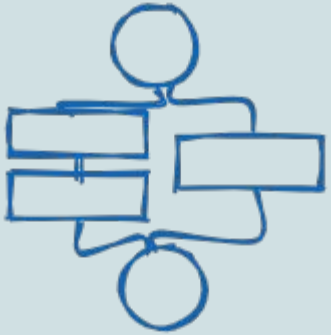
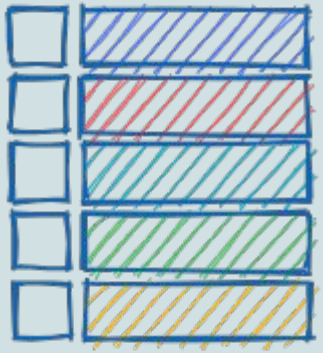
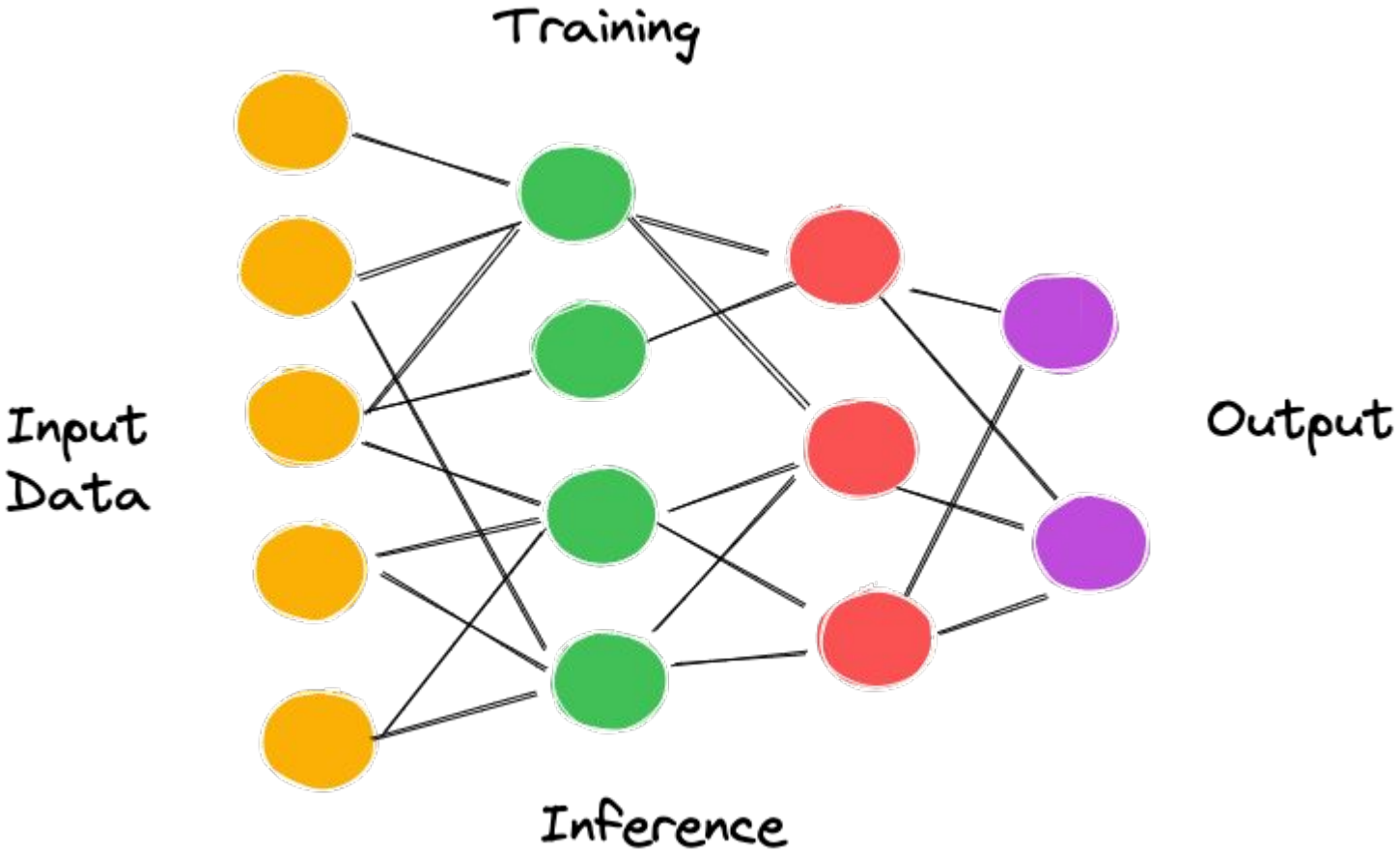
