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LAND USE LAND COVER CLASSIFICATION FROM DIFFERENT CLASSIFIERS IN KEDAH BETWEEN 2014 AND 2021 USING GOOGLE EARTH ENGINE.

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ABSTRACT

Over time, a growing human population that accelerates land use and land cover (LULC) change has placed a massive burden on natural resources. Changes in LULC have become an essential issue for decision makers and environmentalists. Monitoring and evaluating LULC changes over large areas become critical. Understanding the functional diversity of machine learning classifiers is important due to increased geospatial data from satellite remote sensing. The potential of Google Earth Engine (GEE) as cloud-based computing to know the changes of the map area in a long period is interesting to study. Therefore, this study aims to evaluate the LULC classification map using different classifiers in Kedah between 2014 and 2021 conducted on Google Earth Engine. The objective of this study is i) to classify LULC carried out on the Google Earth Engine Platform using three (3) different classifiers (Random Forest, smile CART, and Minimum Distance) for Landsat 8 images in Kedah between 2014 and 2021, ii) To compare their performance for three (3) classifiers using accuracy assessment, and iii) to produce land use land cover maps for the years 2014 and 2021 for each classification. Landsat 8 images are obtained from GEE, and all the processing involved is done on this platform. The study prove that the best classifier was Random Forest and the OA = 80.50%, kappa = 0.73 for 2014 while in year 2021 OA = 80.88%, kappa 0.75. This study shows the GEE cloud platform's efficiency in generating spatial temporal classification maps with high accuracy and takes a short time, and is easy to modify. The final output for this study was the LULC maps for the years 2014 and 2021 will benefit local authorities and policy makers for their planning and sustainable management.

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CHAPTER ONE
INTRODUCTION

1.1 Research Background

Land cover refers to the physical characteristics of Earth's surface, captured in the distribution of vegetation, water, soil and other physical features. Land Use (LU) indicates how human beings utilize the land (Foley et al., 2005). Land use land cover (LULC) dynamics are a well-known, accelerating, and substantial process, mostly driven by hu-man activities, that is contributing significantly to forest fragmentation, land degradation, and biodiversity loss(Regasa et al., 2021). Land, water, and environment have been apparently affected due to rapid growth in the human population and technological advancements (Lambin & Meyfroidt, 2011; Li, Zhang, Qin, & Yan, 2017b; Lu, Wu, Ma, & Li, 2019). With the invent of remote sensing and Geographical Information System (GIS) techniques, land use/cover mapping has given a useful and detailed way to improve the selection of areas designed to agricultural, urban and/or industrial areas of a region (Selcuk et al., 2003). A key element of current strategies for managing natural resources and tracking environmental changes is the shift in land use and land cover. Viewing observing Earth from orbit is now essential to comprehending man's activities throughout time on his base of natural resources. In instances of quick and frequently undetected land use change, Earth observations from orbit offer impartial details on how people have used the landscape. Landsat is the most used satellite in LULC studies. Since the opening of Landsat's archive in 2008, the use of Landsat data significantly increased because of the free access to its 40 years of earth observation data (Afrin et al., 2019). In general, in order to generate a Landsat-based LULC map over a large geographical area like the Athabasca River watershed for a given year, it would be challenging to obtain good-quality Landsat images as they would often be impacted by cloudy conditions(Afrin et al., 2019).

Pixels are classified and given land cover classifications through the LULC classification procedure. Examples include water, cities, horticulture, structures, woods, agriculture, grasslands, mountains, and highlands. The main objective of picture grouping is to organically group all of the pixels in a picture into classes or