Internship Report

Product Team – Software Development

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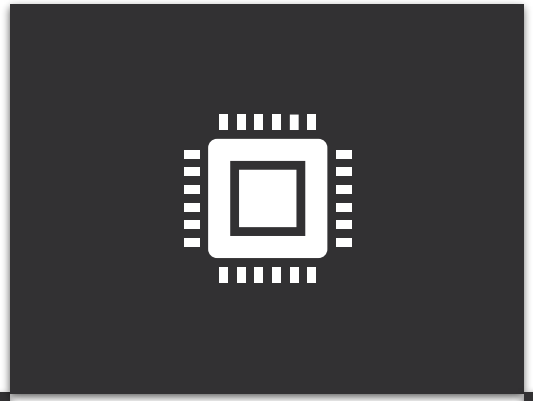
Sep. 2023 ~ Jun.2024

Overview

Projects

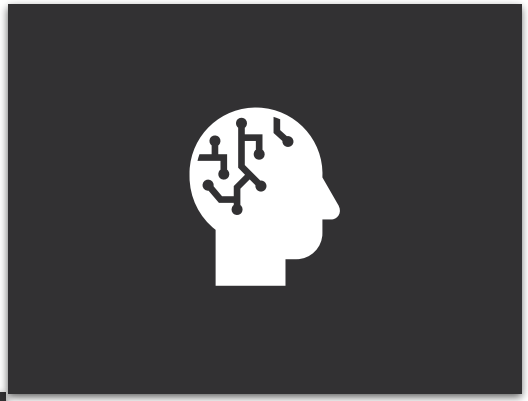
Die Lucator

Die Eye Area Calculator



Time Management

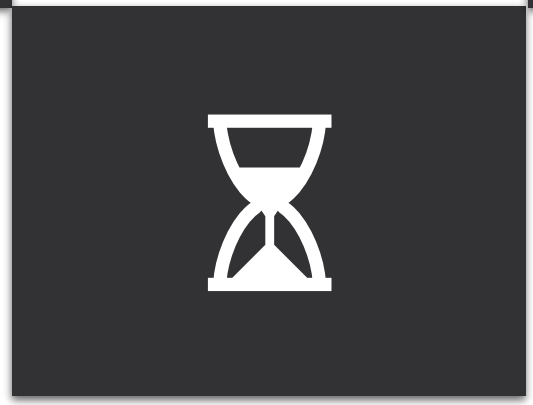
How I spent my time



Lab Experience

VCSEL Testing

Quality Assurance



Takeaway Message

What I've learned

Project List

PO/PR

(TypeScript)