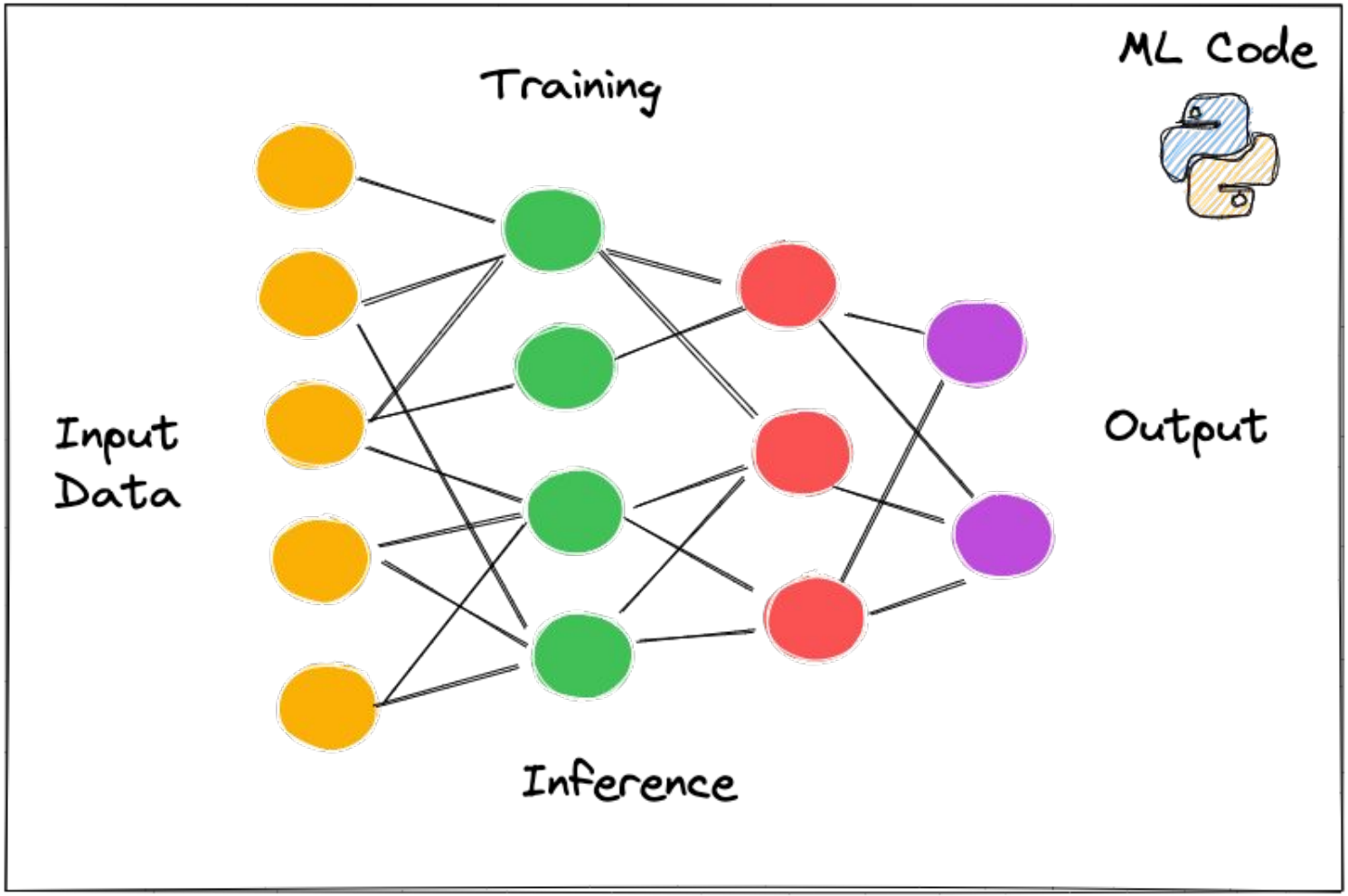
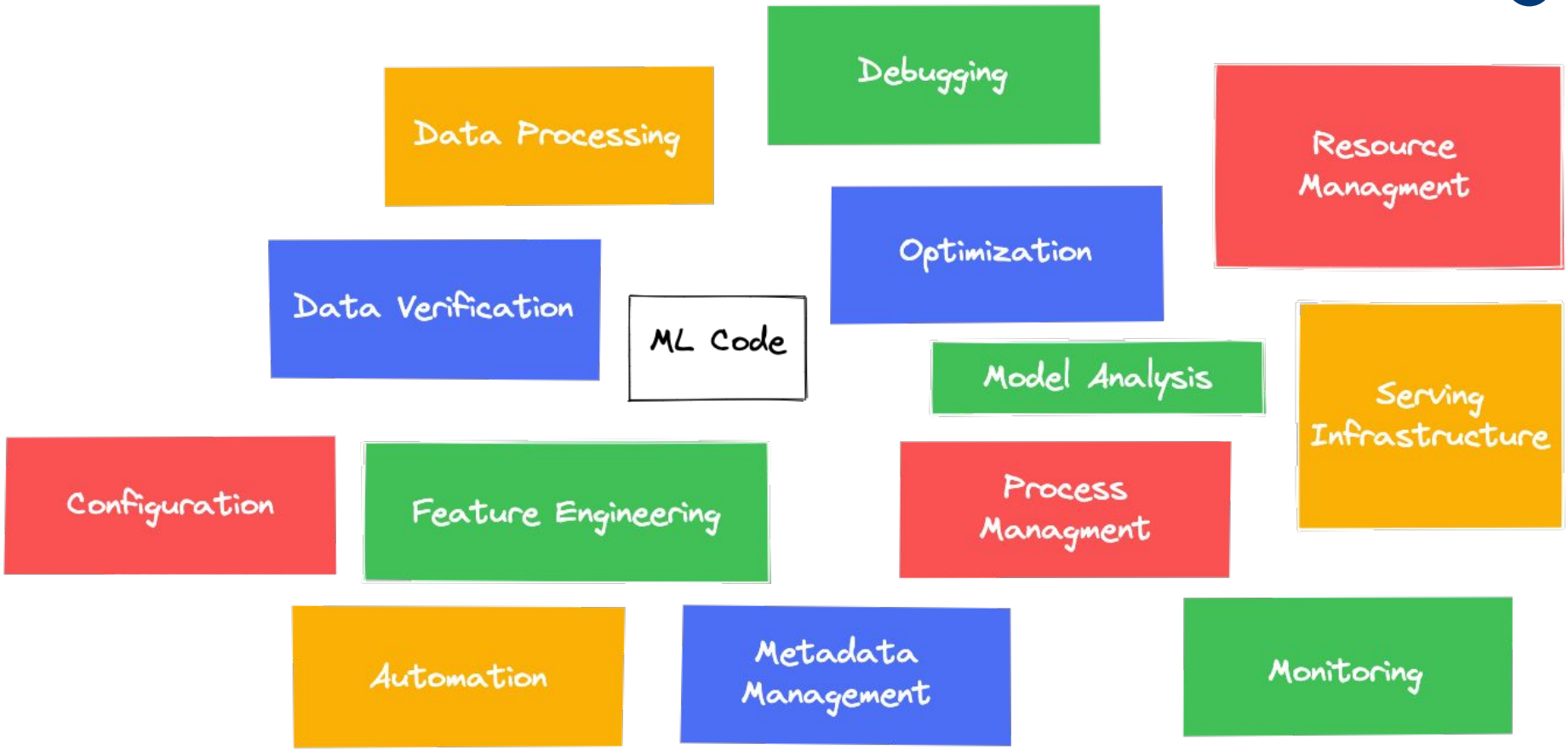


