Marc Clausen

Mechanical Engineer

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Summary

Results-oriented Mechanical Engineer with a strong background in CAD, 3D-printing, and rapid prototyping. Excellent communication and interpersonal skills, with a commitment to continuous learning and professional development.

Languages

Danish — Native

English — Full Professional

German — Elementary

General software

Microsoft 365 — Experienced

Adobe suite — Competent

Practical skills

Prototyping

Laser cutting | Arduino | ESP32 | Soldering | Raspberry pi

Fabrication

Milling | CNC programming | Woodworking | Lathing

Hobbies

Weight lifting | Board games | Music | Cooking | Video games | Personal projects

Work Experience

Novo Nordisk
(Apr 2024 - Present)
Denmark, Hillerød

Student Data Engineer

- Built 10+ data pipelines and 4 dashboards through Palantir Foundry.
- Maintained a PostgreSQL database by updating decrepitated views
- Build more than 5 Databricks pipelines using Apache Spark

Technical University of Denmark
(Sep 2020 - May 2024)
Denmark, Kongens Lyngby

Teacher's Assistant

- Assisted in over 100 group work sessions for math and physics courses.
- Privately tutored over 10 students, successfully elevating their grades from 00 to 7+ after initial exam failures.

Heptagon ApS
(May 2018 - Present)
Denmark, Roskilde

IT assistant

- Participated in 3-day industrial SCADA course.
- Resolved over 60 technical issues on company phones and computers.
- Provided consultation on two distinct projects involving mechatronics and IoT integration.

Optihorse
(Jun 2013 - Feb 2018)
Denmark, Osted

IT Support

- Installed more than 50 computers for pop-up events.
- Assisted in cataloging an inventory exceeding 2000 products.

Education

Technical University of Denmark
(Feb 2023 - Present)

Masters, Mechanical Engineering

- Wrote a CFD script from scratch to numerically solve the Navier-Stokes equations on a 2D volume.
- Developed a series of Python functions to solve intricate multibody dynamic systems based on constraint equations.
- Balanced a two-wheeled robot using a PID controller.

Technical University of Denmark
(Sep 2020 - Dec 2022)
Average grade: 10.1

Bachelors, Mechanical Engineering

- Conducted an analysis of a student formula racing car using Ansys FEA software.
- Increased DALBO's agricultural drum transportation capacity from 2 to 3.
- Modeled and rendered a Rolex Submariner watch, showcasing realistic materials and employing ray tracing techniques.

Highlighted skills

Programming

Python | Java | C++ | Javascript | Typescript | Matlab | CSS | HTML

CAD - CAM - CFD - FEA

Solidworks | Inventor | Creo | OpenSCAD | Ansys | STAR-CCM+

3D - print

Cura | Prusa | Bambu lab | Orca | Netfabb

Portfolio

Introduction

Featured in the following section is a curated compilation of projects I've undertaken over the past 5 years, each accompanied by a delineation of the key engineering skills applied. While detailed project pages is available for all projects, I've highlighted and included a smaller selection to maintain brevity. The comprehensive project list is available upon request, should further details be of interest.

Personal projects

Skills applied

Automatic dart counter	1	Python, 3D-Print, CAD, Raspberry PI
AI generated card game	2	Python, Machine Learning, AI
Electric skateboard	3	3D-Print, CAD, Machining, Electronics
3D Settlers of Catan	4	3D-Print, 3D-Repair, Printer calibration
Android app - Amera	5	CSS, Java, Git, Android Studio
Website for project showcase	6	Javascript, CSS, HTML
Home server	7	Linux, Docker, YAML, Zigbee
Automatic water pump	8	3D-Print, CAD, Arduino
Chess board	9	Lathing, Woodworking

University projects

Data-driven surrogates for wind farm control	10	CFD, Python, Shell script, SSH, AI
DALBO transportation optimization	11	FEA, CAD, 3D-Print, Problem solving
CFD analysis of cavity flow	12	CFD, Matlab
FEA of SAE car frame	13	FEA, Ansys
Solar-Ain	14	Laser cut, CAD, IoT-integration, esp32
Rolex submariner rendering	15	Rendering, CAD, 3Ds Max, Creo

