

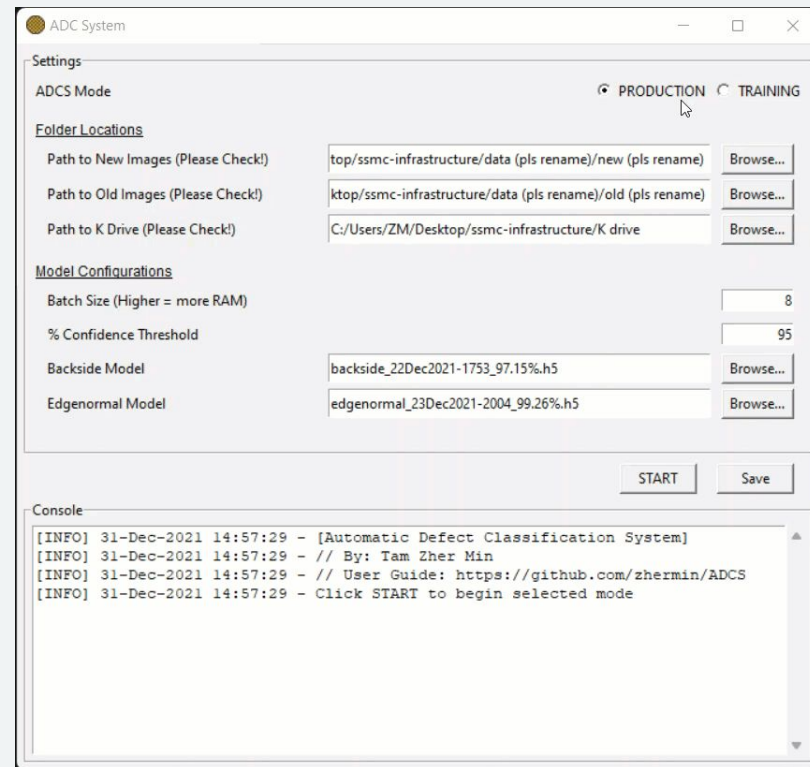
# ADCS

## Automatic Defect Classification System

By: Tam Zher Min

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User Guide: <https://github.com/zhermin/ADCS>



The screenshot shows the 'ADC System' application window. At the top, there are radio buttons for 'PRODUCTION' (selected) and 'TRAINING'. Below this is a 'Settings' section with two sub-sections: 'Folder Locations' and 'Model Configurations'. The 'Folder Locations' section has three rows, each with a label, a text input field, and a 'Browse...' button. The 'Model Configurations' section has four rows, each with a label, a text input field, and a 'Browse...' button. At the bottom right of the settings section are 'START' and 'Save' buttons. Below the settings is a 'Console' window showing log messages.

ADC System

Settings

ADCS Mode ☒ PRODUCTION ☐ TRAINING

Folder Locations

Path to New Images (Please Check!) top/ssmc-infrastructure/data (pls rename)/new (pls rename) Browse...

Path to Old Images (Please Check!) ktop/ssmc-infrastructure/data (pls rename)/old (pls rename) Browse...

Path to K Drive (Please Check!) C:/Users/ZM/Desktop/ssmc-infrastructure/K drive Browse...

Model Configurations

Batch Size (Higher = more RAM) 8

% Confidence Threshold 95

Backside Model backside\_22Dec2021-1753\_97.15%.h5 Browse...

Edgenormal Model edgenormal\_23Dec2021-2004\_99.26%.h5 Browse...

START Save

Console

```
[INFO] 31-Dec-2021 14:57:29 - [Automatic Defect Classification System]
[INFO] 31-Dec-2021 14:57:29 - // By: Tam Zher Min
[INFO] 31-Dec-2021 14:57:29 - // User Guide: https://github.com/zhermin/ADCS
[INFO] 31-Dec-2021 14:57:29 - Click START to begin selected mode
```

# ADCS Summary

- ADCS finds all KLA files and wafer scans from AVI machine in the “New” folder
- ADCS then looks at all of the images and **classifies** them
- At the end, ADCS will move the KLA files and scans to the correct folders
  1. Copy only **scans with defects** (ignore AOK and edgetops) to “K Drive”
  2. Move **all scans** to “Old” folder for backup
- Operator will only need to manage the backup folder and **sort the scans**

