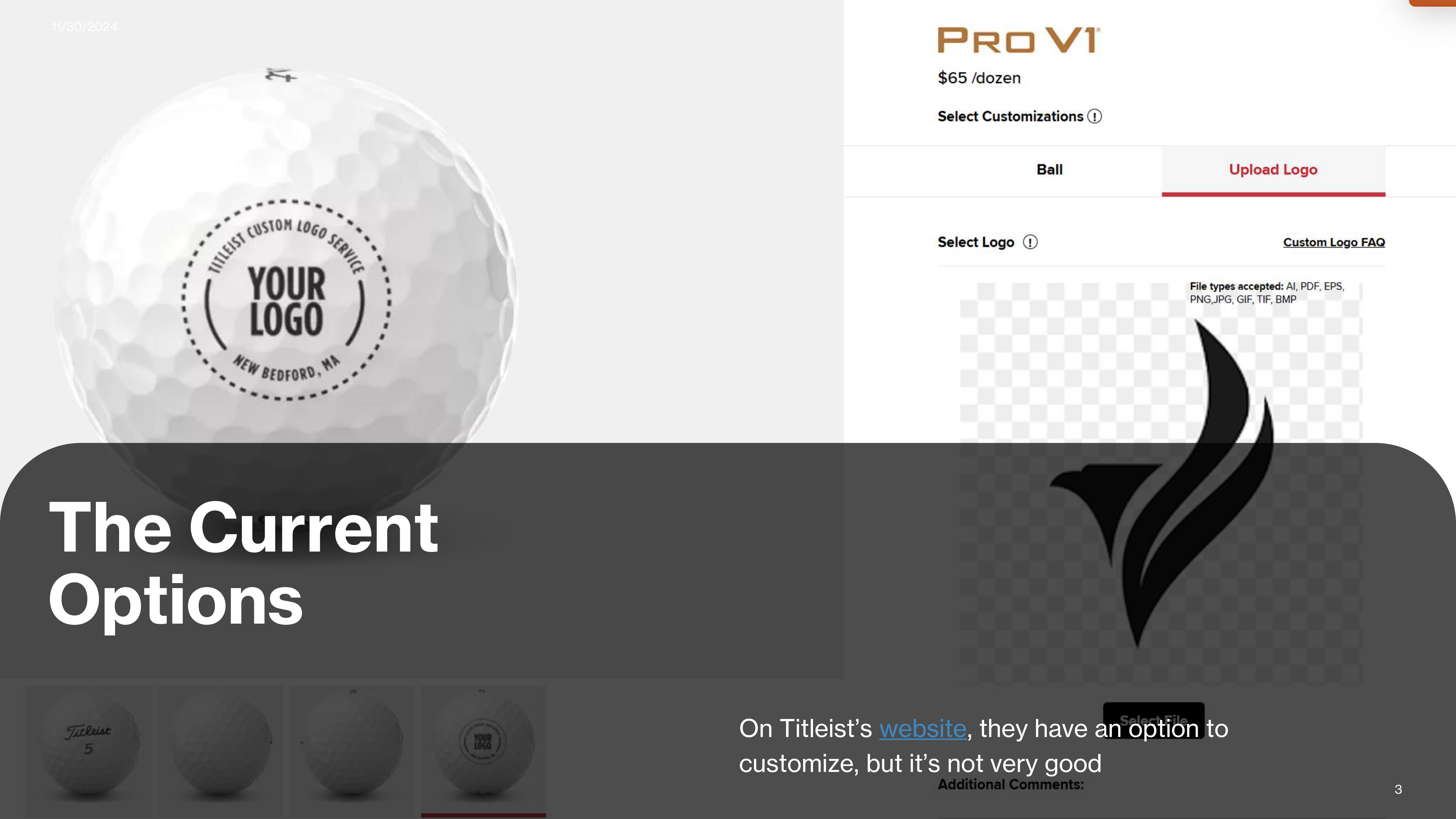
Custom Golf Ball Shop

Using React-Three-Fiber

Background

- My cousin has a startup idea where he can 3D print custom patterns onto golf balls
- Current methods have bad interfaces and poor customizability
- Without him knowing, I took this idea and decided to make a website about it for my final project

The Current Options



File types accepted: AI, PDF, EPS, PNG,JPG, GIF, TIF, BMP

On Titleist’s website, they have an option to customize, but it’s not very good

Architecture

- For this project, we initialized a Vite project with React-Three-Fiber
  - Vite is a modern build tool that provides fast development and optimized production builds
  - Offering an ideal environment for React and Three.js development with minimal setup
- For styling, we went with TailwindCSS
  - In-line utility-based styling framework
  - I used it in previous projects and liked it – good online community
  - Very nice to work with – can spin up good looking apps very quickly
  - Reusable custom attributes using layering
  - Used extensively in industry – good practice

Why We Chose React

After learning it in class, we really liked the reusable component aspect of the framework