Automatic dart counter

Personal

Summary

This project came about as a group of people from my dorm bought a dartboard for the kitchen, but soonly realized that keeping score was more of a hassle than we imagined. Upon researching existing solutions, it became evident that viable options were scarce and often prohibitively expensive. I, therefore, undertook the initiative to design and implement an automated scoring system tailored to our specific requirements. I believe that the successful execution of this project demonstrated my capacity to address practical issues through innovative engineering solutions.

97% accuracy

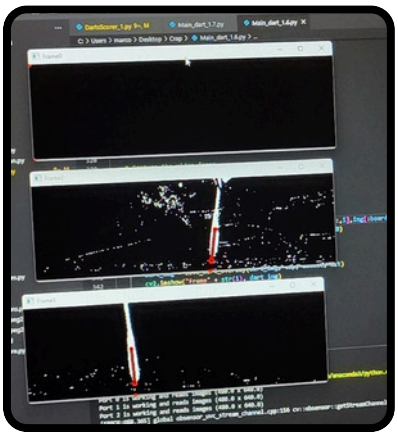
1000+ lines of code

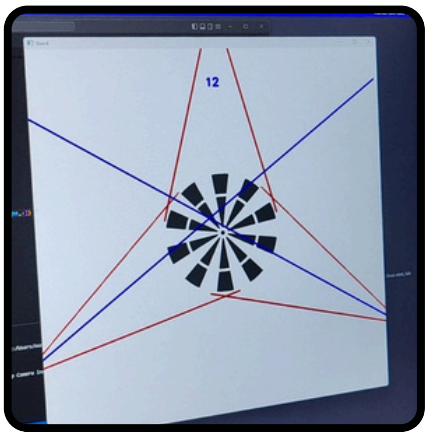
99.9% AI dectection

Process

Jan 2023 - Apr 2023

- Build initial setup using 2 cheap webcams and 3D-printed mounts.
- Wrote initial code using blob detection and line recognition in OpenCV.
- Realized that blob detection works but is not accurate enough in 2D.
- Applied linear transformations to project 3D position to 2D sub-space
- Begun experimenting with AI to recognize darts in an image.
- Build improved setup with 4 elevated cameras and a light ring.
- Using new setup to create training data for artificial neural network.
- Trained artificial neural network based on the YOLO v8 framework.
- Realized that processing 4 cameras were too computational heavy to be viable.
- Created final model with 3 elevated cameras.
- Printed and assembled final construction.
- Programmed the GUI and game mechanics.





Electric skateboard

Personal

Summary

In response to an unexpected bike issue during my time at DTU, I seized the opportunity to embark on a long-contemplated project: constructing an electric skateboard. The concept involved transforming a conventional skateboard by integrating brushless motors and a series of Lithium-Ion battery cells, resulting in an efficient transportation solution for campus mobility. In addition to addressing a practical need, this served as a demonstration of my skills in mechanical design, electronics integration, and project execution.