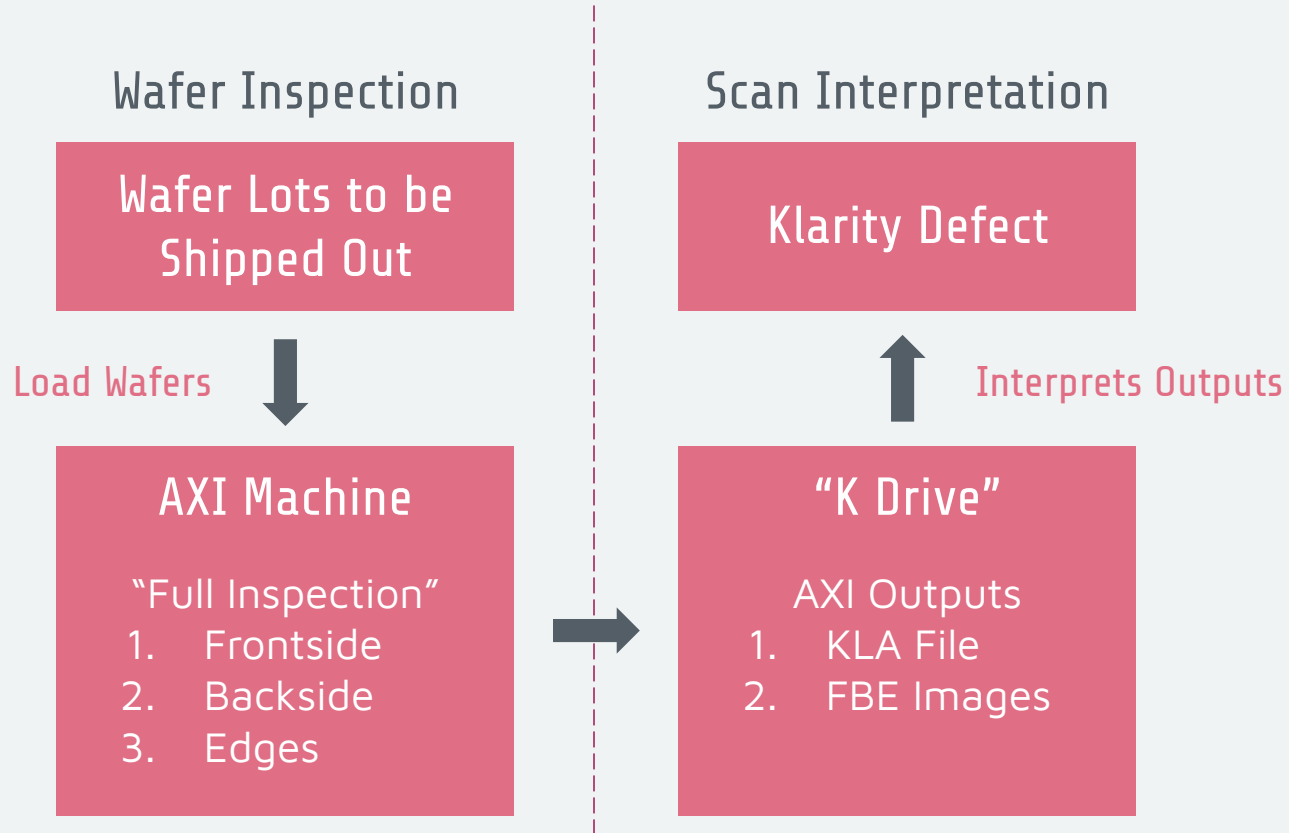
# 01

## Data Flow

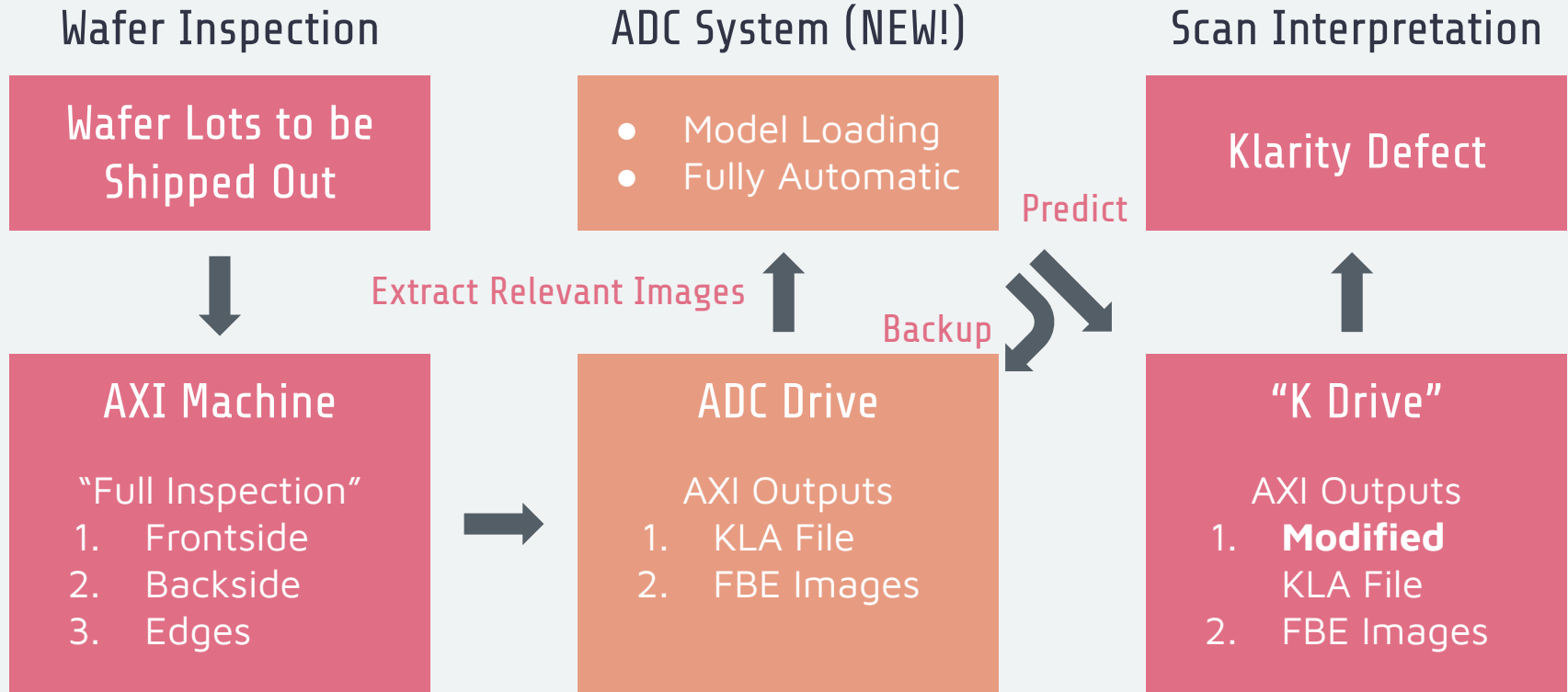
Flow of KLA files  
and wafer scans



# Current State



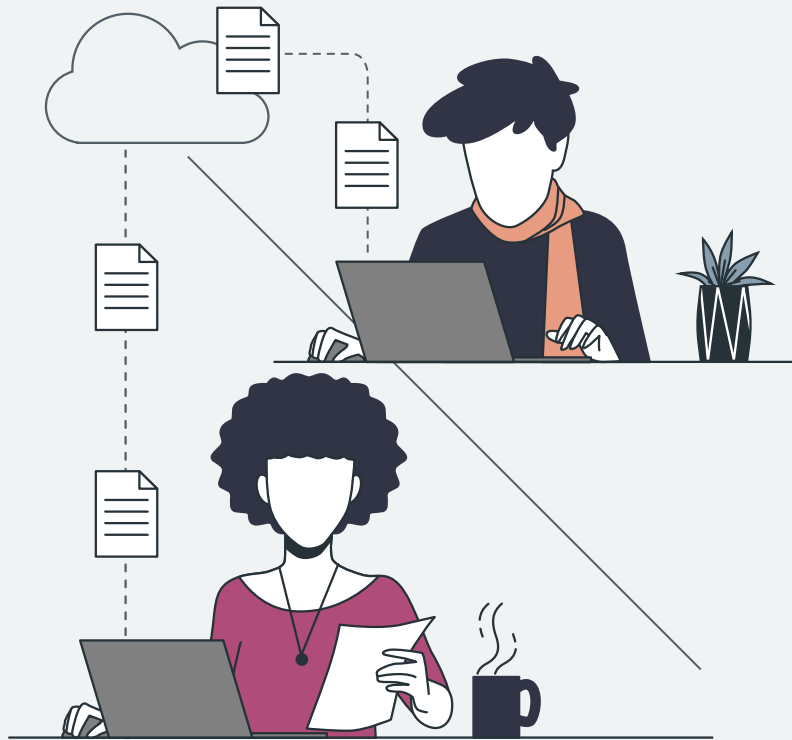
# Future State with ADCS



# 02

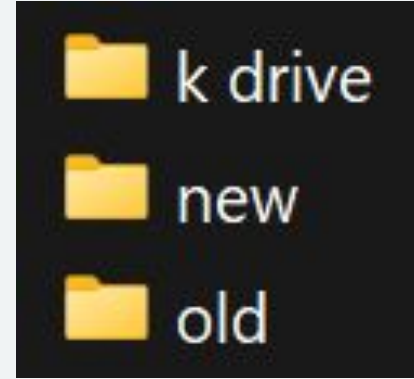
## Sorting Guide

What to do after ADCS has  
classified the wafer scans



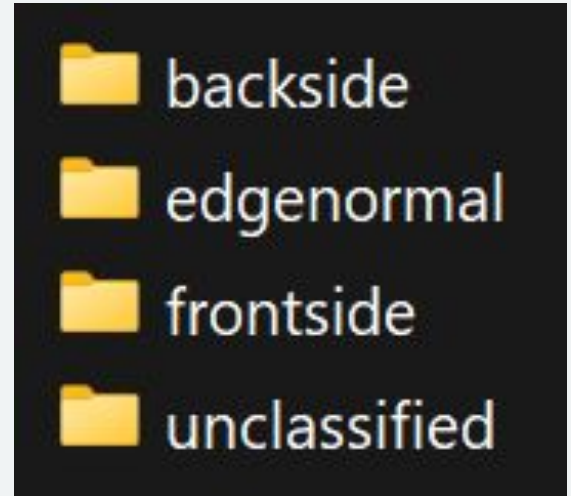
# Step 1

- Go into the “old” folder, where the backups are stored
- You don’t have to access the “k drive” folder or “new” folder



# Step 2







- Inside the “old” folder will be 4 subfolders
  1. \*backside (for backside scans)
  2. \*edgenormal (for bevel edge scans only, no edge top)
  3. frontside (for frontside scans, they are ignored by the ADCS currently)
  4. unclassified (for wafer maps, edge top scans, or unknown classnumbers)






# Step 3


- After the ADCS has completed classifying a wafer lot, look into the backside folder and edgenormal folder
- Both folders will have 3 subfolders
  1. test (20% of the unsorted images)
  2. trainval (80% of the unsorted images)
  3. unsorted (classified images will first be transferred into this folder, **your job is to sort the images inside this folder into the test and trainval folders**)


 backside test trainval unsorted edgenormal test trainval unsorted

# Step 4

- For edgenormal, there are 2 classes, so there will be **2 folders** inside **EACH** of the **3 folders**
  1. aok (all-OK, normal image, no defects)
  2. chipping (bevel edge chipping)


