SAURABH PETHKAR

MECHANICAL ENGINEER | CAD SPECIALIST | MANUFACTURING & QUALITY SYSTEMS ENGINEER

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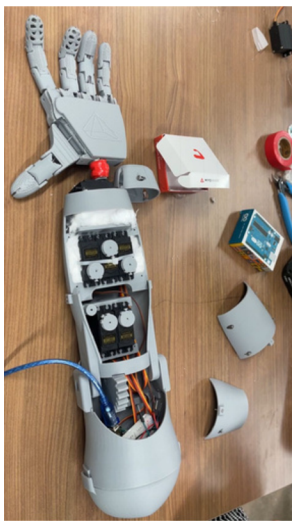
ABOUT ME

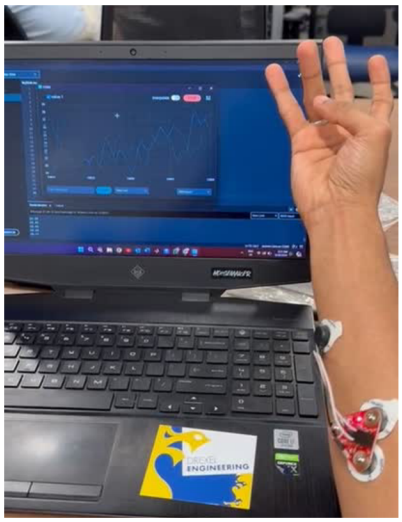
Mechanical Engineer with hands-on experience in CAD design, reverse engineering, manufacturing simulation, and embedded systems integration. I've led and contributed to multidisciplinary projects across prosthetic design, automotive suspension systems, generator retrofitting, and smart urban analytics. Proficient in tools like SolidWorks, AutoCAD, ANSYS, Moldflow, Arduino, and Python, with a strong foundation in both theoretical and field-based engineering. I'm driven by the intersection of design precision, manufacturability, and innovation.

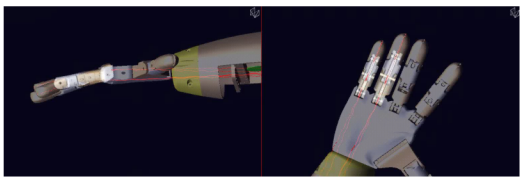
TOOLS & TECHNOLOGIES

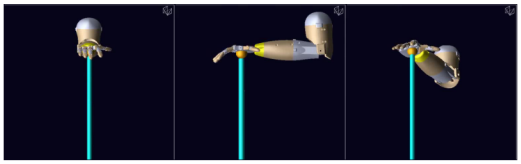
- CAD & Design : SolidWorks · AutoCAD · Fusion 360 · CREO · CATIA
- Simulation & Analysis : ANSYS · Adams View · Autodesk Moldflow · SolidWorks Simulation · MATLAB · FEA
- Manufacturing & Reverse Engineering : Manual Machining · Welding · Turning · Fit & Tolerance Analysis · GD&T · BOM Drafting · Engineering Drawings
- Data Science & Visualization : Python · pandas · NumPy · scikit-learn · seaborn · matplotlib · plotly · Dash · Jupyter Notebooks
- Embedded Systems & Prototyping : Arduino UNO · MyoWare EMG Sensor · Servo Motor Control
- Workflow & Collaboration : Git · GitHub · MS Office · Google Workspace · Canva (for documentation)

AFFORDABLE MYOELECTRIC PROSTHETIC ARM - DREXEL UNIVERSITY









What?

- Designed and fabricated a 3D-printed myoelectric prosthetic arm
- Enabled EMG-based control using muscle signals
- Targeted cost under $350 for accessibility

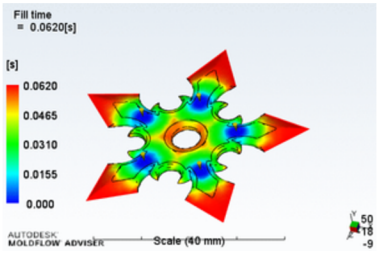
How?

