

# Damage Detection

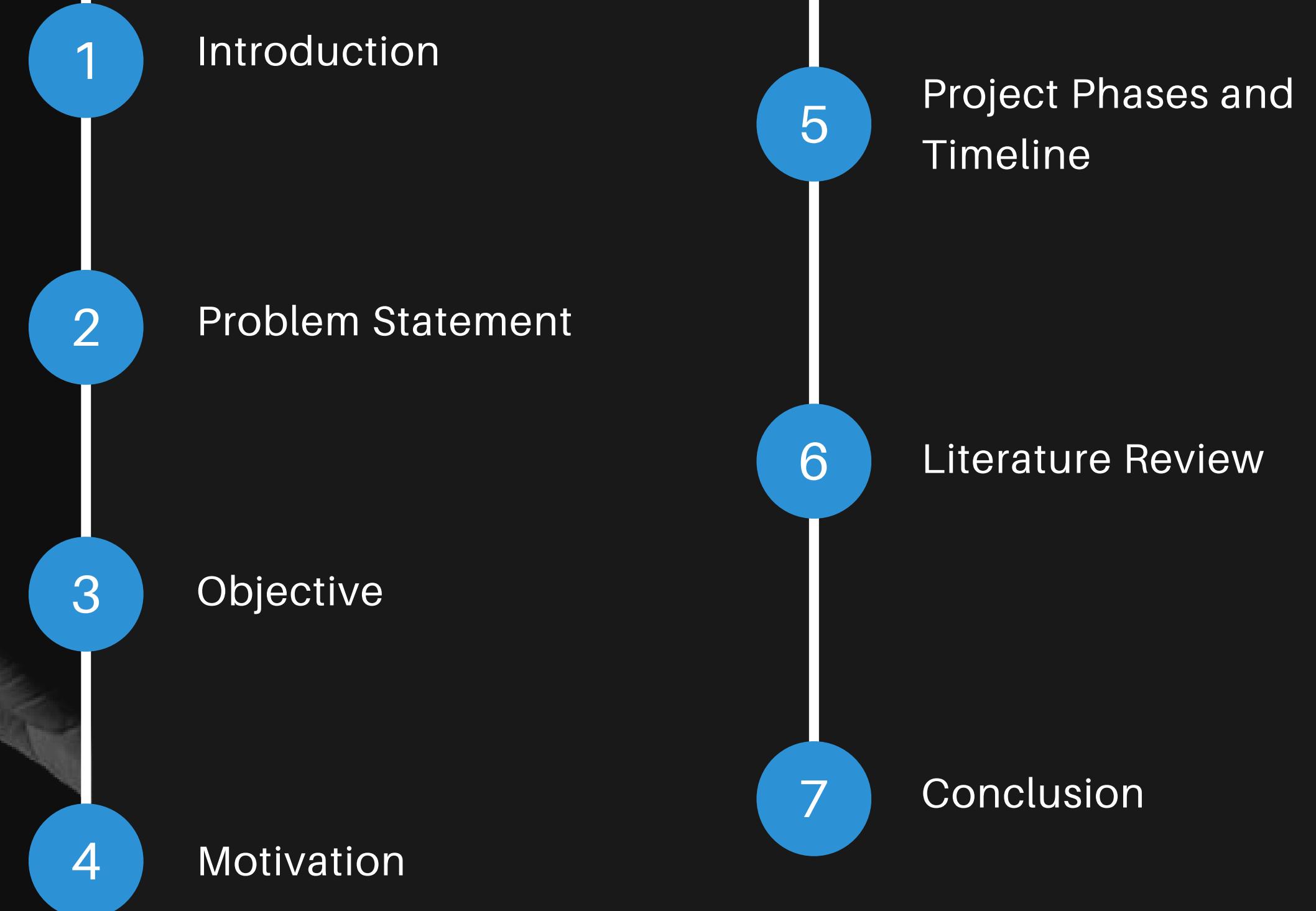
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MACHINE LEARNING MODEL FOR QUALITY ASSURANCE