 edgenormal

 test


 aok


 chipping

 trainval

 aok

 chipping

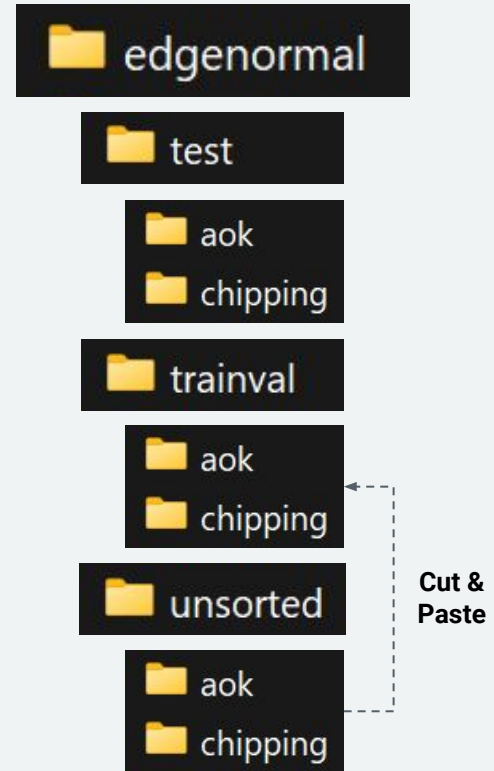
 unsorted

 aok

 chipping

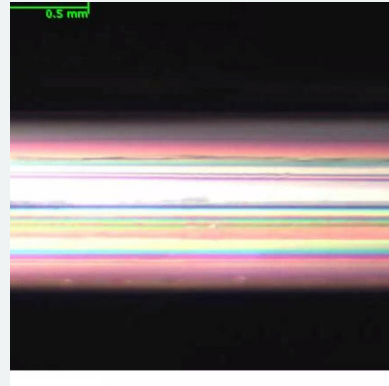
# Step 5

- Check **each** of the defect folders for the wafer lots with defects
- Check if the classifications are correct or not
- After checking, **cut and paste** the images into the **CORRECT** trainval folder
  - Example, if some images from /unsorted/chipping have **no defects**, move them into **/trainval/aok** instead of /trainval/chipping

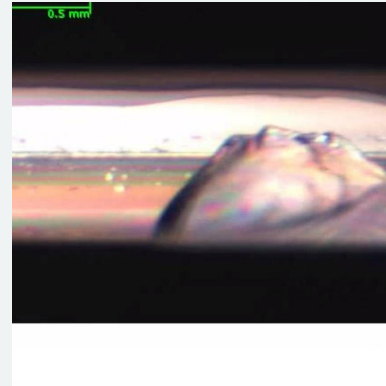


# Edgenormal Classes (2)

[0] AOK





[1] CHIPPING




# Step 4a


- For backside, there are 5 classes, so there will be **5 folders** inside **EACH** of the 3 folders
  1. aok (all-OK, normal image, no defects)
  2. chipping (backside chipping)
  3. scratch (cat-claw)
  4. stain (discoloration, peeling, or probe marks)
  5. whitedot (one whitedot on wafer backside)

 backside


 test


 trainval


 unsorted

 aok

 chipping

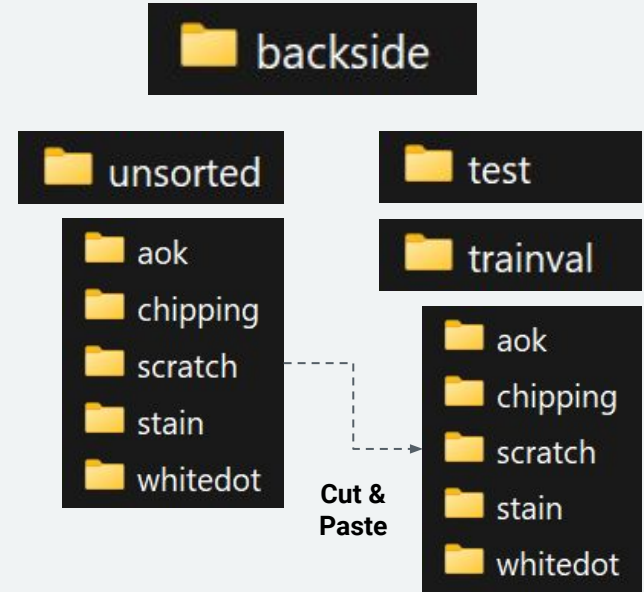
 scratch

 stain

 whitedot

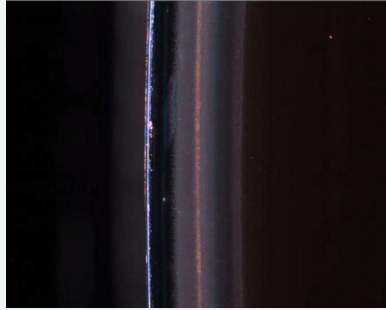
# Step 5a

- Check **each** of the defect folders for the wafer lots with defects
- Check if the classifications are correct or not
- After checking, **cut and paste** the images into the **CORRECT** trainval folder
  - Example, if some images from /unsorted/stain have **no defects**, move them into **/trainval/aok** instead of /trainval/stain

