

STUDY OF SEISMIC PROCESSES USING AI TECHNOLOGY

Suleymanov S.S., Bayramov A.A., Abdullayev F.N.
Republican Seismic Survey Center, Baku, Azerbaijan

It is known that in the pre-earthquake stage, large rheological changes occur in a certain volume of the geological environment: geophysical anomalous volume zones of various nature are formed, cracks open in the zones of increased shear and tensile stress. The development of the pre-earthquake destruction process can affect the change in the recorded geophysical anomalies, anomalous variations in the Earth's magnetic field, gravity, and radon exhalation dynamics [1-4]. For more effective analysis of the results of regular monitoring of changes in the Earth's magnetic field and the propagation of seismic waves, it is necessary to create an automated magnetometer, as well as a mathematical and hardware-software complex using artificial intelligence-based neural networks, Fourier analysis, wavelet transforms, etc. methods for processing the received seismic spectra [5-7].

The purpose of the report is to present the results of the creation of a new generation automated magnetometer complex; regular observation of seismic waves in a selected area; assessment of the current situation in the depths of the earth and on the surface based on information (spectral data) received from seismological devices, analysis of the dynamics of spectral data for separate periods.

References

1. Hashimov E. G. et al. Determination of the bearing angle of unobserved ground targets by use of seismic location cells //2017 International Conference on Military Technologies (ICMT). – IEEE, 2017. – p. 185-188.
2. Hashimov E. G., Bayramov A. A. Detection unobserved moving armored vehicles by seismic method //National Security and Military Sciences. 2015. vol. 1. №. 1. C. 128-132.
3. Hashimov E.G., Bayramov A.A. Destruction of enemy combat power in indeterminacy condition //Proc. of Vth International Scientific Technical conference “Modern development directions of data communication technology and control means. 2015.p.23-24
4. Hashimov, E.G., Maharramov R.R. Methods of effective detection of unmanned aerial vehicles // Проблеми інформатизації. Тези доповідей 9- і міжнародної науково-технічної конференції. Том 1. -Черкаси – Харків-Баку – Бельсько-Бяла: 18 – 19 листопада, -2021, -с.118-119
5. Sundhararajan M., Gao X., Nejad H. Artificial intelligent techniques and its applications. Journal of Intelligent & Fuzzy Systems 34 (2018), pp. 755–760.
6. Bajaj, S., Bopardikar, S., Moll, A., Tornig, E., Casbeer., D.: Perimeter Defense using a Turret with Finite Range and Service Times. arXiv:2302.02186v1 [eess.SY] 4 Feb 2023
7. Guerrero-Bonilla, L., Nieto-Granda, C., Egerstedt, M.: Robust Perimeter Defense using Control Barrier Functions. In 2021 International Symposium on Multi-Robot and Multi-Agent Systems (MRS). IEEE, pp. 164–172. (2021).
8. Hashimov E. G. et al. Application of relief digital model for combat operation planning //Military Knowledge. – 2015. – Т. 4. – С. 63-69.