The way we see the world changes depends on the point of view and the way we look at them. The successful experiment of 1783, involving the balloon filled with hot air, which was raised in to the sky, has initiated a new era of Earth observation. The reality we have known for years has reached a completely new level. This new reality has become a driving force to find remote methods for Earth observation. Therefore, today, in the 21st century, the Earth observations are driven according to the idea that **"we can see more from above"** from low-level flight sensors to high-level flight sensors. Among these sensors, Airborne Laser Scanning (ALS) is the main technology that has the ability to penetrate through the vegetation, so far. Thus, this also enables capturing of high-resolution information about the topography in the forested areas. Such effective data has been used in the exploring and modelling of the surrounding reality, and it has also created new opportunities for remote identification of landslides.

A landslide is a sudden mass movement occurring on the slope under the influence of gravity**. Landslides are one of the most common natural hazards that occur in different parts of the world.** The basic method for reducing the economic and environmental losses caused by mass movements is the landslide and landslide prone areas identification and exclusion of these areas from economic use. Various data sources are used for this purpose, and the identification and mapping of landslides have so far been mainly carried out using conventional methods that are based on the terrain analysis during field works. In Poland, landslides occur in the south part of the country in the area of Flysch Carpathians. The activation of many landslides in 2010 as a result of intense precipitation has brought about catastrophic destruction. Many residential buildings and roads have been destroyed. In the Polish part of the Carpathians, landslide areas often occupy about 30-40% of the municipalities areas.

Motivation to develop automatic methods and algorithms is high due to interesting research aspects and also because of the later application possibilities. **The completeness of landslide databases for most European countries was below 25% (as of 2012).** Automatic landslide identification (unambiguous recognition of landslides by algorithms with minimal human intervention) can give disproportionate benefits in the future. The automatic method can increase efficiency, reduce costs and speed up the creation of landslide databases and landslide susceptibility mapping.

The development of a methodology together with a set of algorithms for automatic landslides identification using object-oriented approach (OBIA) and ALS data is the innovative aspect of the study. OBIA has radically changed the traditional image processing and classification. OBIA offers an approach that is similar to human perception or interpretation of objects. The developed OBIA classification usually turns out to be universal because the developed classification or identification rules are reproducible. In the contrary to the classic pixel-based classification methods, OBIA is based on groups or segments that create homogeneous and conceptually logical segments or objects. This approach allows for the automation of the process of humans object perception. Based on the relationships related to the characteristics of the objects e.g. colour, texture, surface, topology and relations between elements, it is possible to create a set of rules that represents the relationships between the elements of an object and allow its interpretation.

For this purpose, a wide set of topographic derivatives will be used along with a set of landslide identification rules based on high resolution digital elevation model derived from ALS data. This extended set of derivatives with a set of OBIA classification rules and deep learning classifiers, will be the fundamental source for development of the methodology for automatic identification of landslides. The developed methods will be verified independently using the reference data from the landslide database (SOPO). The developed algorithms will be developed and verified in the study area located in the Lesser Poland voivodeship.