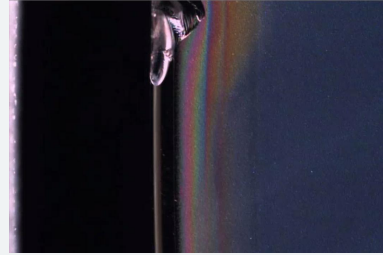


# Backside Classes (5)

[0] AOK



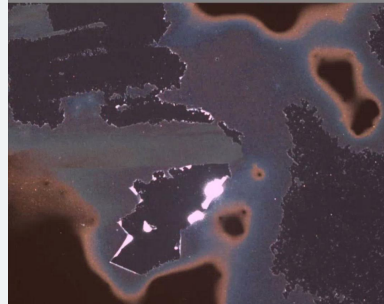
[1] CHIPPING



[2] SCRATCH



[3] STAIN

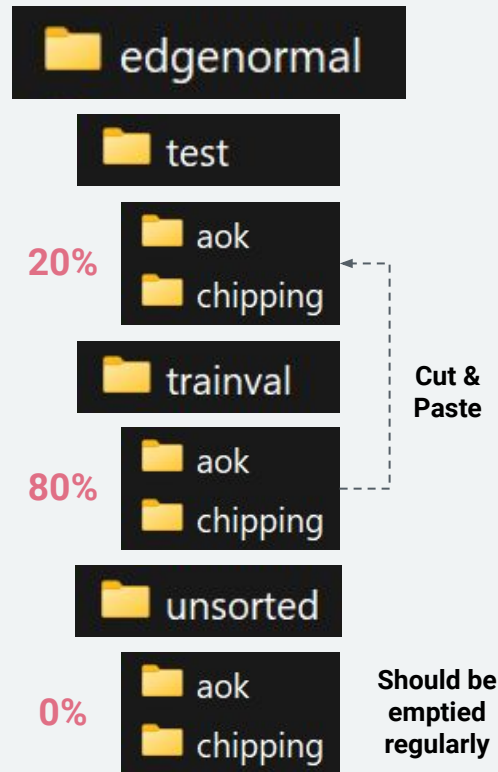


[4] WHITEDOT



# Step 6

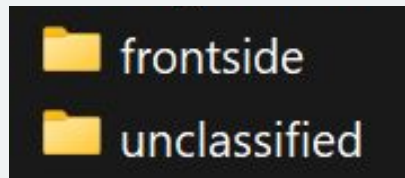
- In the end, all folders in the unsorted folder for backside and edgenormal folders should be **empty**
- But, the trainval folder should grow over time
- The test folder should receive **20%** of the images from the trainval folder before **model training** is done (ADCS' Training Mode)





# Step 7

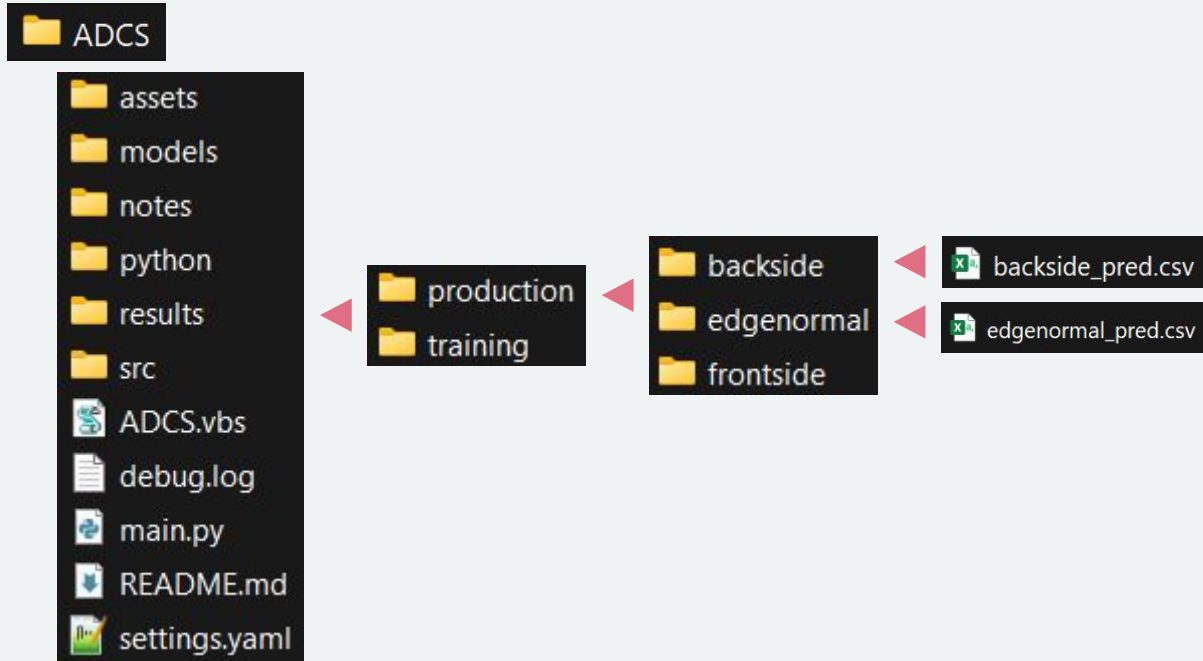
- For the frontside and unclassified folders, you may leave them alone because they are ignored by the back and edge models
- However, both folders will **grow over time**, so you may consider periodically deleting images that are unimportant to **save space**



Can consider clearing them to  
save space after checking

# Step 8 (optional)

- The classification results are also stored in table format as Excel files
- Found in **/ADCS/results/production/backside** & **.../production/edgenormal**