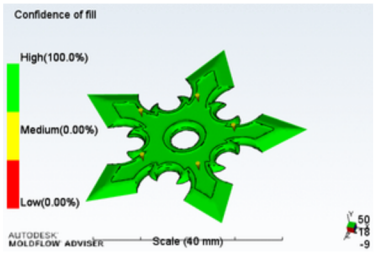
- CAD modeled using SolidWorks & Fusion 360
- Actuated via servo motors, controlled using Arduino UNO
- Integrated MyoWare EMG sensor for input
- Fabricated via FDM 3D printing with PLA

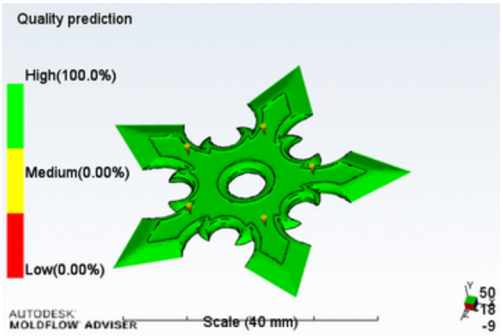
Results

- Significantly more affordable than commercial prosthetics
- Open design supports customization & iterative testing

SHURIKEN DESIGN & INJECTION MOLDING SIMULATION -DREXEL UNIVERSITY







What?

- Designed a Naruto-inspired Shuriken using SolidWorks
- Aimed to balance aesthetic appeal and manufacturability
- Simulated injection molding using Generic PP (Polypropylene)

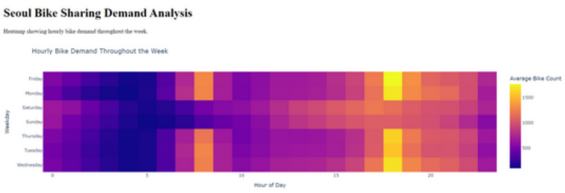
How?

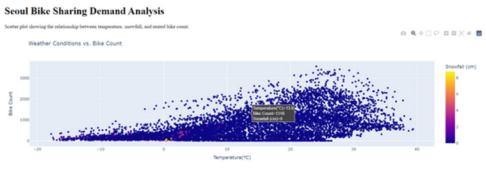
- Modeled intricate blade shapes in SolidWorks
- Simulated fill flow, pressure, and temperature in Autodesk Moldflow
- Analyzed mold behavior: fill time, weld lines, and pressure drops
- Ensured part met manufacturability criteria for plastic molding

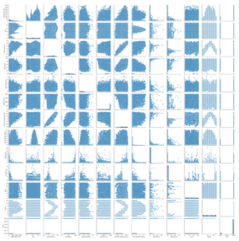
Results

- Fill time: 0.06 seconds
- Moldflow analytics showed 100% fill confidence
- Achieved clean, even temperature distribution → no warpage

SEOUL BIKE SHARING DEMAND ANALYSIS - DREXEL UNIVERSITY







What?

- Analyzed Seoul's bike rental dataset to identify demand trends
- Combined temporal, weather, and user data for accurate prediction
- Aimed to optimize citywide bike sharing services

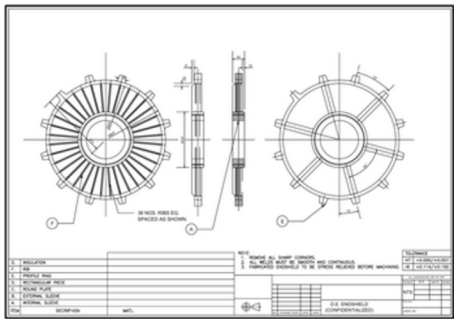
How?