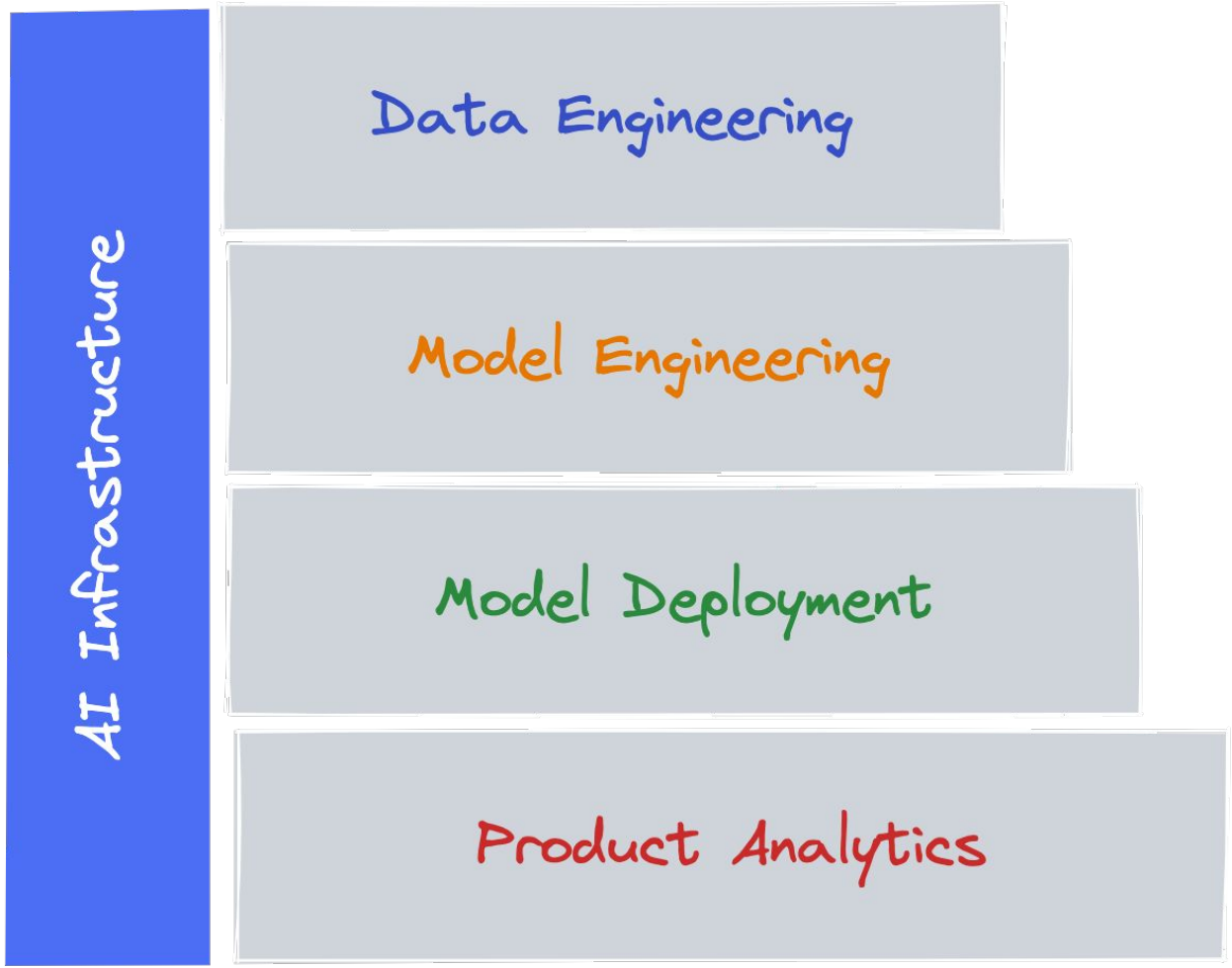


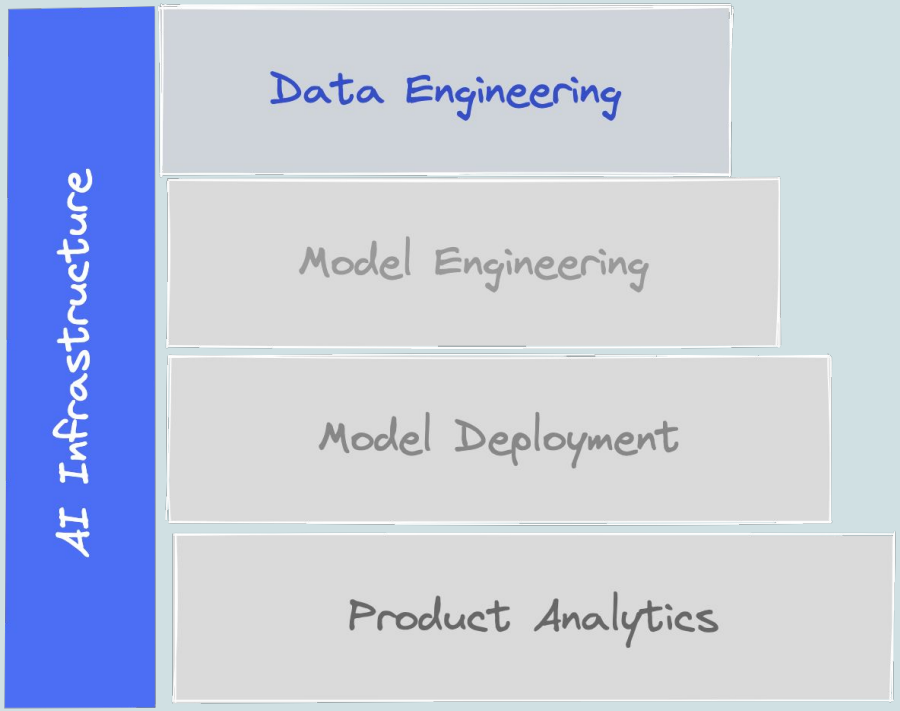
AI Lifecycle and ML Workflow


Training
Input Data
Output
Inference


ML Code
Training
Input Data
Output
Inference

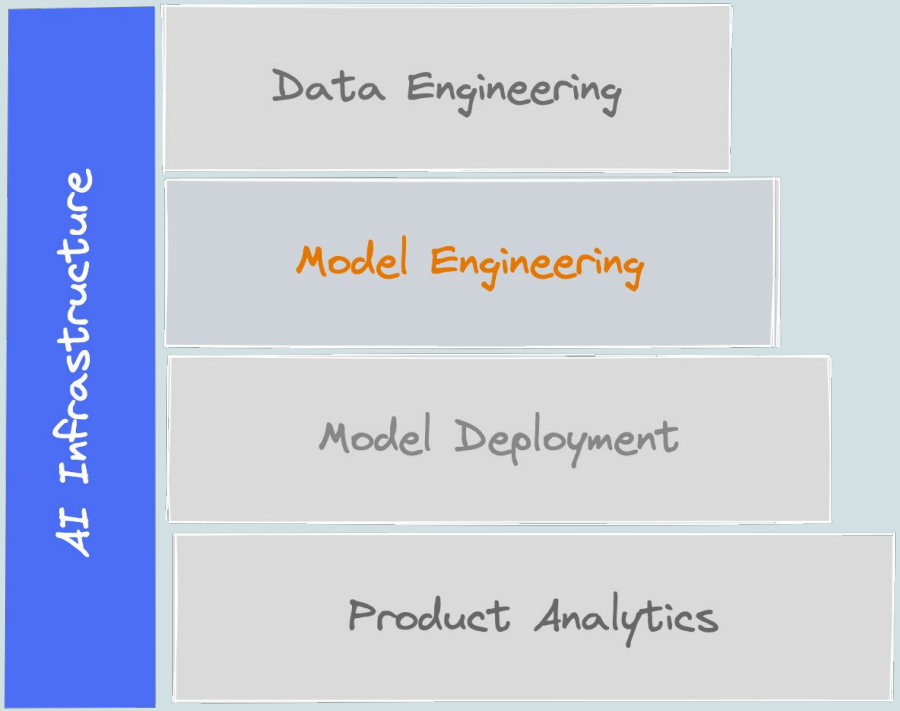

Debugging
Data Processing
Resource Managment
Optimization
Data Verification
ML Code
Model Analysis
Serving Infrastructure
Configuration
Feature Engineering
Process Managment
Automation
Metadata Management
Monitoring


AI Infrastructure
Data Engineering