Team 2

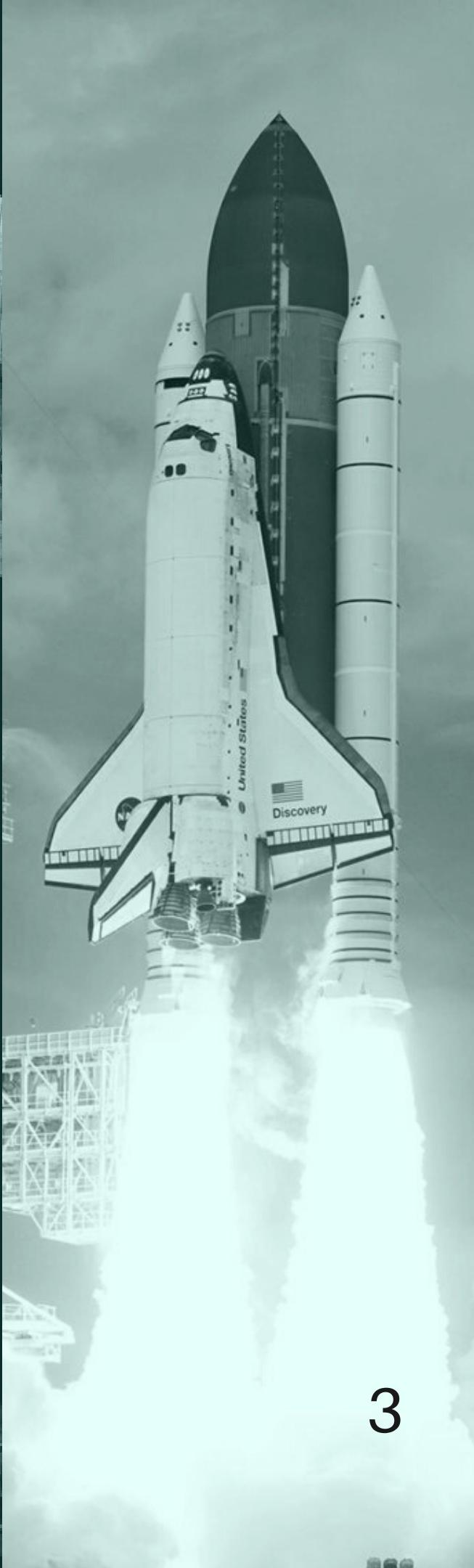
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# Overview



# Problem Statement

- Rockets power military and space exploration. Rocket safety and reliability matter. We should improve component assembly QA.
- Component damage detection ensures rocket safety. Early damage detection saves lives and resources.
- However, harsh environments and limited access make rocket component damage detection difficult.





# Objectives

- Data security of the component are not accessible to other parties, which hamper sensitive components.
- Classification of damages from images should be possible.
- Model should be able to detect damages of components from images with accuracy of 75% and above.
- Creation of a standalone product which doesn't interact with another network.

## Motivation

- Damages in rocket components cause harm to people, damage the payload, and cause overall failure of mission.
- Huge financial loss experienced by industries
- Component quality checks need to be completed in a shorter amount of time.

### \$700 million NASA rocket failures linked to faulty parts from fraud company

NASA suffered more than \$700 million in losses due to rocket failures between 2009 and 2011. The reason a fraudulent company supplied faulty parts to NASA for the rockets. Oregon-based Sapa Profiles, Inc. (SPI) was a manufacturer of aluminium parts for the NASA rockets and the company pleaded guilty of supplying faulty parts to NASA for around two decades. The company also supplied material to the Department of Defense and a few other entities, and has not got to pay up a

