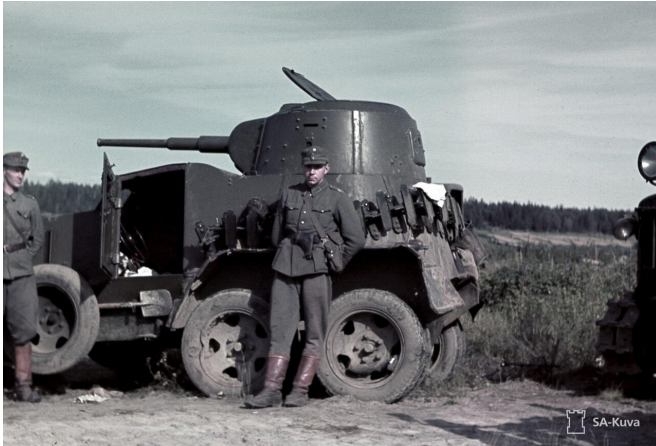


# Artificial intelligence dives into thousands of WWII photographs

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September 5, 1941, Porlammi, Finland. A Finnish soldier stands in front of a seized BA-10 armored vehicle. Photo: Heikki Roivainen. Credit: SA-kuva

In a new international cross disciplinary study, researchers have used artificial intelligence to analyze large amounts of historical photos from World War II. Among other things, the study shows that artificial intelligence can recognize the identity of photographers based on the content of photos taken by them.

Artificial Intelligence (AI) is now able to identify photographers based on the content of images they've taken.

This is the conclusion of a new study at AU Engineering, Aarhus University, where, in collaboration with Tampere University and the Finnish Environment Institute, researchers have used state-of-the-art [artificial intelligence](#) to trawl through photographs taken by 23 well-known Finnish photographers during the Second World War.

The photographs used in the study are part of the publicly available Finnish Wartime Photograph

Archive containing around 160,000 photographs from Finnish Winter, Continuation, and Lapland Wars captured in 1939-1945.

The study was published in the scientific journal *IEEE Access*, and the researchers wanted to demonstrate the advantages of using modern neural networks to analyze images to such an extent that the machine could automatically detect people and objects in a variety of scenes and even distinguish photographers on the basis of characteristics in the image—all much faster than any manual reviewing process.

Such an automatic analysis can serve as a tool for providing content-based textual descriptions of public photographic archives like the Photo Archives of the Museum of Danish Resistance, as it is now required at the European Union level.

The EU Accessibility Directive (DIRECTIVE (EU) 2016/2102) came into effect in September 2020 and requires textual descriptions of image contents to be added to all public images on the Web.

"We were quite surprised by the accuracy with which the AI can recognize photographers based on characteristics in the photos, such as content and framing," says Alexandros Iosifidis, an associate professor and expert in artificial intelligence at Aarhus University.

The photographs analyzed in the study show that some photographers have very distinct and easily recognizable characteristics, while others are more difficult for the AI to recognize. On average, the AI model achieved a classification accuracy of 41.1 per cent. (20.1—69.7 per cent).

The most recognizable [photographer](#) was Heikki Roivainen, a Finnish professor of botany who worked as an official war photographer during the Continuation War; the second of two wars fought between Finland and the Soviet Union during

WWII.

"Big data analysis of the contents of photograph collections has been a long-time dream for me and I am very fascinated about the results in this project. That an AI can recognize eg. the framing and various aspects of contents in photographs has many applications in a wide range of fields within humanities and social sciences," says university lecturer at Tampere University Anssi Männistö, who has been researching photographs in journalism for more than 25 years.

The name of the study is 'Machine-Learning-Based Analysis of Finnish World War II Photographers', and it was initiated to facilitate public access to the Finnish war photography archive by using intelligent image search, among other things.

AI also provides the opportunity to link photo archives of this kind to war-related research in social sciences, as the AI can make observations that would otherwise not be possible at a large-scale.

The research results have now been made publicly available to introduce and facilitate this modern approach to research into historical and social studies via photo archives.

**More information:** Kateryna Chumachenko et al, Machine Learning Based Analysis of Finnish World War II Photographers, *IEEE Access* (2020). [DOI: 10.1109/ACCESS.2020.3014458](https://doi.org/10.1109/ACCESS.2020.3014458)

Provided by Aarhus University

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