

# Valikhujaev Yakhyokhuja

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## MACHINE LEARNING ENGINEER

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Passionate ML | DL | CV Engineer with 3 years of industrial and 2+ years of academic experience delivering impactful solutions for various industries. Proficient in supervised | self-supervised | transfer learning and in-depth experience in damage & defect detection, object segmentation | tracking and video recognition. Exceptional skills in developing & deploying machine learning models, building & optimizing pipelines, and collaborating with cross-functional teams to drive business growth.

## SKILLS SUMMARY

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- **Programming:** Python, C/C++, Java, MySQL.
- **ML:** Numpy, Scikit-learn, PyTorch, PyTorch Lightning, Tensorflow, Keras, HuggingFace, Transformers.
- **MLOps:** Git/Github, Docker, Kubeflow, MLFlow, WANDB, Flask, Fast API, gRPC.
- **Project Management:** Asana, ClickUp, Jira, Notion, Slack.
- **Main Competencies:** Damage Detection, OCR, Defect Detection, Medical Imaging, Object Tracking, Clustering, Vision-Language modeling, Natural Language Processing, Building End-to-End Pipelines, Unit Testing and CI/CD.

## WORK EXPERIENCE

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- **Pyler Co. Ltd** Seoul, South Korea  
*ML Engineer* *July 2022 - September 2023*
  - **Video-based Visual Content Moderation:** Build a Video Moderation Pipeline which helps to flag inappropriate video contents using latest state-of-the-art video recognition models, achieving over a 10% improvement of model accuracy.
  - **Detection-based Visual Content Moderation:** Utilized segmentation and detection techniques to precisely detect unsuitable content for the brand safety. Implemented latest state-of-the-art models in terms of real-time speed and efficiency, improved the model precision and recall by around a 15% by conducting active learning techniques. Build whole end-to-end pipeline using Kubeflow.
  - **Classification-based Visual Content Moderation:** Leveraging multi-label and multi-head classification techniques improved the precision by approximately a 20% while using self-supervised and supervised training approaches. This novel approach showcases the adaptability and efficacy of the model for hard samples.
- **D-Meta Co. Ltd** Seoul, South Korea  
*AI Research Engineer* *November 2020 - July 2022*
  - **Slab text Recognition:** Developed and designed text detection and recognition model to efficiently recognize handwritten texts on slab metals using Spatial Transformer Networks and Sequential modeling. Built a whole pipeline from data pre-processing to training and evaluation of the model. Achieved over a 90% accuracy, by integrating state-of-the-art detection and recognition models for scene text images.
  - **Automatic Number Plate Recognition:** Designed and developed ANPR model to accurately detect and recognize number plates. Leveraging active learning and synthetic image generation techniques improved the precision and recall by around a 15%.
  - **Car Damage Detection:** Built lightweight damage detection model and deployed it on Android device using torchscript. Improved the precision of the model by around a 10% by tuning the model parameters.

## RESEARCH EXPERIENCE

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- **AI and SC Lab at Gachon** Seongnam, South Korea  
*Research Assistant* *Sep 2018 - Nov 2020*
  - **Computer Vision based Fire and Smoke Detection:** Designed and implementation of the dilated CNN architecture for improved feature extraction and recognition in images/videos. Carefully tuning and optimizing the model, achieved a high level of accuracy in fire and smoke detection, reducing false positives and having 1.5x faster inference speed compared to the fastest counterpart.
  - **Model Optimization for Edge Devices:** Improved the FPS on Edge device (Raspberry PI 2) by using hyper-parameter tuning and quantization for detection model.

## PROJECTS

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### • Bolt Defect Detection

- **Development:** Developed a detection model based on segmentation for detecting four types the defects of bolts on a conveyor belt.
- **Evaluation:** Implemented and compared the performances of several models and various types of loss functions.
- **Explainability:** Conducted model explainability assessment using Grad CAMs in order to check the inductive bias.

### • Road Crack Detection

- **Development:** Designed and developed an efficient, clean code project which uses UNet based model to effectively detect road cracks.
- **Evaluation:** Applied various loss functions and analyzed their performance. Compared the impact of the augmentation techniques to the performance of the model.

### • Optical Character Recognition

- **Development:** Reproducing the results of the paper titled “EAST: An Efficient and Accurate Scene Text Detector”.
- **Evaluation:** Created a clean and high-performance code base for training and evaluation stages.

### • Medical Image Segmentation

- **Development:** Designing and Developing a clean-code based project in order to segment polyp from colonoscopy images
- **Ongoing:** At present working on improving the performance by utilizing transformer-based encoders (ongoing)

Please visit <https://www.github.com/yakhyo> to see more implementations of different ML models.

## EDUCATION

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### • Gachon University

Seongnam, South Korea

*MSc in Computer Engineering; advised by Prof. Young Im Cho; GPA: 4.01/4.5*

*Sep 2018 - Feb 2021*

### • Tashkent University of Information Technologies

Tashkent, Uzbekistan

*BSc in Computer Engineering; GPA(%): 85/100*

*Sep 2014 - June 2018*

## PUBLICATIONS

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- **Valikhujaev Y**, Abdusalomov A, Cho YI. Automatic Fire and Smoke Detection Method for Surveillance Systems Based on Dilated CNNs. *Atmosphere*, **IF 2.9**. 2020; 11(11):1241. <https://doi.org/10.3390/atmos11111241>.

## HONORS

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**Best paper award** from Fire Investigation Society of Korea (FISK); (Domestic Conference, 2020)

**Best presentation award** from ISIS2019 & ICBAKE2019; (Domestic Conference, 2019)