Model Engineering
Model Deployment
Product Analytics



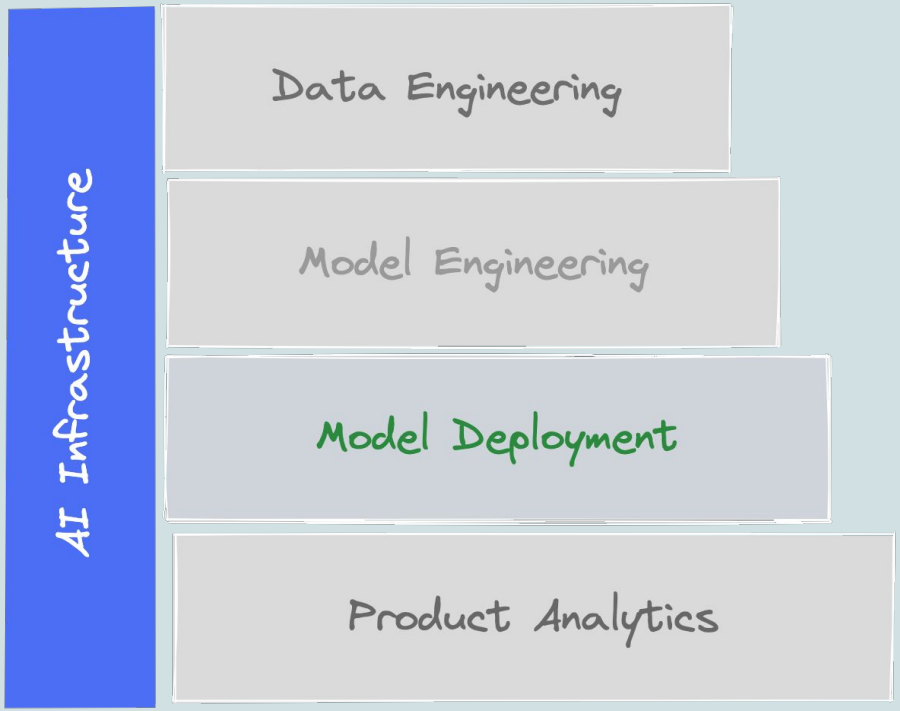
Data Engineering

- Defining data requirements
- Collecting data
- Labelling the data
- Inspect and clean the data
- Prepare data for training
- Augment the data
- Add more data



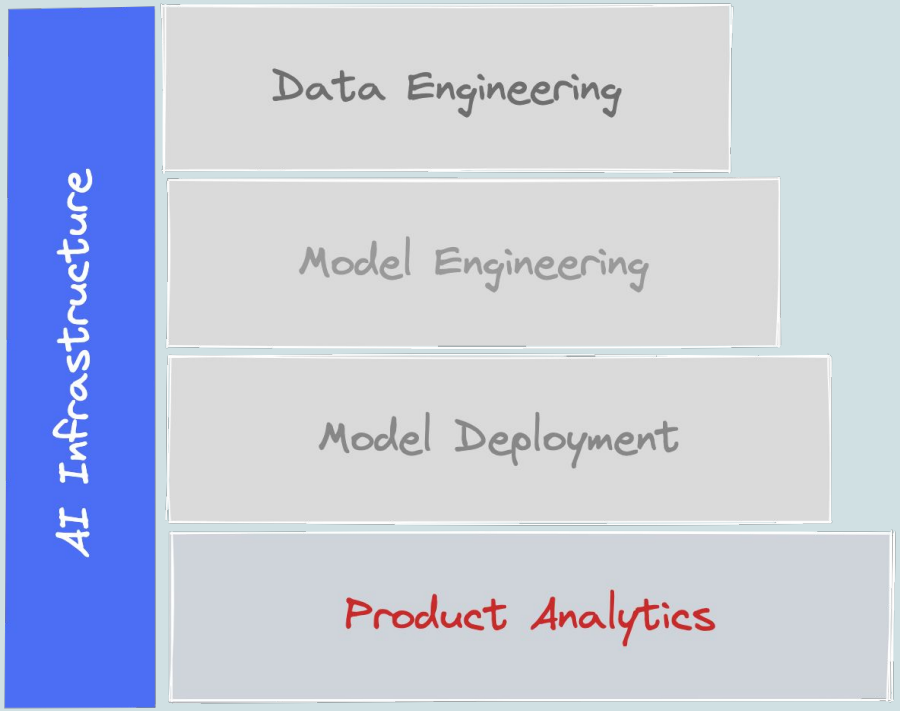
Model Engineering

- Training ML models
- Improving training speed
- Setting target metrics
- Evaluation against metrics
- Optimizing model training
- Keeping up with SOTA



