Madhav Manoj

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Versatile Full-Stack Developer with 7 years of experience in the design, development, and management of innovative web and mobile applications across diverse industries from drone analytics, GIS and fintech to healthcare and telemedicine. Proven expertise in creating robust solutions using React, Rust, Python, Java, Kubernetes, Docker, Jenkins, and more. Demonstrated ability in enhancing product performance and user experience in fast-paced startup environments, contributing to significant growth and efficiency improvements. Adept at collaborating effectively with stakeholders to meet and exceed project goals.

Work Experience

Freelance Developer

April 2023 - Present

I have been working as a freelance developer since April 2023, working on a variety of projects, ranging from creating a wedding website platform, to creating a shopify plugin, to working on a teledermatology platform.

- Worked on enhancing a client's teledermatology platform, and automating manual workflows.
  - Implemented screens from designs using NextJs and React.
  - Added supporting APIs for new product features as well as customer and internal notifications using email using Django and Django Rest Framework
  - Implemented supporting features across the front-end and the back-end to simplify the user experience
- Working on an e-commerce site to sell organic farm produce
  - Initially created a shopify plugin to enable a custom delivery process.
  - Designed a website to replace shopify in Figma, and implemented the website using NextJs, React and PostgreSQL.
- Created a platform for people to create their own wedding websites.
  - Conducted market research, and spoke to users to validate the idea
  - Created a prototype of a wedding website creation platform using React and Rust, used for multiple weddings.

AspecScire

June 2017 - March 2023

AspecScire was an early-stage drone data analytics startup, initially focused on surveying, mapping, and construction, and later expanded to solar, infrastructure inspections, mining, agriculture, and forestry. In this dynamic environment, I played a key role in designing and building a wide range of features for their SaaS platform, Vimana, creating a versatile self-serve platform for customers, and additionally developed tailored solutions to meet the unique needs of various clients.

Full-stack Developer

- Wrote python scripts to automate the processing of large datasets of drone imagery using photogrammetry software, to create 3D models & point clouds, orthomosaics and digital elevation models. These outputs were then used to create interactive maps & 3D visualisations, and perform volumetric analysis & other measurements.
  - Wrote scripts to automate the processing of drone imagery using Agisoft PhotoScan. Designed, tested, and implemented different methods to improve performance by 8x, while preserving accuracy and quality.
  - Wrote scripts using Mapbox APIs to upload orthomosaics and other outputs for visualization. Optimized uploads to make datasets available for visualization 40% faster.
  - Wrote scripts using python-gdal, shapely and other GIS tools to create custom rasters and vectors when required for a customer's use case.
- Owned the front-end codebase and user-facing functionality, first in Angular and later in React, for the drone analytics platform, Vimana.
  - I worked on the first version of our web platform, Vimana. I worked on adding a file uploader, using AngularJS, and integrating it with our backend APIs. I also added a map to visualize the location of where the uploaded files were captured, using MapboxGL JS.
  - Used antd for UI components, redux for global state management, react-joyride for user tutorials, and react-router for routing. Updated webpack & migrated our custom webpack config to add Hot Module Replacement, improving build and refresh times.
- Once we saw the demand for a more powerful platform, we re-designed and re-architected the platform, and I was primarily responsible for the front-end.
  - We used React, Redux, and Ant Design to create a powerful platform, with a focus on user experience, where users could upload and process drone data, visualize the outputs on a map, and create annotations.
  - Implemented custom map interactions and visualization for Geospatial Data. Initially, we used MapboxGL to visualize the data, and used Sketchfab & Potree to support 3D visualization.
  - Eventually, we migrated away from Mapbox and implemented our own tiling service. I used OpenLayers to create our own interactive map visualization, with support for tiling and backwards compatibility with Mapbox datasets.
  - Using our new tiling service and the performance improvements from WASM modules written in rust we created, I moved the measurements logic to work on the front-end, to reduce costs and improve performance.
  - Created a workflow end-to-end to enable users to upload CAD design files, manually georeference them during upload using OpenLayers, and visualize them on the map.
- Wrote & maintained the APIs for our web platform Vimana. I owned features from gathering business requirements, to database & API design, to implementation, documentation and testing.
  - Built multiple python-flask microservices to support a mobile app, and platform features. Implemented an upload micro-service for drone data, a measurement service to enable distance, elevation, area and volume measurements on our interactive maps, and more.
  - Created a python-flask microservice to handle object detection and other tasks, able to handle inputs from multiple sources, such as automated detections from our in-house ML models, and manual annotations from our platform.

    - Created an issues feature for users to mark problems on the maps or other visualizations, have conversations about it, classify them, and share it with other users. Added pagination support for issues, and their associated comments.
    - Re-architected & migrated APIs from python-django to Java Spring, and finally to Rust, to improve performance and maintainability.
    - Implemented email notifications via mailchimp, to keep our customers up-to-date with the state of their data, processing status, and about any issues with their data.
    - Used Swagger & OpenAPI to create internal API documentation.
- Managed infrastructure & deployments of the platform on GCP and AWS, using Kubernetes, Docker, and Jenkins. Migrated the platform from GCP to be platform-agnostic to allow for on-premise deployments.
    - Used Docker to containerize various services, and Docker Compose to orchestrate them locally, and Kubernetes for services in production.
    - Migrated the database from Google Cloud Datastore to PostgreSQL, and generalized access to file storage via S3-like APIs.
    - Used AWS Sagemaker to run ML inference on our dataset.

Protium

April 2021 - March 2022

Protium is a leading engineering-driven, risk-focused lender in India, operating as a full-stack lender with a nationwide branch presence, catering to MSMEs, consumers, and educational institutions. Using proprietary models for revenue and growth assessment, Protium offers both secured and unsecured lending solutions. They serve customers through digital platforms, sales teams, and partnerships, boasting scalable systems and advanced lending APIs. During their early testing phase, I developed a successful prototype to add support for multiple regional languages in their user-facing lending platform.

Full-stack Developer (Part-time)

- Backend development
    - Integrated custom functionality on top of an open-source Process Orchestration Platform
    - Handled basic custom authentication using an open-source Identity & Access Management Platform
- Front-end Development
    - Developed a prototype web application, a mobile application, and custom forms using Formio, React, and React-Native.

Dune

January 2017 - May 2017

Dune was a social video platform where users can create, share, discover and redistribute videos shot on mobile. At the core of it is a video editing app that takes a user shot video on and makes it look as good as professionally edited content. I worked on the back-end of the app, creating various video filters and presets, using C++, OpenGL, and Python.

Back-end Developer

- Implemented custom video filters using OpenGL in C++, such as slow-motion, fast-forward, and tilt-shift. Besides these, I worked on video stabilization, custom color grading presets and more.
- Exposed a python wrapper for these features, using Boost. This was used in the server to process videos uploaded by users.

Education

National Institute of Technology, Calicut. GPA: 8.18 / 10

June 2013 - May 2017