2D barcode

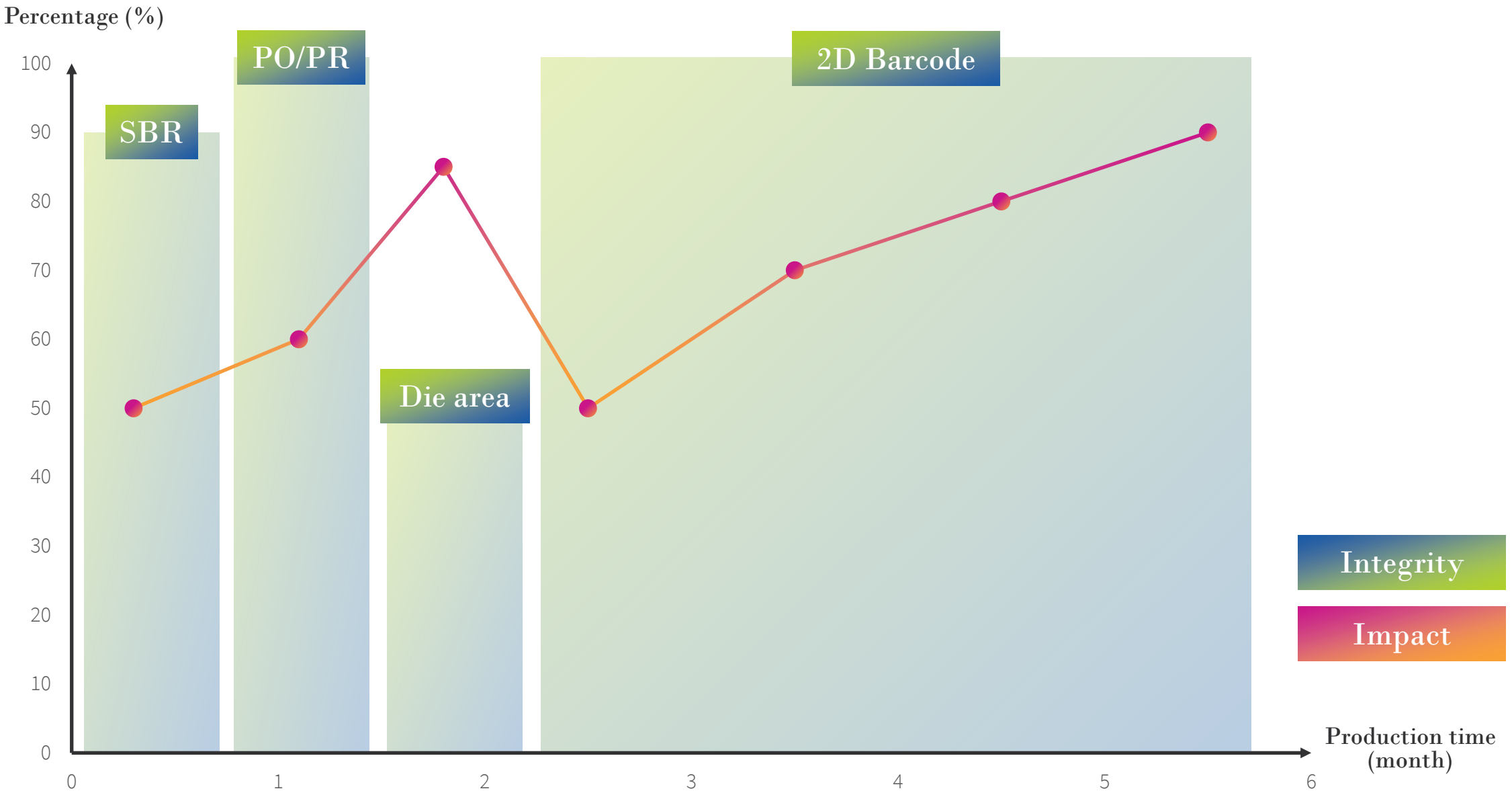
(Python, OpenCV, Tkinter)

SBR tool

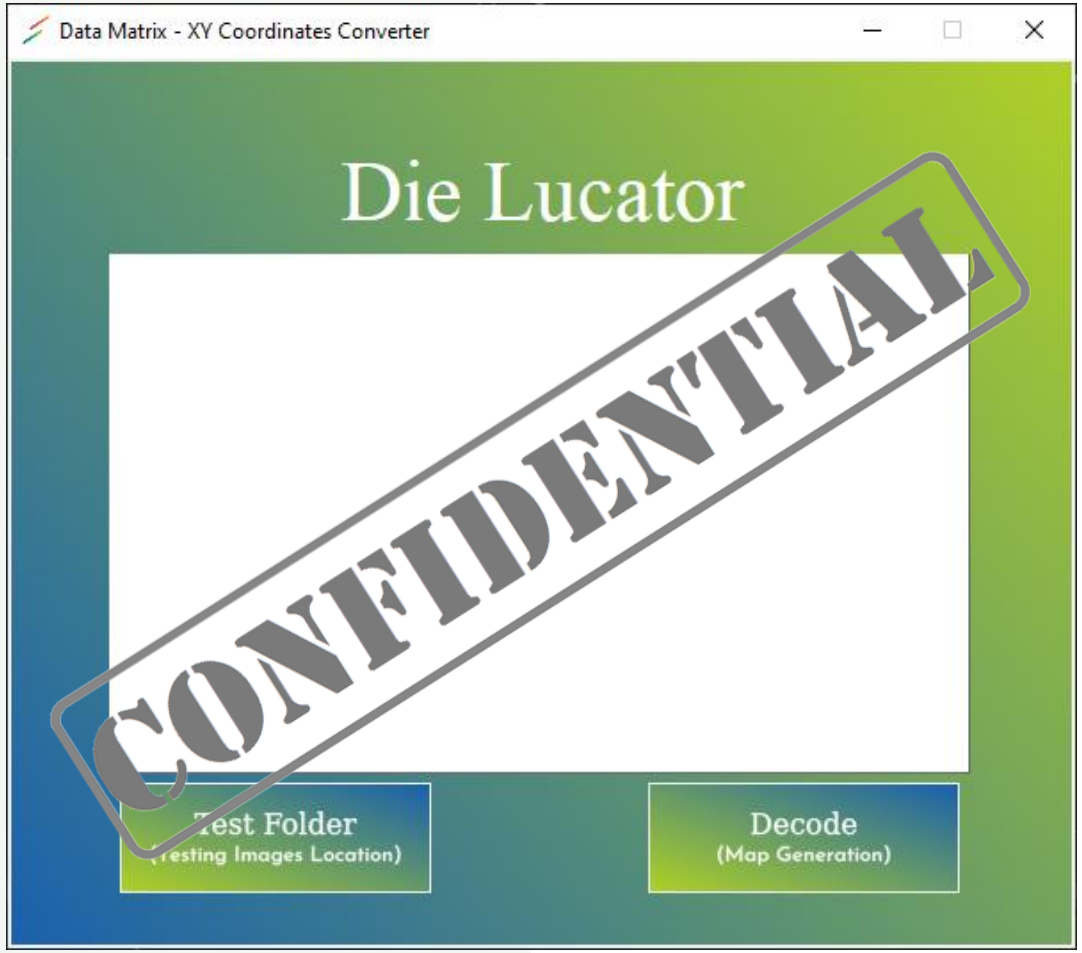
(Python, requests, flask)