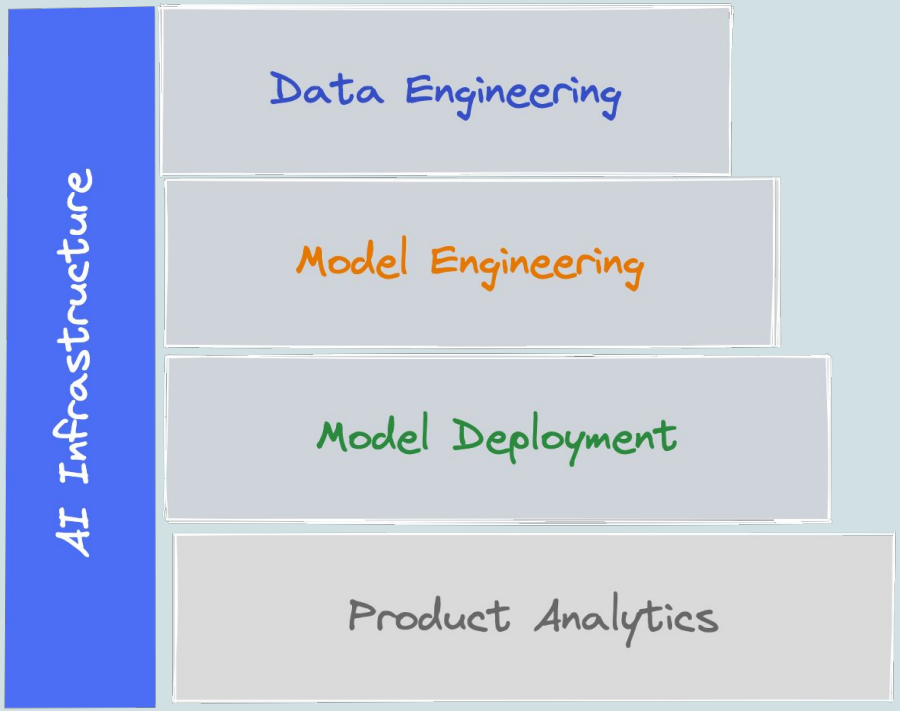
Model Deployment

- Model conversion
- Performance optimization
- Energy-aware optimizations
- Security and privacy
- Inference serving APIs
- On-device fine-tuning