**Examples:**

**M Drive**

**K Drive**

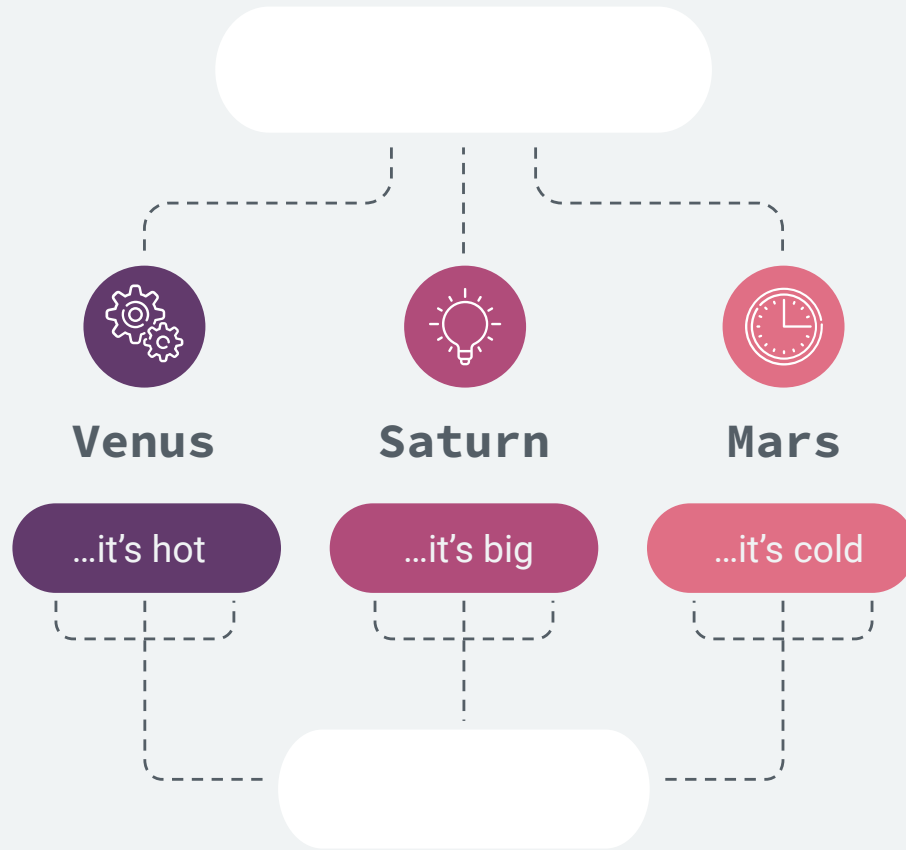
**G Drive**

“new”

“k drive”

“old”





# Agenda

1

## Project schedule

Describe the section briefly



2

## Project timeline

Describe the section briefly



3

## Status report

Describe the section briefly



4

## Upcoming report

Describe the section briefly



# Project timeline



1

**Mars**

Mars is  
actually cold

2

**Venus**

Venus is  
terribly hot



3

**Saturn**

Saturn is the  
ringed one




4

**Jupiter**

Jupiter is a  
gas giant



A young couple is shown from the chest up, looking at a laptop screen. The woman on the left has blonde hair and is wearing a striped shirt. The man on the right has dark skin and curly hair, also wearing a striped shirt. Both are smiling and have their hands raised in a gesture of excitement or surprise. The image is overlaid with a semi-transparent pink filter. The text "A picture is worth a thousand words" is written in white, bold, sans-serif font on the right side of the image. A small white circle is visible in the top right corner.