Die area

(C++, OpenCV)


Percentage (%)
100
90
80
70
60
50
40
30
20
10
0
SBR
PO/PR
Die area
2D Barcode
0
1
2
3
4
5
6
Production time (month)
Integrity
Impact

Die Lucator



Portable Software Program for Wafer Testing

Objective:

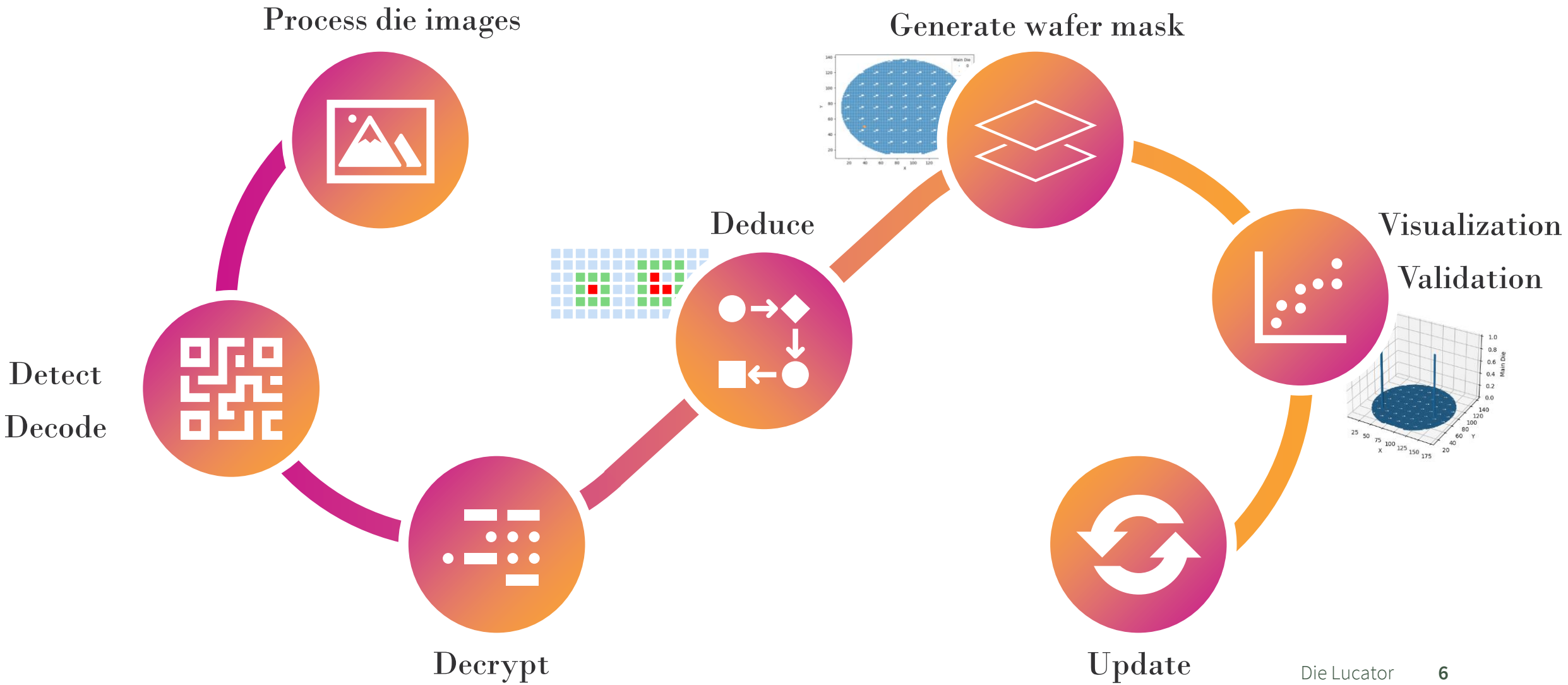
- **Extirpate all manual work** from crack dies elimination process