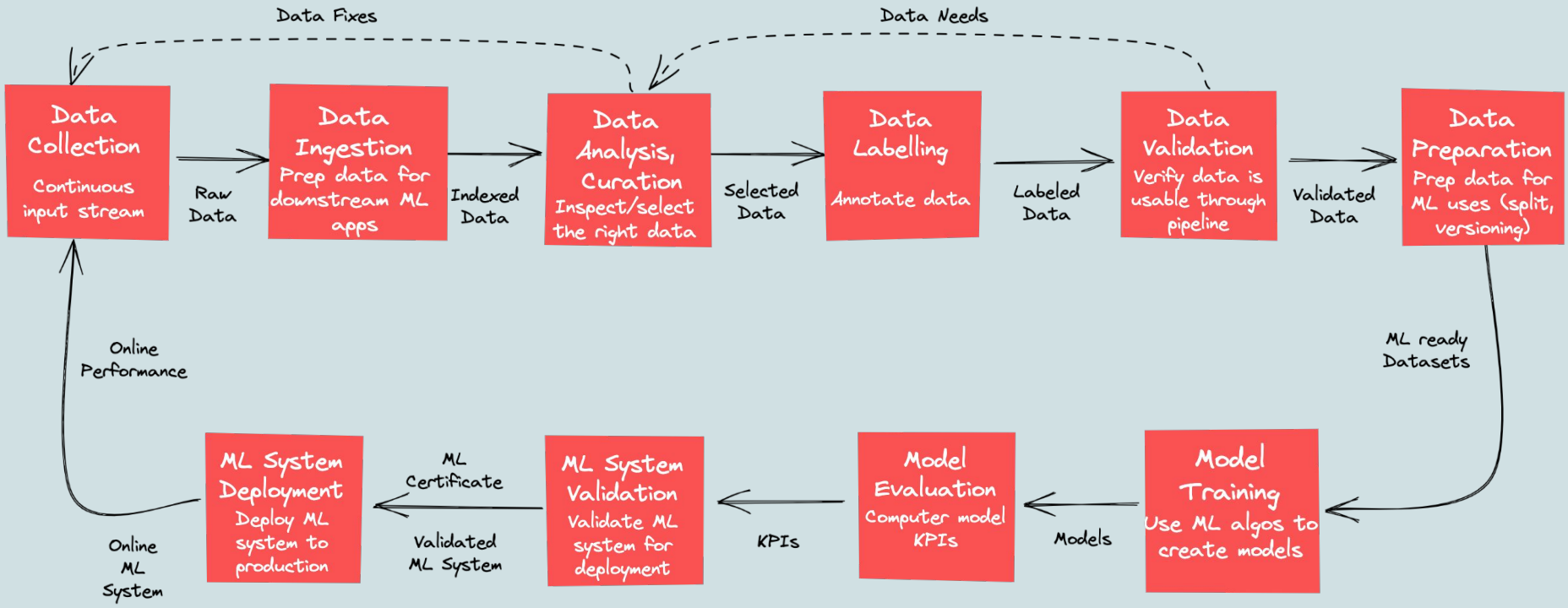


Product Analytics

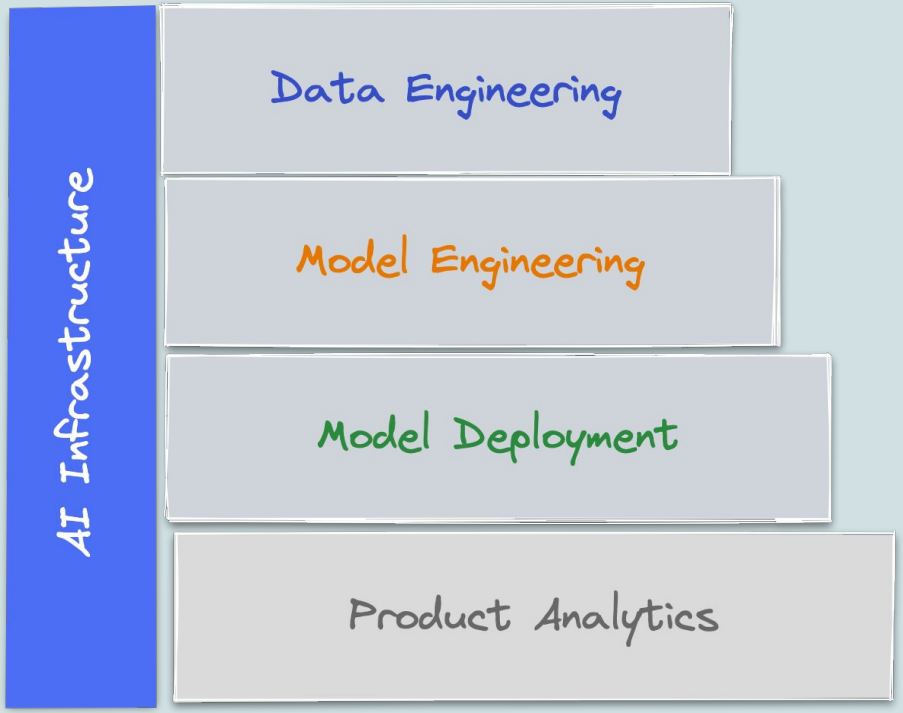
- Dashboards
- Field data evaluation
- Value-added for business
- Opportunities for advancement and improvements



Focus in TinyML


Data Fixes
Data Needs
Data Collection
Continuous input stream
Raw Data
Data Ingestion
Prep data for downstream ML apps
Indexed Data
Data Analysis, Curation
Inspect/select the right data
Selected Data
Data Labelling
Annotate data
Labeled Data
Data Validation
Verify data is usable through pipeline
Validated Data
Data Preparation
Prep data for ML uses (split, versioning)
ML ready Datasets
Model Training
Use ML algos to create models
Models
Model Evaluation
Computer model KPIs
KPIs
ML System Validation
Validate ML system for deployment
ML Certificate
Validated ML System
ML System Deployment
Deploy ML system to production
Online ML System
Online Performance

ML Workflow


AI Infrastructure
Data Engineering
Model Engineering
Model Deployment
Product Analytics