**A picture  
is worth a  
thousand  
words**

# Upcoming events



## Mars

Mars is a very  
a cold place



## Venus

Venus has a  
nice name



## Saturn

Saturn is the  
ringed planet



## Mercury

Mercury is a  
small planet



## Neptune

Neptune is the  
farthest

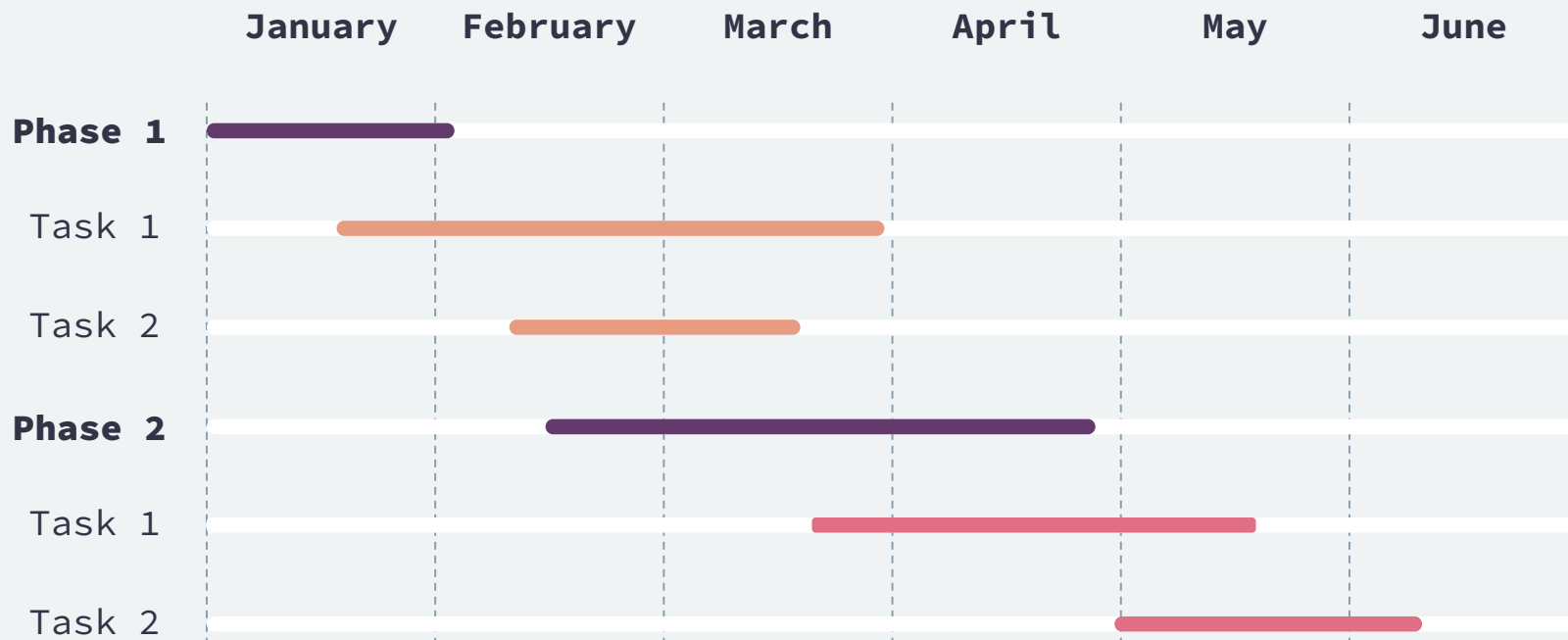


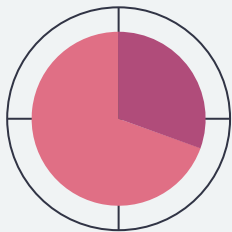
## Jupiter

Jupiter is a  
gas giant too



# Project schedule





**30%**

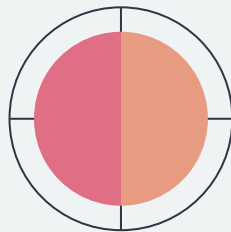
**Jupiter**

**70%**

**Mars**

## **Where we are today**

Saturn is the ringed planet. It's a gas giant and it's composed mostly of hydrogen and helium



**50%**

**Uranus**

**50%**

**Neptune**

## **Where we aim to be**

Venus has a nice name. It's even hotter than Mercury, which is the closest planet to the Sun

# 4,333,000,000

Big numbers catch your audience's attention



# Checklist

## Strategy 1

Mars is a cold place, not hot



## Strategy 2

Venus has a beautiful name



## Strategy 3

Saturn is the ringed one



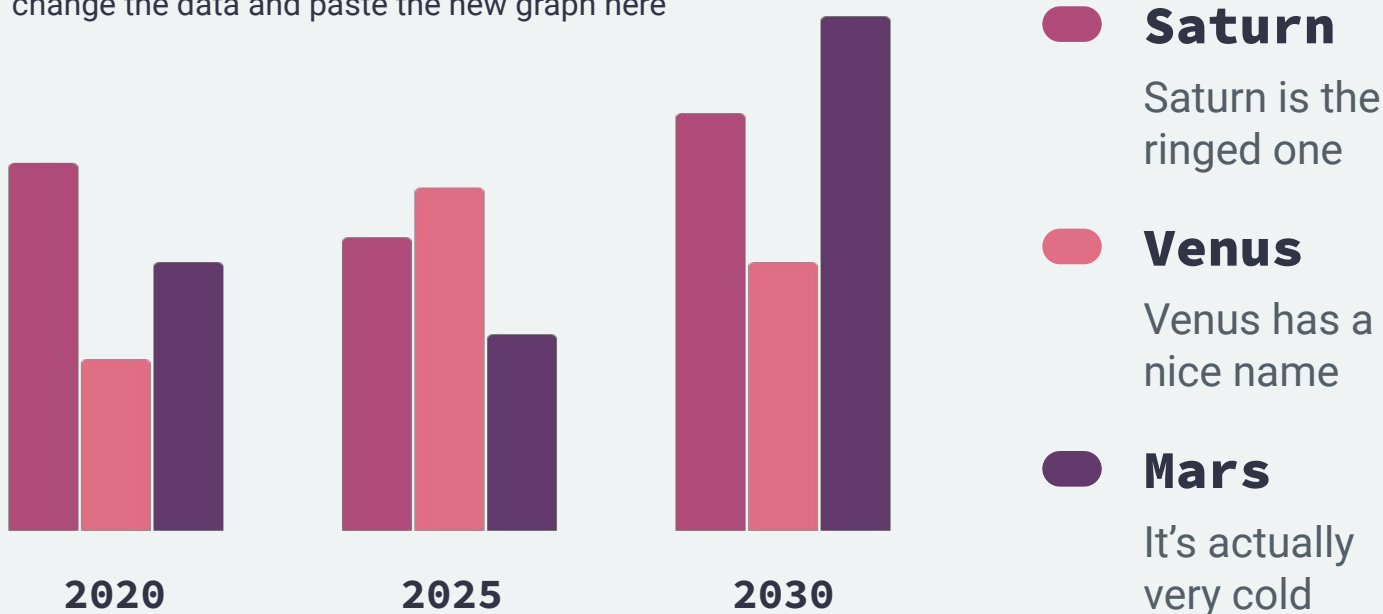


«This is a quote. Words full of wisdom  
that someone important said and can  
make the reader get inspired»

**—SOMEONE FAMOUS**

# KPI dashboard

To modify this graph, click on it, follow the link,  
change the data and paste the new graph here