Features:

- Use **OpenCV** to process microscopic VCSEL die crack images
- **Accelerate decoding process** by preprocessing images (position, brightness, area ratio)
- **Detect** the 2D barcode & **decode** data matrices to ciphers
- **Decrypt** ciphers into XY-coordinates
- Eliminate crack dies and **generate a wafer mask** for mapping
- Allows wafer mask **visualization** & **cross validation**
- Handle and **deduce undetectable crack dies**
- Support new wafer mask rules **update mechanism**

Tools: Python, OpenCV, Pandas, Docker, Visual Studio, Tkinter

Die Lucator Execution Flow



Die Eye Area Calculator

Portable Software Program for die eye area calculation

Objective:

- Given the images of the die eye, calculate its area, width and length

Features:

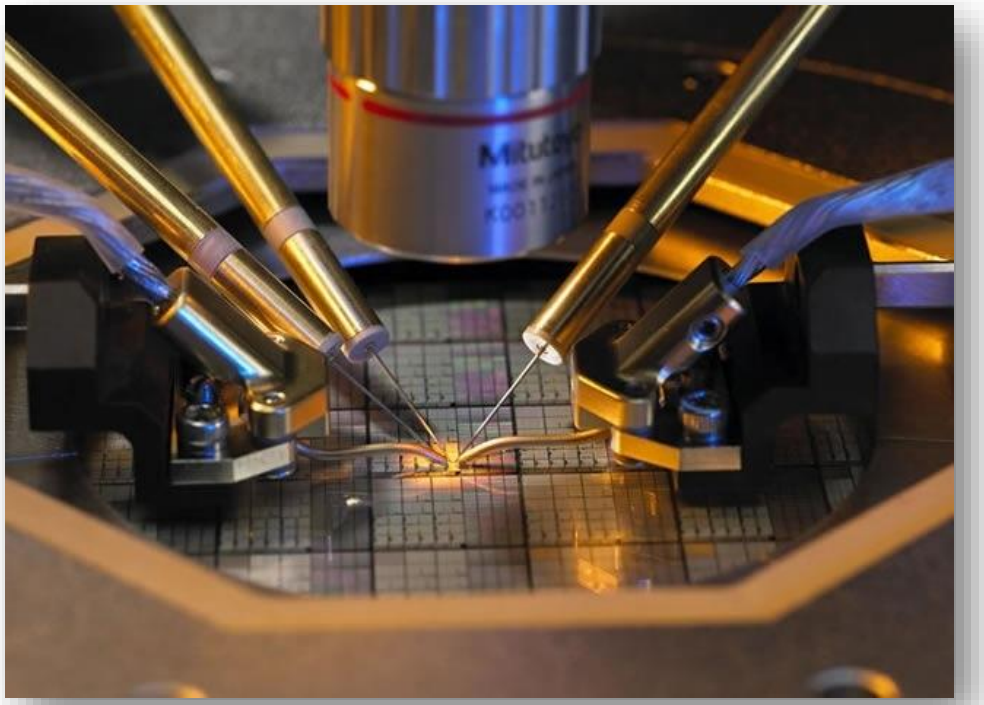
- Use OpenCV to process microscopic .bmp VCSEL images
- Locate the eye position and crop the image to fit the eye
- Filter to find the eye's irregular shape
- Count the pixels to calculate its area and scale to real size
- Aggregate all the results in a .csv file