Acoust Sensors

Ultrasonic, Microphones, Geophones, Vibrometers

Image Sensors

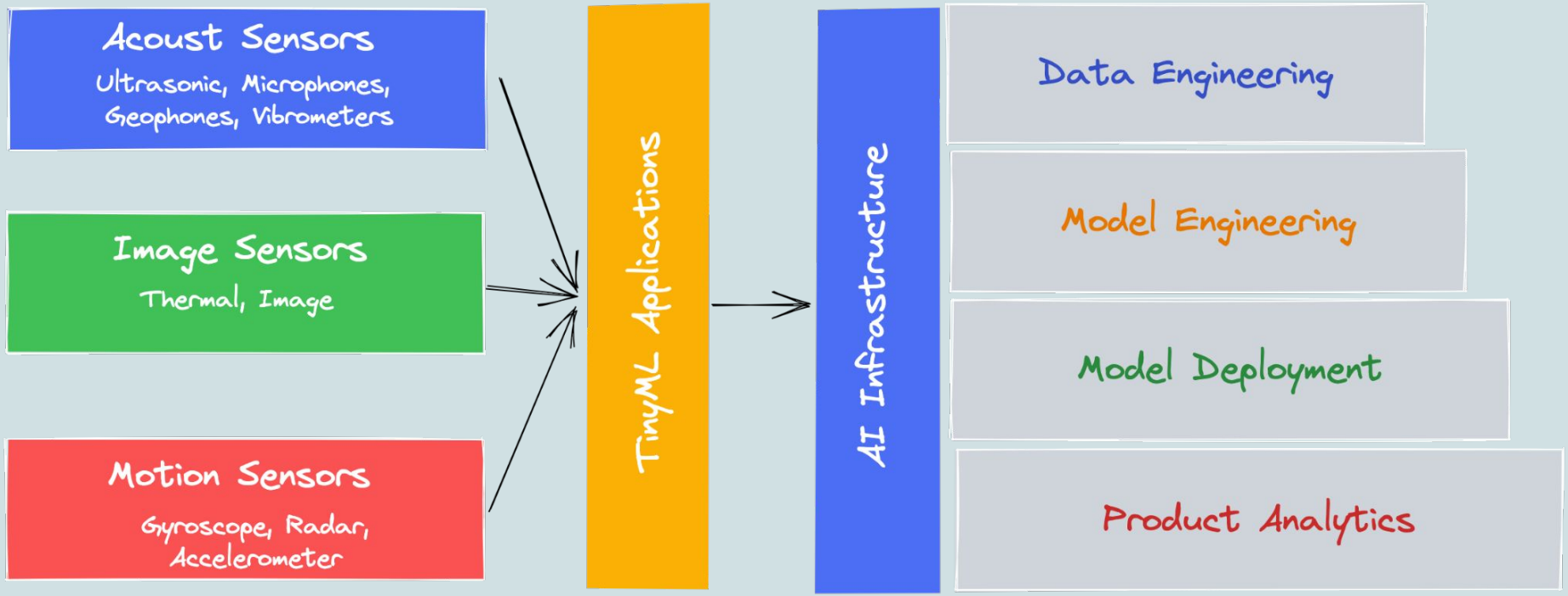
Thermal, Image

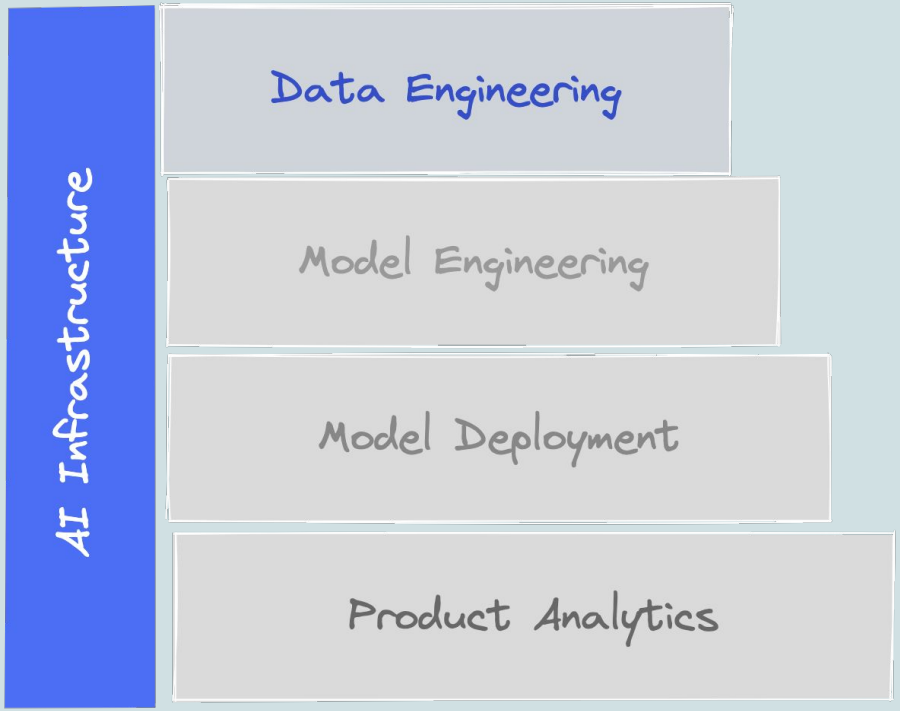
Motion Sensors

Gyroscope, Radar, Accelerometer

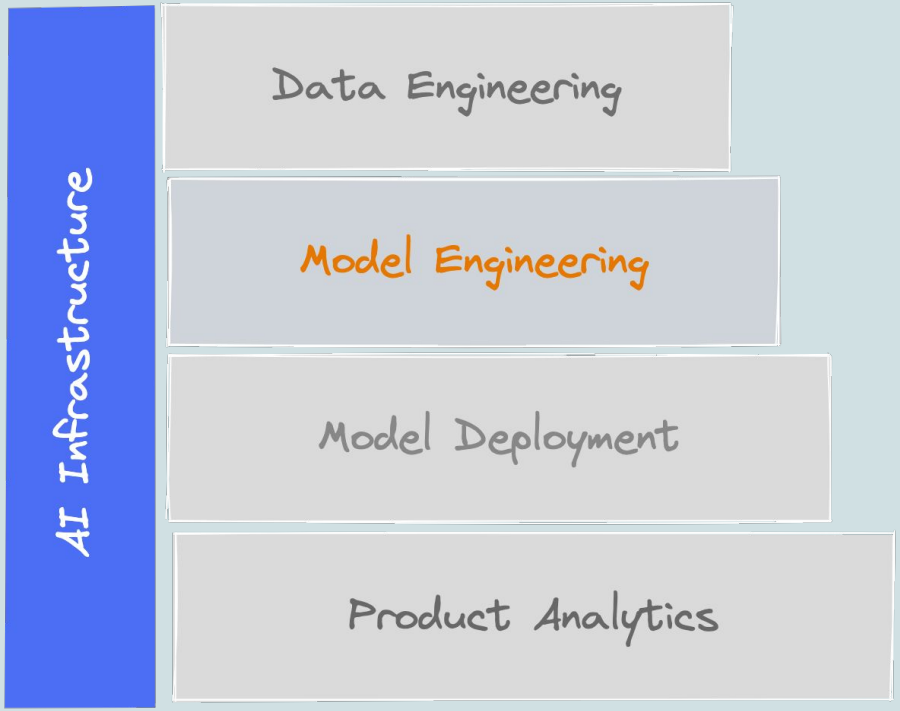
AI Infrastructure

- Data Engineering
- Model Engineering
- Model Deployment
- Product Analytics

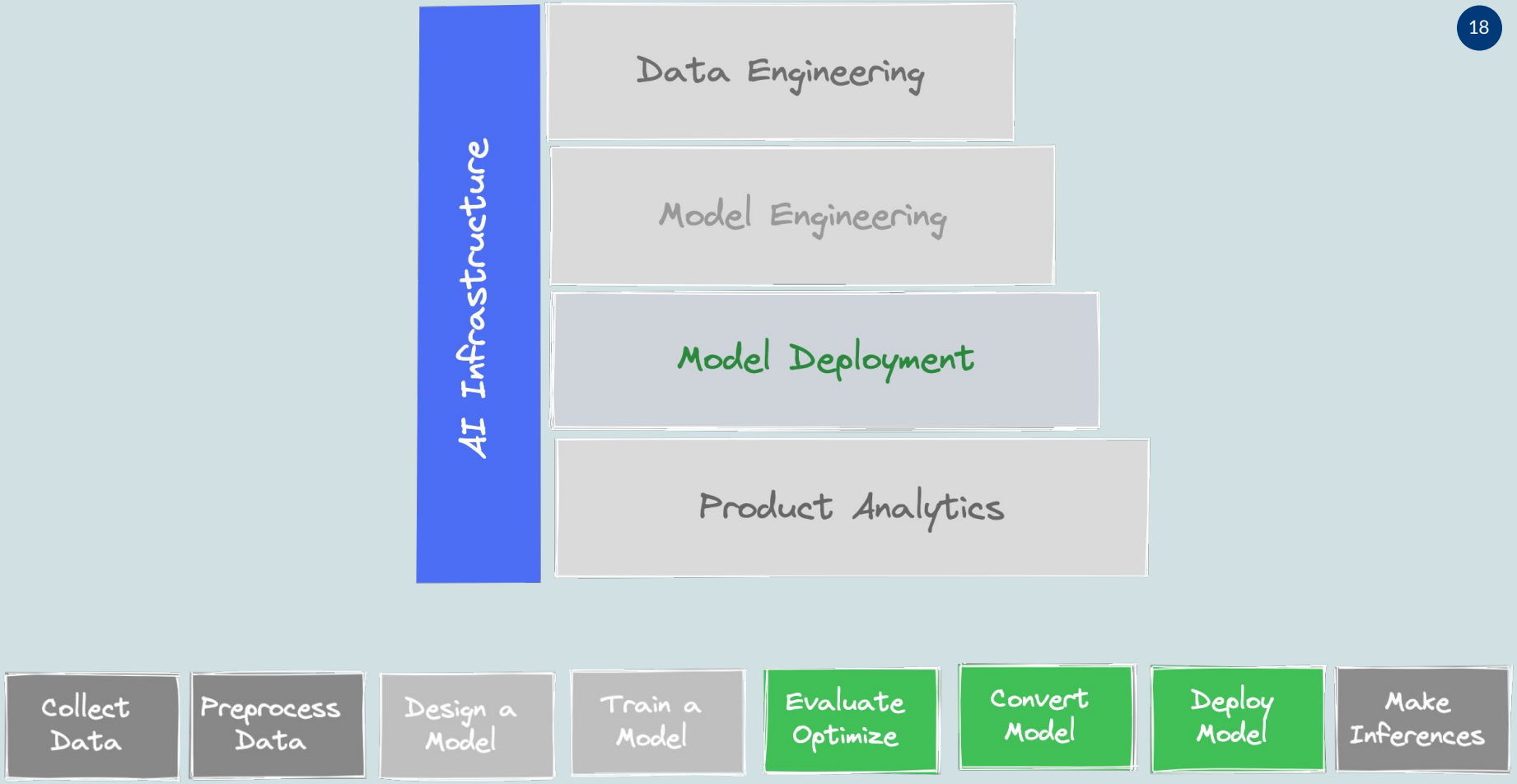

Acoust Sensors
Ultrasonic, Microphones, Geophones, Vibrometers
Image Sensors
Thermal, Image
Motion Sensors
Gyroscope, Radar, Accelerometer
TinyML Applications
AI Infrastructure
Data Engineering
Model Engineering
Model Deployment
Product Analytics

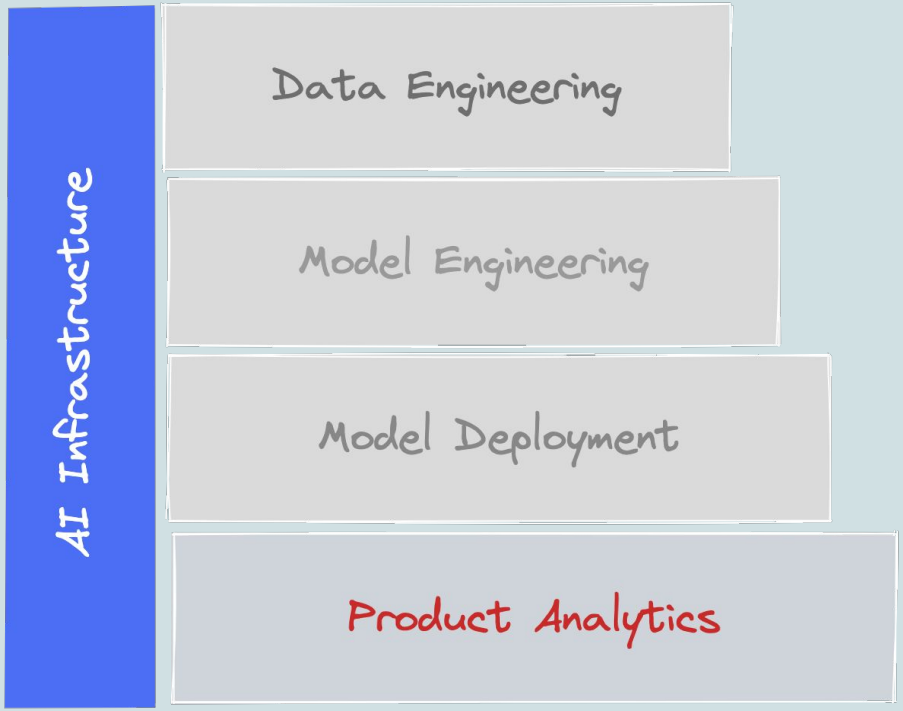


Collect Data | Preprocess Data | Design a Model | Train a Model | Evaluate Optimize | Convert Model | Deploy Model | Make Inferences