figures. Among the traditional reporters were Egypt, re

ures of six moose, a twe

increase on 2011's figures

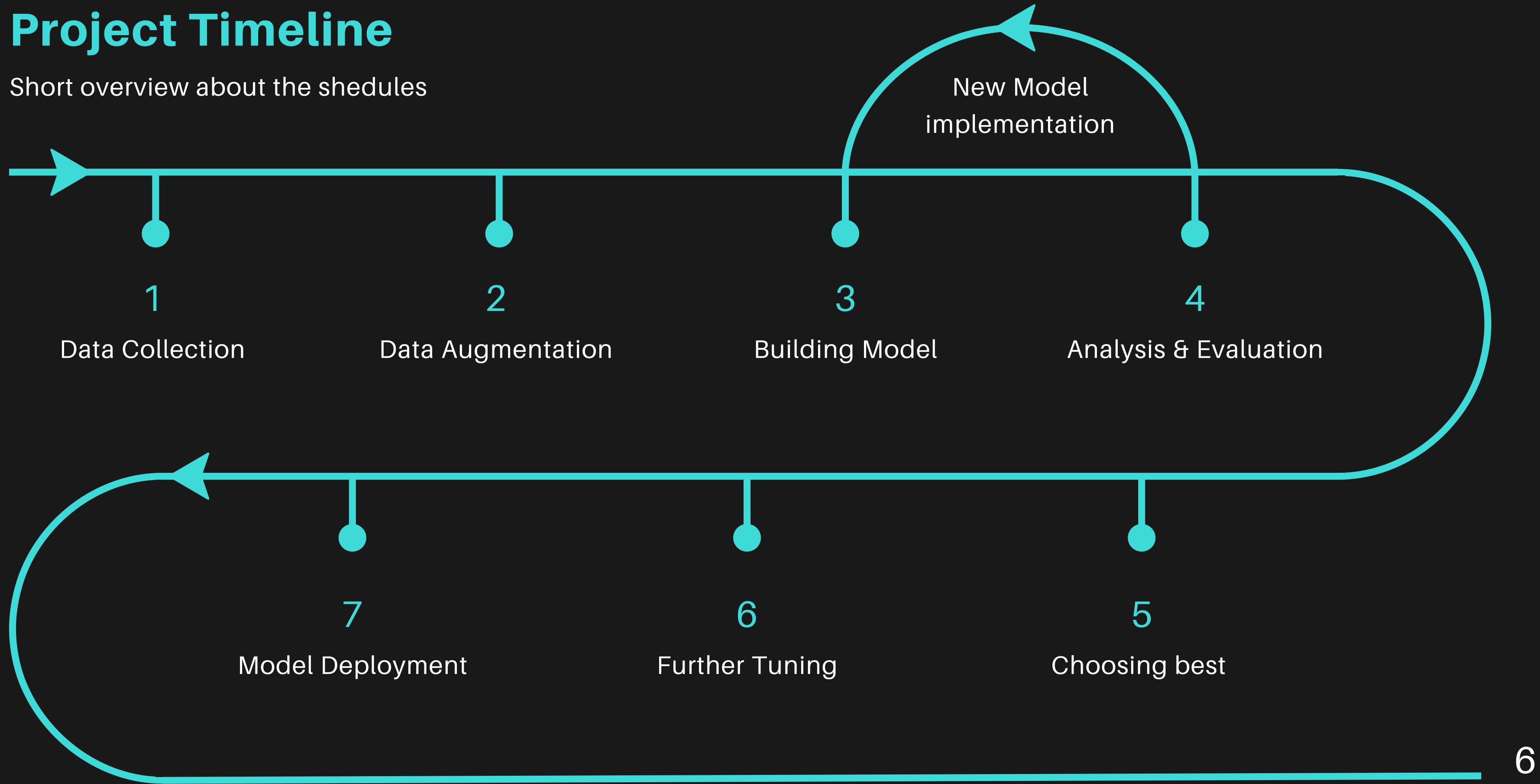
Uruguay whose moose po

mains stable at eleven.

According to Robbie head of the UN Moose tion Council, worldwide numbers are expected to grow on last year due to the moose strongholds of Canada United States, with the developing moose ecologies to make gains. The large agege increase in moose come from China", says The Chinese government has heavily in moose infrastr the past decade, and the ment to macrofauna is b pay dividends". Since 200 expanded moose pasture of arable land to nearly 5 moose numbers are expe

# Project Timeline

Short overview about the schedules



# Literature Review

- Study conducted by Liu (2020), an ANN-based damage detection model was developed to identify the cracks in the aluminum honeycomb sandwich structure of a rocket payload .
- Study conducted by Xie (2020) proposed a hybrid approach that combines an ANN with a support vector machine (SVM) to detect damages in a rocket motor nozzle.
- Researchers have proposed using deep learning models, such as convolutional neural networks (CNNs), to detect damages in rocket components.

# Challenges

1. Limited availability of dataset.
2. Identifying a suitable model with low system requirements.
3. Preventing overfitting and underfitting of the model.

