

Mateusz Cole

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SUMMARY

Automation Engineer with six years improving **machine learning** and autonomy systems for robots operating beyond controlled laboratory settings. Production work covers failure triage, perception and planning evaluation, dataset development, model fine tuning, **deployment validation**, and physical robot testing. Uses Python, PyTorch, and C++ to trace difficult behavior through telemetry, logs, sensor traces, **model outputs**, and system interactions. Builds **evaluation sets** from field failures, refines labeling guidance, and checks whether improvements generalize across customer sites. Partners closely with modeling, data labeling, robotics, and deployment teams, turning production observations into reproducible tests and practical engineering changes. Brings thoughtful debugging, hands on autonomy experience, and a steady focus on dependable operation for customers using real world robotic systems.

EXPERIENCE

Automation Engineer, Robotics Autonomy

October 2023 - Present

Northstar Mobile Robotics

San Diego, CA

Owns autonomy triage for mobile robots in logistics facilities, supporting production reliability, customer use cases, **model evaluation**, and staged deployment. Leads evidence based collaboration across modeling, data, robotics, and field operations teams.

- Reconstructed production failures from **telemetry**, **logs**, sensor traces, and model outputs for focused autonomy diagnosis
- Built failure review workflow grouping field events by behavior, impact, evidence, and acceptance criteria
- Created PyTorch evaluation datasets from occlusions, aisle geometry, and unusual traffic interactions for model comparison
- Fine tuned models with curated examples and regression sets, checking site gains against broader fleet behavior
- Integrated **inference** updates with C++ robotics components, validating **physical robots** before staged production deployment
- Supported customer use cases from prototype through live operation, converting observations into practical **system changes**

Machine Learning Robotics Engineer, Autonomy Systems

July 2021 - September 2023

VectorPath Autonomy

Oceanside, CA

Developed perception and prediction experiments for autonomous material handling robots, combining Python, **PyTorch**, labeled sensor sequences, hardware validation, and deployment tooling. Supported repeatable decisions across modeling, **data**, and field engineering functions.

- Developed **perception** and **prediction** experiments with Python and PyTorch against labeled sensor sequences
- Designed dataset slices around false detections and trajectory errors for focused field condition comparison
- Traced preprocessing, inference, and downstream **C++** consumers to resolve timing and interface failures
- Established reproducible evaluation runs recording dataset versions, configurations, and representative failures for deployment decisions
- Worked with field engineers during hardware validation to reproduce observations under realistic robot motion
- Standardized model artifacts and configuration checks, reducing mismatches between evaluated and deployed robot versions

Junior Robotics Software Engineer, Autonomous Systems

October 2020 - June 2021

Canyon Robotics Lab

Temecula, CA

Supported supervised development of an autonomous mobile robot stack through log analysis, C++ integration, labeled scenario preparation, hardware testing, and repeatable documentation. Quiet improvements gave engineering teams clearer evidence during difficult debugging sessions.

- Implemented **Python** utilities for robot logs and sensor data during navigation **debugging**
- Extended C++ components under senior review, improving data flow between **perception** and **planning** interfaces
- Prepared labeled scenario sets covering obstacles, localization uncertainty, and constrained navigation paths
- Ran repeatable hardware tests after software and model updates, comparing behavior with scenario outcomes
- Built analysis scripts that surfaced recurring error patterns across robot test runs
- Maintained experiment, dataset, and configuration notes so findings stayed reproducible across teams

Robotics Engineering Associate, Autonomous Systems

October 2019 - September 2020

Granite Motion Systems

Escondido, CA

Supported indoor autonomous robot prototype development through Python testing, C++ changes, sensor recording, telemetry analysis, and machine learning data preparation. Built early habits around careful evidence collection and practical hardware validation.

- Supported an indoor autonomous robot prototype with Python utilities and small C++ changes
- Collected sensor recordings from laboratory and warehouse trials with timestamps and configuration details
- Executed **perception** and **planning** test plans on physical hardware, documenting regressions across repeated scenarios

- Created **telemetry** scripts that reduced manual inspection across builds and experimental configurations
- Prepared data subsets for **machine learning** experiments and checked labels against sensor sequences
- Coordinated test evidence with **robotics** and machine learning engineers during integration reviews

PROJECTS

Site Failure Evaluation Pipeline 📅 2024

Created a reusable workflow for converting deployed robot failures into labeled datasets, regression cases, and acceptance criteria. Connected telemetry review with model evaluation and deployment validation across site specific scenarios.

Learned Navigation Regression Study 📅 2022

Evaluated learned navigation behavior against curated sensor sequences and physical robot trials. Compared model candidates across recurring trajectory errors, unusual traffic, and constrained paths before deployment decisions.

LEADERSHIP & AWARDS

- Recognized by robotics and deployment peers for turning difficult production failures into reproducible evaluation cases.
- Selected by engineering leadership to support customer use cases from prototype validation through live robot operation.
- Trusted reviewer for model artifacts, dataset versions, and physical robot rollout evidence.

EDUCATION

Bachelor's Degree in Computer Science

2019

California State University San Marcos GPA: 3.5

San Marcos, CA

Coursework: Machine Learning, Robotics, Data Structures, Algorithms, Software Engineering

CERTIFICATIONS

- Deep Learning Specialization 📅 2021
- C++ Programming for Robotics 📅 2020

TECHNICAL SKILLS

- **Programming Languages:** Python, C++, Bash
- **Machine Learning Frameworks:** PyTorch, TensorFlow, scikit learn
- **Autonomy Functions:** Perception, prediction, planning
- **Data Engineering:** ML data pipelines, dataset curation, data labeling
- **Model Operations:** Model training, model fine tuning, model evaluation
- **Robot Systems:** Autonomous systems, learned navigation, sensor fusion
- **Production Diagnostics:** Telemetry analysis, log analysis, model outputs
- **Deployment Validation:** Model deployment, rollout validation, rollback criteria
- **Testing Methods:** Regression testing, scenario testing, hardware validation
- **Software Integration:** Inference integration, C++ interfaces, configuration checks

SKILLS

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|--------------------|----------------------|----------------------|--------------------|
| • Python | • Robotics | • Planning | • Model evaluation |
| • C++ | • Autonomous systems | • Learned navigation | • Data labeling |
| • PyTorch | • Perception | • Model training | • Model deployment |
| • Machine learning | • Prediction | • Model fine tuning | |

PROFESSIONAL AFFILIATIONS

- Robotics Industries Association, professional member focused on deployed autonomy.
- Association for Computing Machinery, computing professional member.

LANGUAGES

- English (Native)
- Spanish (Intermediate)

ADDITIONAL INFORMATION

Work Status : Authorized to work in United States. No sponsorship required.

REFERENCES

AVAILABLE ON REQUEST