Tools: C++, OpenCV, Visual Studio

VCSEL Testing

Experience

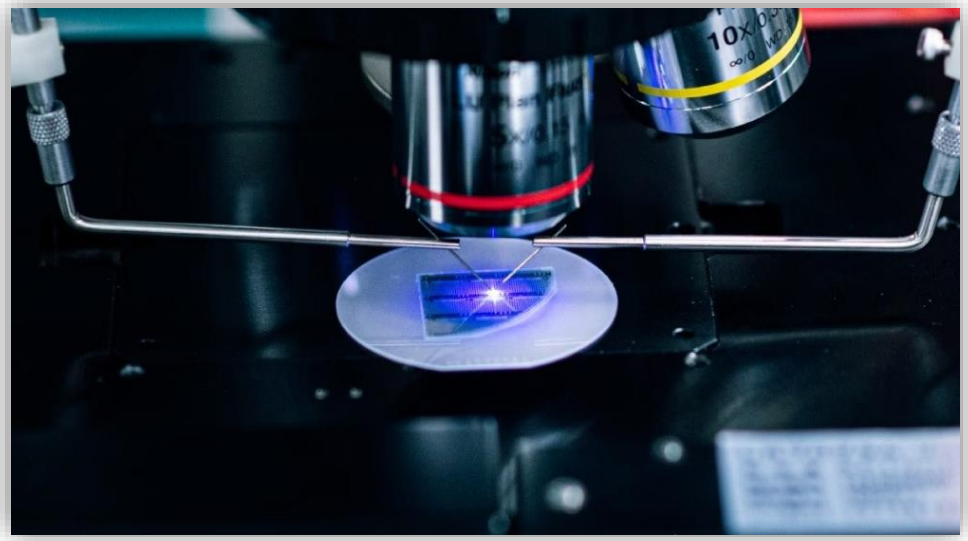
- Perform **VNA probing** to test VCSEL wafers
- Collect **S-parameters** & **Smith chart** for **photometric test report**



Quality Assurance

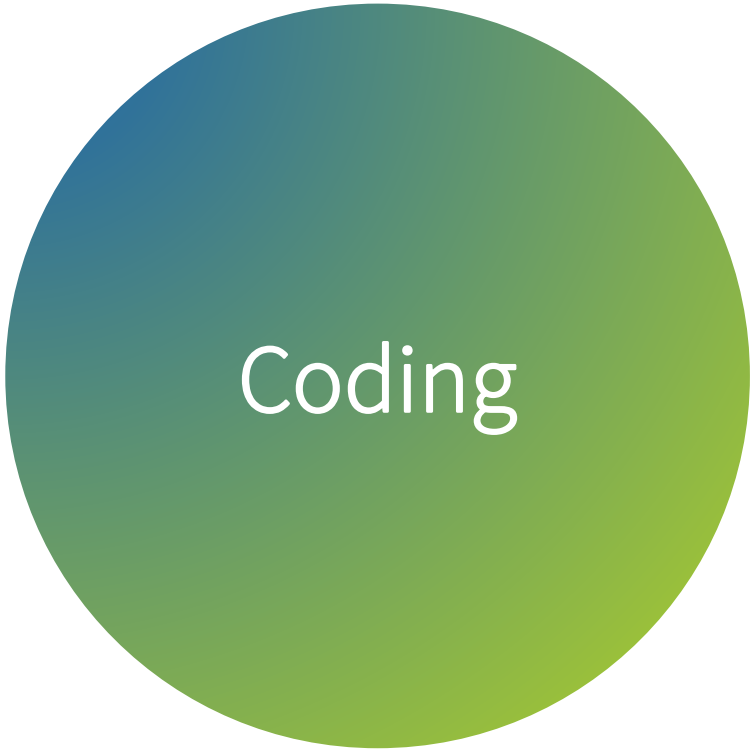
Experience

- Use a **microscope** to observe the **surface quality** of VCSELs
- Inspect the **illumination functionality** of VCSELs via an **IR camera**
- Validate its **I-V curve** & **luminescence spectrum**



