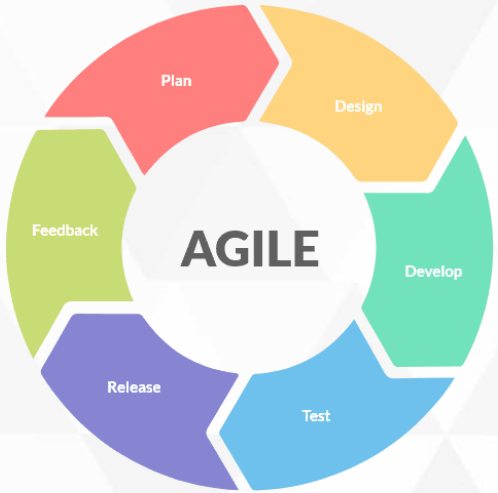
Search

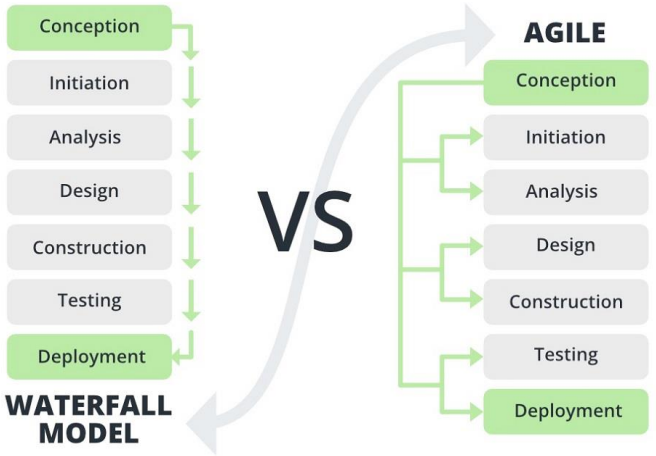
Serial Number | Technician

Serial Number	Date	Technician	Humidity	Temperature	Notes
624153	28-Feb-24	Rich	4300%	74	
149482	04-Jan-24	Rich	0%	0	
171996	06-Feb-24	Rich	0%	0	
326354	14-Feb-24	Rich	0%	0	
326354	21-Feb-24	Rich	0%	0	
32826	05-Jan-24	Rich	0%	0	
332321	03-Jan-24	Rich	0%	0	
396617	05-Jan-24	Rich	0%	0	
397265	05-Jan-24	Rich	0%	0	
412868	03-Jan-24	Rich	0%	0	
412884	14-Feb-24	Rich	0%	0	
462668	03-Jan-24	Rich	0%	0	
462747	05-Jan-24	Rich	0%	0	
513107	04-Jan-24	Rich	0%	0	
513977	23-Feb-24	Rich	0%	0	
5492491	31-Jan-24	Rich	0%	0	
5533572	23-Feb-24	Li	0%	0	