40+ km/t

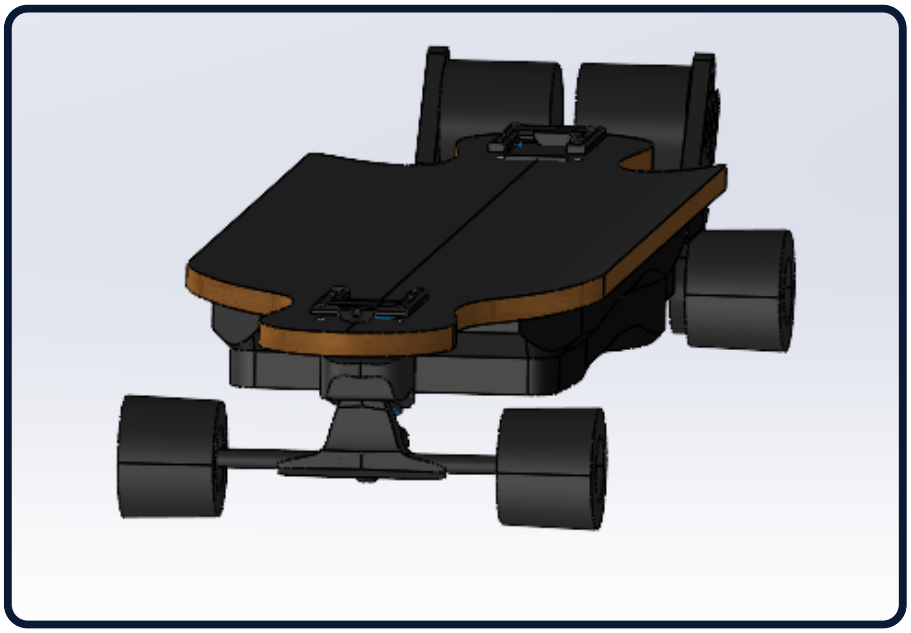
30+ km range

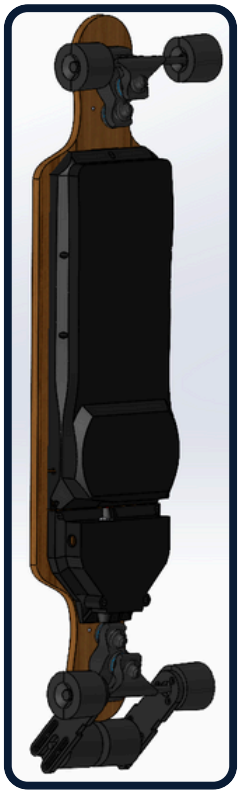
2x4000W motors

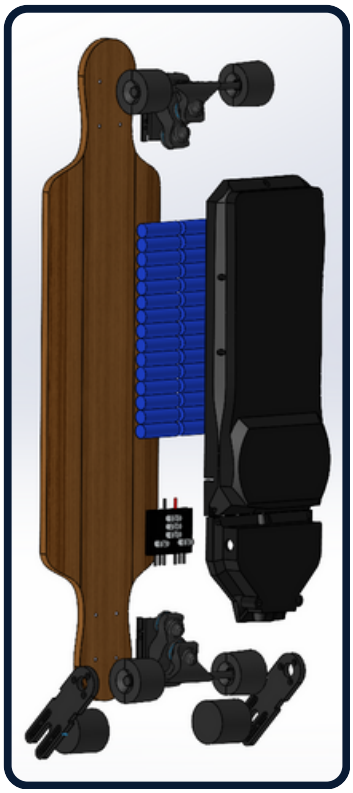
Process

Jan 2023 - Apr 2023

- Designed the basic layout of the components.
- Ordered components from Chinese manufacture.
- Designed basic circuit for motors and speed controller.
- Powered circuit tested with laboratory power supply.
- Welded the 30 battery cells together in series of 10 and connect to battery management system.
- Designed enclosure for battery pack and electronics.
- Machined brackets to mount motors on trucks.
- Assembled all the parts.
- Programed the speed controller for the given motors and remote.
- Tested the final construction.







FEA of SAE car frame

University

Summary

In a finite element analysis course, I undertook the analysis of a student formula car's frame. This project showcased my capability to seamlessly translate theoretical knowledge into practical applications within FEA software. While modeling such structures can be acquired with relative ease, a theoretical understanding is required in efficiently leveraging beam and volume elements and interpreting the results generated by the program. This experience underscores my proficiency in applying theoretical insights to solve real-world engineering problems.

Process

Jan 2022

- Modeled frame as simple beam structure.
- Added masses for motor and passenger.
- Added link-elements to connect masses and wheels.
- Modeled suspension as elastic beam element.
- Computed stresses in structure under different loads.
- Contucted advanced contact analysis in most vulnerable connections.