

# Tomasz Hawro

Born: February 6, 1998

Git: <https://github.com/thawro>

Website: <https://thawro.github.io>

Email: [tomaszhawro.kontakt@gmail.com](mailto:tomaszhawro.kontakt@gmail.com)

Mobile: 502-518-889

## ABOUT ME

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I am passionate about implementing state-of-the-art computer vision algorithms, building complete training, evaluation and inference pipelines from scratch. As a passionate learner, I often conduct extensive research to ensure that the best possible solution is implemented correctly. As an AI engineer with almost three years of experience, I've worked with classic Machine Learning and advanced Deep Learning approaches in various fields, including computer vision and medical signals. Although I mainly work in research, I provide clean, reproducible and cross-platform solutions so that models created in the research phase are properly evaluated and made available for deployment as quickly as possible. I also enjoy collaborative brainstorming sessions on novel AI topics, stimulating creativity and innovation in each project.

## EXPERIENCE

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- **BonaSoft**  
*Python Developer* *Mar 2021 - Jul 2021*
  - **Backend development:** Implementation of REST API backend for a website. **Tech:** Python, Django, Swagger,
  - **Unit tests:** Implementation of unit tests for REST API calls. **Tech:** Python, Django.
- **MX Labs**  
*Machine Learning Engineer* *Jul 2021 - Jul 2023*
  - **Deep Learning (DL):** Implementation of multimodal Deep Neural Networks for blood pressure estimation (modalities: bio signals, face video, metadata). **Tech:** PyTorch, PyTorch Lightning,
  - **DL:** Implementation of lightweight CNN architectures for face metadata extraction. **Tech:** PyTorch,
  - **Productization:** Models productization from PyTorch research phase to ONNX model applicable in C++. **Tech:** PyTorch, ONNX,
  - **Research:** Versatile research on ML and DL approaches for blood pressure estimation based on PPG signals,
  - **Feature Engineering:** Implementation of feature extraction algorithms for the PPG signal. **Tech:** NumPy, SciPy,
  - **AutoML:** Optimizing ML models and preprocessing pipelines with Optuna. **Tech:** Optuna, Joblib, scikit-learn.
- **Vestigit**  
*Artificial Intelligence Engineer* *Jul 2023 - Present*
  - **Research:** Versatile research on classical and DL approaches for efficient DL-based video watermarking solutions and saliency detection,
  - **DL:** Implementation and training of Convolutional Neural Networks (CNN) architectures for image segmentation, object detection and invisible real-time video watermarking. **Tech:** PyTorch, ONNX, OpenCV

## EDUCATION

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- **Wrocław University of Science and Technology** Wrocław, Poland  
*Bachelor's degree - Biomedical Engineering, Medical Informatics (Grade 5.5)* *2017 - 2021*
- **Wrocław University of Science and Technology** Wrocław, Poland  
*Master's degree - Artificial Intelligence (Grade 5.5)* *2021 - 2023*

## SKILLS SUMMARY

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- **Languages:** Python, C#, Java, JavaScript, SQL, Android,
- **Libraries:** PyTorch, OpenCV, PyTorch Lightning, NumPy, Matplotlib, Optuna, scikit-learn, SciPy, plotly,
- **Tools:** Docker, ONNX, GStreamer, GIT, Linux, MLFlow, WandB, DVC, AutoML, Gradio, Hydra,
- **Other:** Solid knowledge of ML/DL algorithms and ability to train complex neural networks from scratch.

## PROJECTS

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- [Human Pose Estimation](#): Implementation (from scratch) of Human Pose Estimation neural networks (StackedHoughglass, SimpleBaseline, HRNet) and training + evaluation on multiple datasets
- [Heart Rate from face video](#): Heart Rate (HR) estimation from the video of the face using PSPNet deep neural network (for skin segmentation) and DSP algorithms for further rPPG signal extraction and HR estimation
- [YOLOv1 from scratch](#): Implementation and training of YOLOv1 architecture. **Tech**: Python, PyTorch, mlflow
- [YOLOv8 Digits detection](#): Handwritten digits detection using a YOLOv8 model trained on a custom dataset ([demo](#) available online). **Tech**: Python, PyTorch, PyTorch Lightning, ONNX, ONNX Runtime, React
- [Bachelor thesis](#): Categorization of auditory evoked potentials using machine learning. **Tech**: Python, scikit-learn, pandas, NumPy, SciPy
- [Master thesis](#): The influence of medical signals (ECG, EMG, EOG, PPG) representation on machine learning models results. **Tech**: Python, PyTorch, PyTorch Lightning, scikit-learn, pandas, NumPy, SciPy
- [SqueezeNet Flowers classification](#): Classification of 102 flower species using SqueezeNet architecture pretrained on ImageNet ([demo](#) available online). **Tech**: Python, PyTorch, PyTorch Lightning, Docker, Gradio
- [GeDa](#): Python package that helps to download and arrange the data for ML projects. **Tech**: Python, OpenCV

## HONORS AND AWARDS

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- Winning the Dean's Award twice
- Winning the [poster](#) session competition at *OMatKo!!!* conference - November, 2021
- Winning the competition of IT projects of the AI Tech Summer School during the [poster](#) session - May, 2022

## LANGUAGES

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- **Polish**: Native
- **English**: Proficient