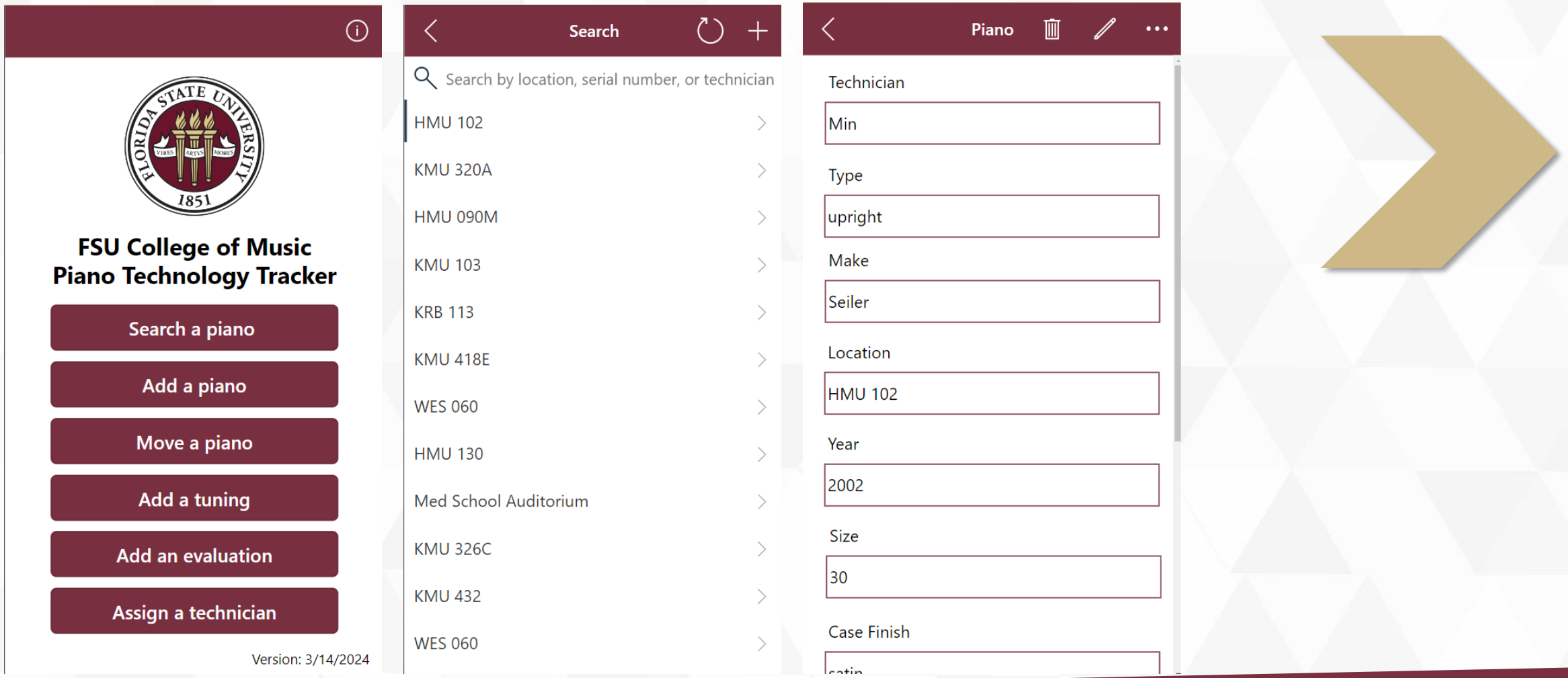
Agile Methodology

- Conducted monthly meetings with technicians to showcase new features and gather feedback
- The agile method promotes iterative development, collaboration, and flexibility to adapt to changing requirements throughout the project lifecycle





Demo


FSU College of Music
Piano Technology Tracker
Search a piano
Add a piano
Move a piano
Add a tuning
Add an evaluation
Assign a technician
Version: 3/14/2024
Search
Search by location, serial number, or technician
HMU 102
KMU 320A
HMU 090M
KMU 103
KRB 113
KMU 418E
WES 060
HMU 130
Med School Auditorium
KMU 326C
KMU 432
WES 060
Piano
Technician
Min
Type
upright
Make
Seiler
Location
HMU 102
Year
2002
Size
30
Case Finish

Feedback

- The project was a success, resulting in an impressive 92% reduction in software costs
- Not only did it replace Gazelle, but it had customized features and was designed to be used from a phone

"Jonpier was appointed to us after we had been using this one software for a few years. It was a free online software, but they decided to charge FSU over $100 a month. This is where Jonpier stepped up. He was able to save us money, and the software he wrote has more features than the other software. It was nice to be able to have software customized made for our department."

Rich Fell, Piano Technology Program Manager

Key Takeaways

- Microsoft Suite provides a lot resources for designing solutions, offering diverse tools and platforms for addressing various business needs
- Power Apps and SQL Server integration are a powerful connection, simplifying app development even for non-technical users
- This framework can be used to solve solutions on campus using available resources

Thank you!

Please Provide Feedback!