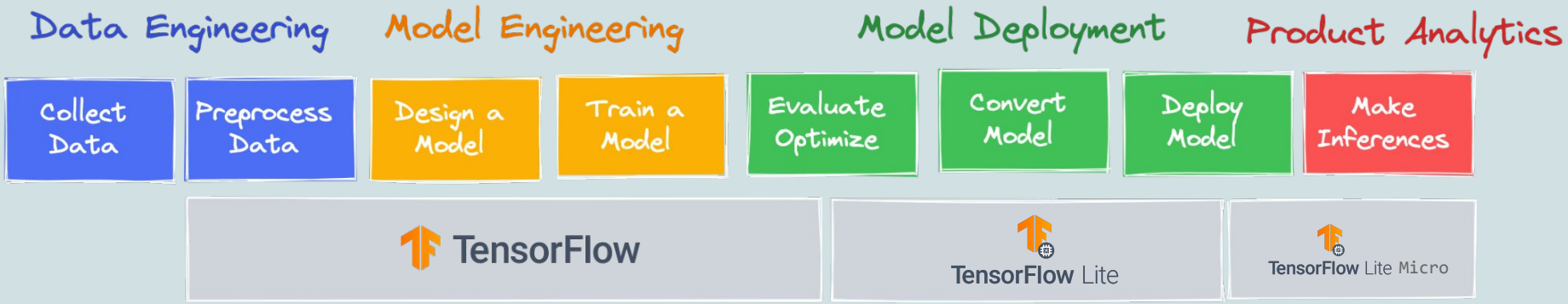


Collect Data | Preprocess Data | Design a Model | Train a Model | Evaluate Optimize | Convert Model | Deploy Model | Make Inferences


AI Infrastructure
Data Engineering
Model Engineering
Model Deployment
Product Analytics
Collect Data
Preprocess Data
Design a Model
Train a Model
Evaluate Optimize
Convert Model
Deploy Model
Make Inferences



Collect Data | Preprocess Data | Design a Model | Train a Model | Evaluate Optimize | Convert Model | Deploy Model | Make Inferences


Data Engineering
Model Engineering
Model Deployment
Product Analytics
Collect Data
Preprocess Data
Design a Model
Train a Model
Evaluate Optimize
Convert Model
Deploy Model
Make Inferences
TensorFlow
TensorFlow Lite
TensorFlow Lite Micro