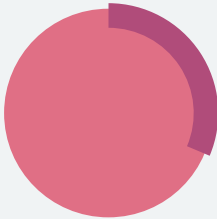


# Check out these percentages

▶ 26%

**Saturn**

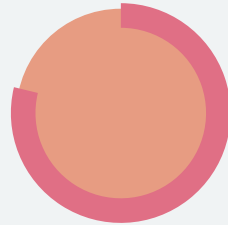
It's the  
ringed one



▶ 77%

**Venus**

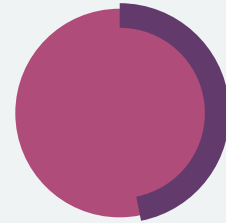
It has a  
nice name



▶ 28%

**Mars**

It's very  
cold



# Status report



**Sales**



**Debt**



**Margin**

**Mercury**

0,06

0,38

0,38

**Mars**

0,11

0,53

0,38

**Saturn**

1,16

9,4

1,16



# RAID summary

## Risks



Neptune is the  
farthest planet

## Assumptions



Mars is red and full of  
iron oxide dust

## Issues



Mercury is the  
smallest planet

## Dependencies



Jupiter is a gas giant  
and the biggest planet

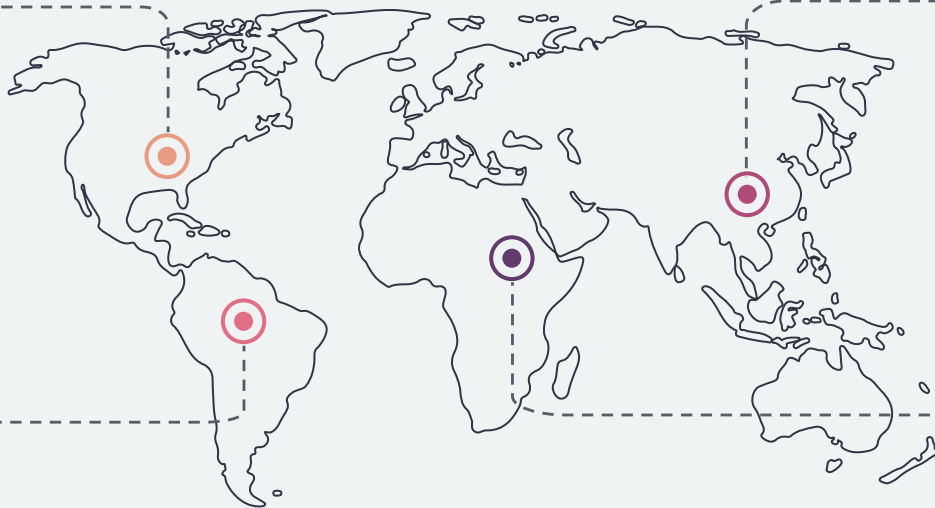
# This is a map

## Saturn

Saturn is the  
ringed planet

## Venus

Venus has a  
nice name



## Mars

Mars is a cold  
place

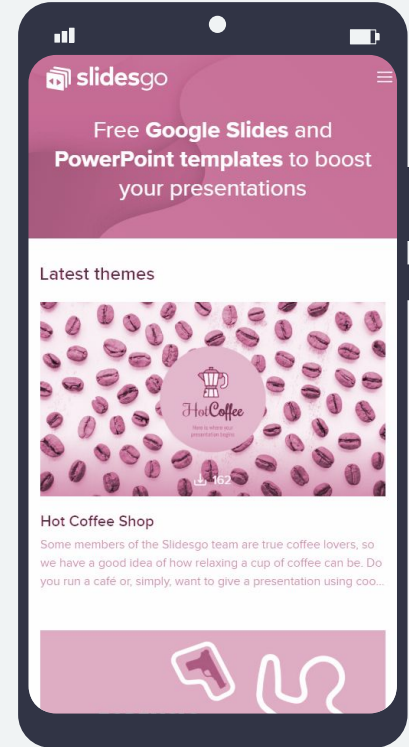
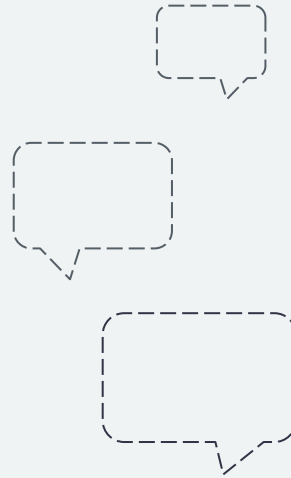
## Jupiter

Jupiter is a  
gas giant too

# Connect with our community

If you want to replace the image on the screen with your own work, just right-click on it, choose “Replace image” and add yours here instead

[www.yoursite.com](http://www.yoursite.com)





# **A picture always reinforces the concept**

Images reveal large amounts of data, so remember: use an image instead of long texts

# Thanks !

Do you have any questions?

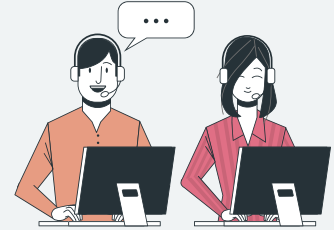
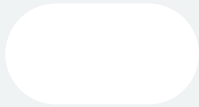
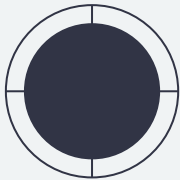
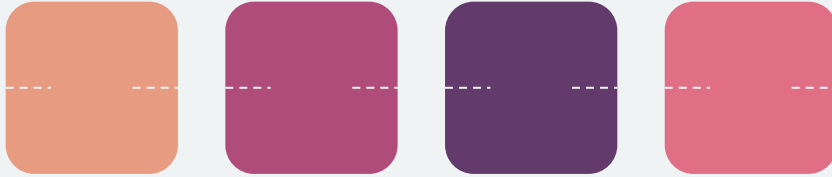
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