**Result name:** Software prototype for facial image authentication based on image steganography.

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**Customers:** customers of APIS Ltd.

**Raised funds (non-refundable):** year 2020: 45,569.02 € (total: 80,564.79 €)


### Result annotation

The result was achieved in the form of image steganography model and software prototype to verify the authenticity of images.

The image steganography model is based on the embedding and extraction of messages using positional matrices, which are generated by the Optimized Model of Pulse Coupled Neural Network (OM-PCNN) [1, 4]. Selected neural networks for hidden data encryption and image hashing were also tested as part of the solution [2, 3].

The software prototype (Fig. 1) is based on the proposed image steganography model, symmetric encryption using AES-256 and a cryptographic hash function SHA-2 with a 512-bit fingerprint. The OM-PCNN weights are initialized by steganographic key to increase the security of the steganographic model.
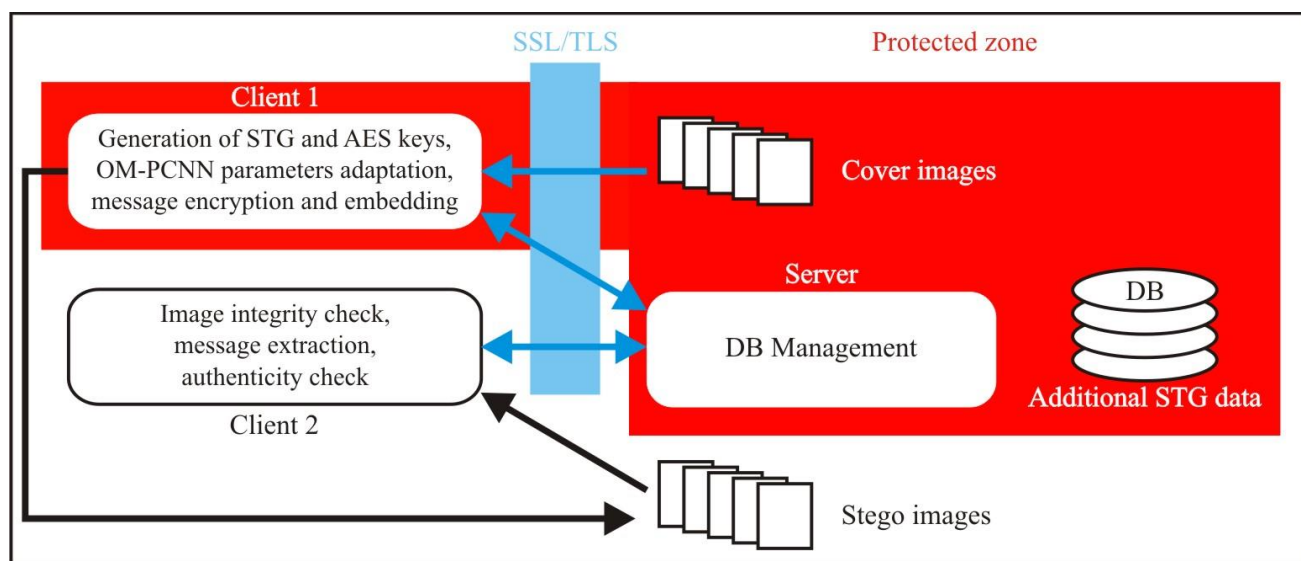


Fig. 1 Software prototype architecture


### Main scientometric outputs

[1] FORGÁČ, Radoslav – OČKAY, Miloš – KRAKOVSKÝ, Roman. Impact of Pulse Coupled Neural Network Parameters on Image Steganography. In KIT 2019: Communication and information technologies conference proceedings, IEEE, Vysoké Tatry, Slovakia: Armed forces academy of gen. M. R. Štefánik Liptovský Mikuláš, 2019, p. 128-133. ISBN 978-80-8040-575-5.

[2] FORGÁČ, Radoslav – OČKAY, Miloš. Contribution to Symmetric Cryptography by Convolutional Neural Networks. In KIT 2019: Communication and information technologies conference proceedings, IEEE, Vysoké Tatry, Slovakia: Armed forces academy of gen. M. R. Štefánik Liptovský Mikuláš, 2019, p. 122-127. ISBN 978-80-8040-575-5.

[3] ASTALOŠ, Ján - OČKAY, Miloš - FORGÁČ, Radoslav. An overview of hash functions based on neural networks. In Science and military, 2019, vol. 14, no. 2, p. 5-10. ISSN 1336-8885.

[4] FORGÁČ, Radoslav - OČKAY, Miloš - KRAKOVSKÝ, Roman. Entropy Based Image Quality Assessment of Stego Images Created by Pulse Coupled Neural Network. In NTSP 2020 - New Trends in Signal Processing. Demänovská dolina, Slovakia, IEEE, 2020, p. 19-23. ISBN 978-1-7281-6154-9.