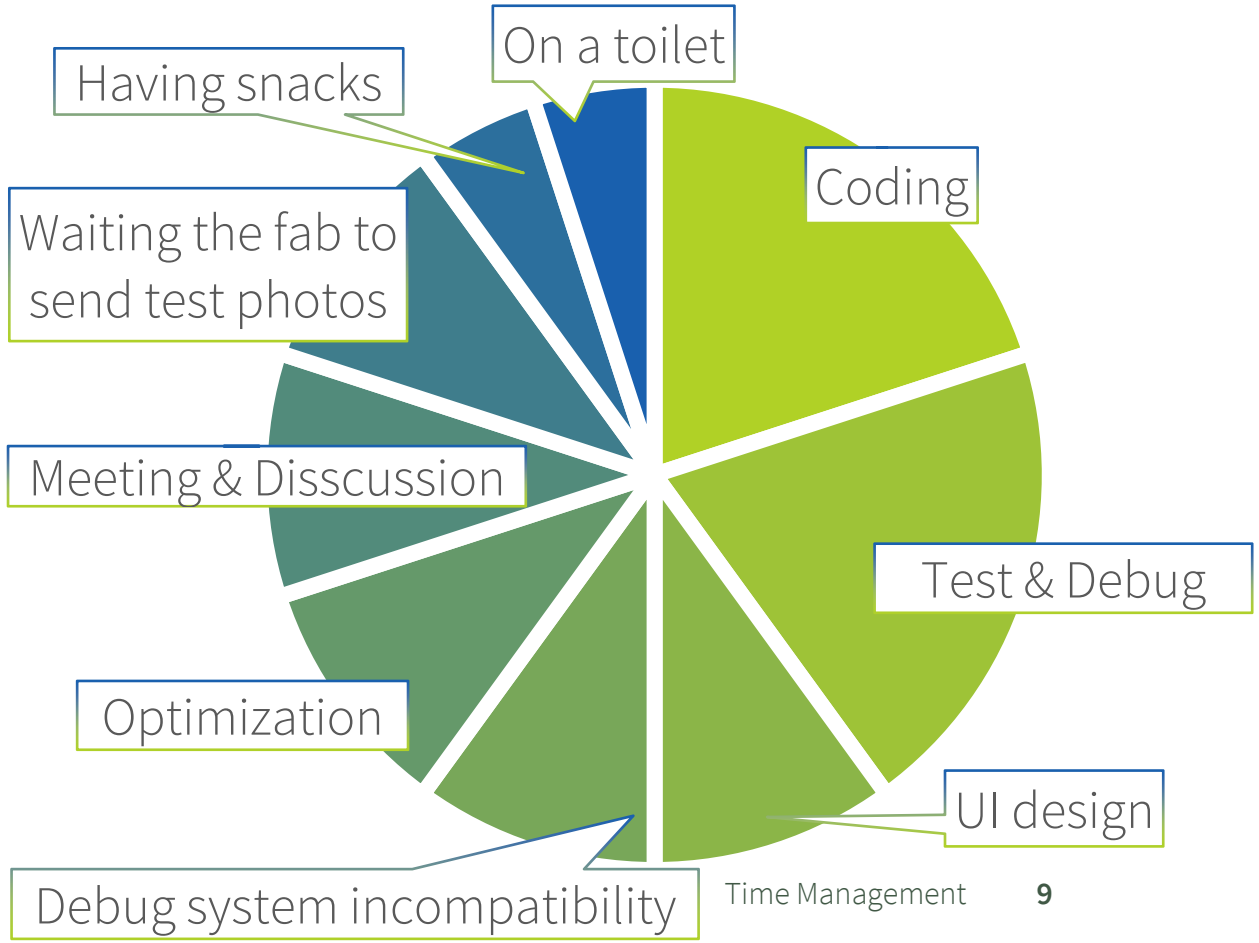
Expectation

How I though I'd spend my time



Reality

How I actually spend my time



Takeaway Message

What I've learned

As a beacon of photonic innovation, Lumentum has cultivated an exceptional work environment and a congenial culture that draws esteemed engineers and staff to the exciting field of optical communication. The flexible work hours and abundant snack options allows me to concentrate fully on my projects. The culture of open communication among global coworkers and effective management has boosted enhanced work performance. Recreational activities such as badminton, stair climbing, and weight loss challenge have not only promoted health but also fostered camaraderie among colleagues.

Looking back, my tenure at Lumentum has been immensely beneficial, providing me with invaluable experience in real-world projects aimed at streamlining laborious manual operations. The positive feedback from my colleagues and customers has rounded off my internship with a sense of accomplishment. I would wholeheartedly recommend this influential company to all distinguished individuals seeking to make their mark in the industry.