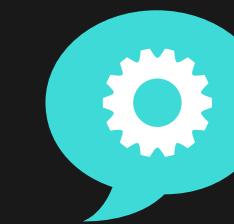


# Tools



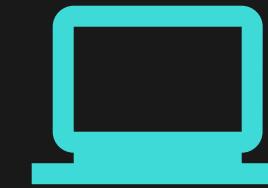
PYTHON

Programming Language



TENSORFLOW AND  
PYTORCH LIBRARY

open-source machine learning  
frameworks

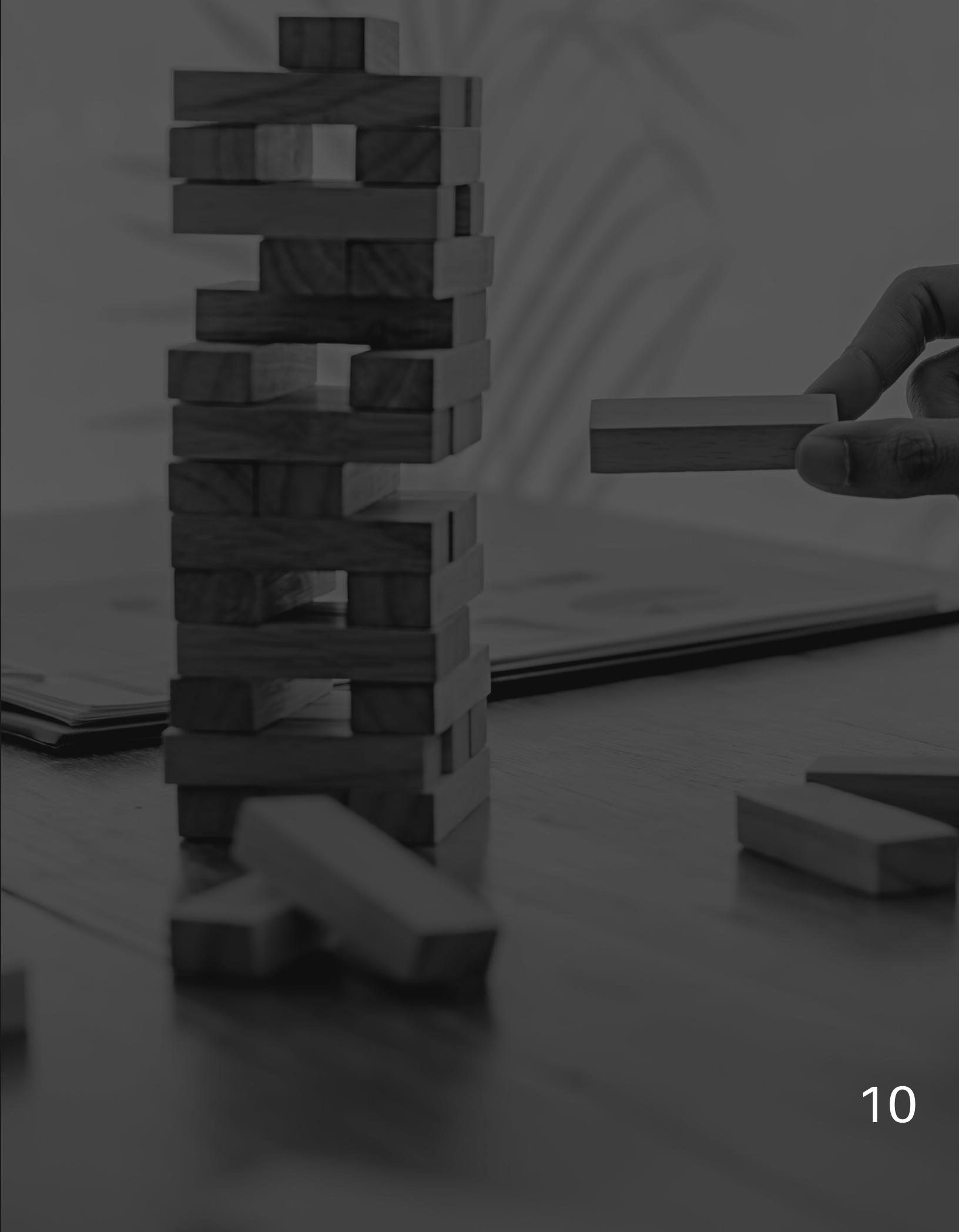


PRETRAINED MODELS

Pretrained models in machine  
learning that have been trained on  
large datasets and preprocessed for  
specific tasks

# Project Model

- Our project will use the iterative and **incremental development model** for flexibility and adaptability to changes in requirements and data.
- This will enable quick responses to changing requirements and allow for continuous refinement and improvement of the project.



# Team Details

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Data Preprocessing

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Model Development

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Model Development



# Thankyou