Huge ecosystem

Tools available for us to use Three.js with React

Allowed us to turn 3D models into react components

Gives all the tools normally accessible to React components

React-Router-DOM

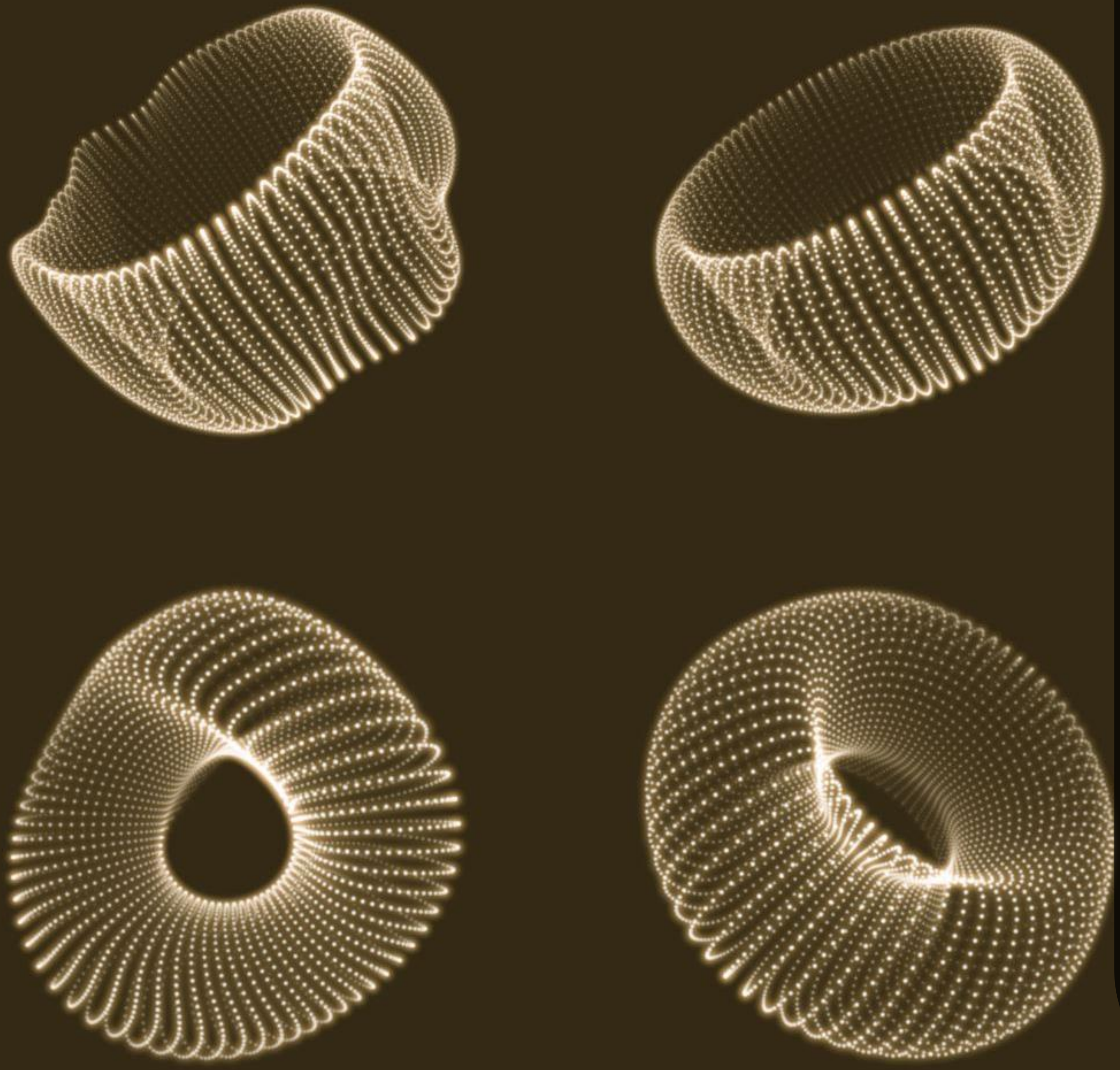
Easily setup Routes for a SPA

Let’s us save component state between pages

Better user Experience

R3F Under the Hood

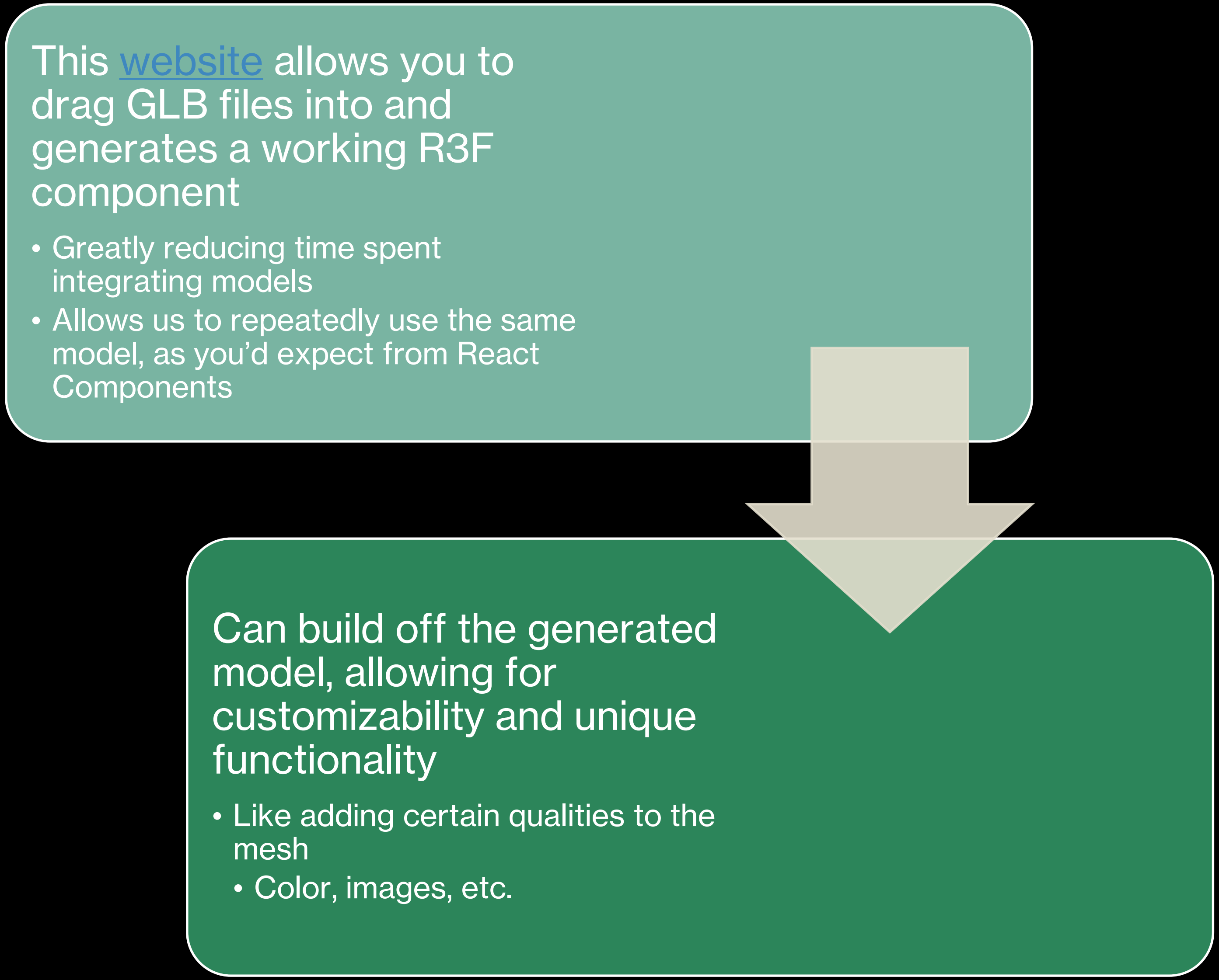
- WebGL allows websites to render 3D models
  - Takes advantage of graphics processors
- Three.js is the first layer of abstraction, allowing developers to more effectively develop with 3D models
- R3F is an additional abstraction, allowing us to use all the React technologies we are used to with 3D models
  - Huge ecosystem of technologies, very refined technology
  - No additional overhead, all Three.js functionality is available



3D Models

- Making your own 3D models is fine, but can be slow
  - Especially with more complex models
  - We decided to find free models on sketchfab
- Finding free 3D models on sketchfab is great, but implementing by hand is pretty hard
  - Going through the GLB file, understanding the meshes, etc.
- This led us to finding a website that does this part for you
  - R3F’s extensive community has created some great tools

GLTF → R3F



This website allows you to drag GLB files into and generates a working R3F component

- Greatly reducing time spent integrating models
- Allows us to repeatedly use the same model, as you'd expect from React Components

Can build off the generated model, allowing for customizability and unique functionality

- Like adding certain qualities to the mesh
  - Color, images, etc.

How it Looks

- After getting our model into R3F code, we can use it as a normal react component
  - Add props, adjust state, use repeatedly
- Additionally, by accessing the material directly using Three.js, we can change how it looks
  - This is the basis of how we allowed user input to modify the model

Position and Light

- The hardest aspects:
  - Position – where the model shows up on the screen
    - Uses a 3D array [x, y, z]
    - Allows you to put the model anywhere on the canvas
  - Lighting – how you can actually see the model
    - Several types of lighting – we mostly use ambientLight (easiest)
- Can save a lot of time by showing the grid: “<gridhelper args={[10, 10]} />”

React Hooks

- The driving force behind modifying our R3F component
  - useState to set the brand, color, and logo based off user input
  - useNavigate to cache the modified model to send to the checkout page
  - useMemo to keep track of pricing adjustments

Demo

Struggles

Typically, 3D websites are static

Usually used for advertisements or portfolio websites

Most resources online didn’t have info on dynamically updating meshes

Even less had info on updating based on user input

Uploading files and resizing

We couldn’t find a way to allow the user to change the size of an image once it’s uploaded