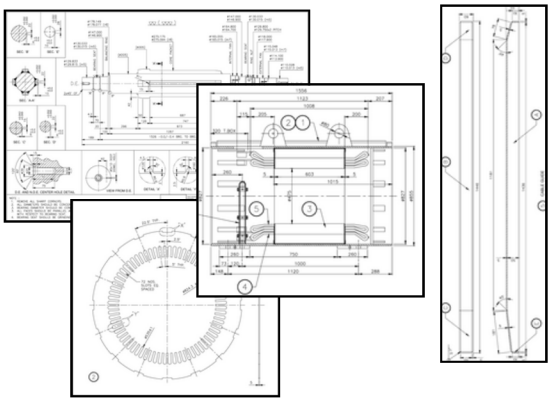
- Performed EDA to visualize hourly/seasonal demand
- Engineered new time features (e.g., weekend, peak hours)
- Trained and tuned regression models using RandomizedSearchCV
- Evaluated models with cross-validation and error metrics

Results

- Identified peak demand during weekdays 8–9 AM & 6–7 PM
- Temperature & Solar Radiation had strongest positive impact
- Achieved strong model accuracy with Random Forest Regressor
- Delivered insights for fleet reallocation and weather-aware planning

GENERATOR REVERSE ENGINEERING - DOL ELECTRIC CO. PVT. LTD.





What?

- Reverse engineered a generator component for XYZ (confidential)
- Created fully detailed 2D manufacturing drawings using AutoCAD
- Initiated in-house manufacturing based on legacy hardware

How?

- Used physical inspection + measurement tools (Verniers, Micrometers)
- Drafted 2D parts in AutoCAD for production readiness
- Coordinated with fabrication and machining units
- Applied GD&T principles for fits and functional tolerances
- Verified against OEM performance parameters

Results

- Successfully fabricated fully functional replacement generator parts
- Saved client cost & lead time on OEM procurement
- Enabled in-house capability for future overhauls

ALL-TERRAIN VEHICLE (ATV) – BAJA SAEINDIA 2019 - MUMBAI UNIVERSITY

What?

- Designed, built, and raced a rugged ATV
- Participated in Mahindra BAJA SAEINDIA with 30-member team
- Focused on CVT transmission, 3D modeling, and final assembly

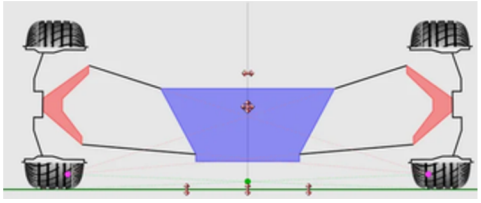
How?

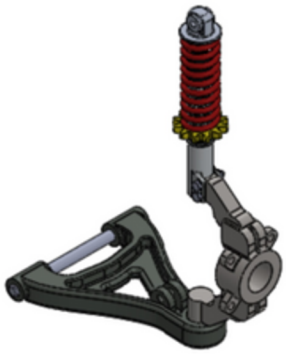
- Used SolidWorks for CAD + ANSYS for validation
- Fabricated chassis in-house using welding, turning & painting
- Led Transmission Department – CVT Design & Integration
- Created working prototypes, validated braking & ride quality

Results

- Secured 52nd rank all-India in first-time participation
- Completed technical inspections, dynamic events, endurance
- Developed core skills in design, simulation, manufacturing & teamwork

DESIGN & ANALYSIS OF DOUBLE WISHBONE SUSPENSION SYSTEM - MUMBAI UNIVERSITY





What?

- Designed a full Double Wishbone suspension system
- Compared its behavior against the McPherson strut design
- Aimed at improved handling, load management, and ride comfort

How?

- Developed accurate 3D models using SolidWorks
- Simulated dynamic loading using Adams
- Validated geometry and motion response under typical conditions
- Presented comparative performance analysis using graphs/metrics

Results

- Double Wishbone showed improved cornering & load distribution
- More consistent camber angles and ride comfort across uneven terrain
- Achieved deeper understanding of suspension dynamics & software tools
- Demonstrated simulation-backed justification for design preference