Visualization of Isolects in Cirebon Regency Based on Geospatial

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S Wiyanti[1], A Fadlilah[1] and N Sugito[2]*

[1]Department of Indonesian language and Literature, Universitas Pendidikan Indonesia, Jl. Dr. Setiabudi 229, Bandung 40154, Indonesia

[2]Department of Geography Education, Universitas Pendidikan Indonesia, Jl. Dr. Setiabudi 229, Bandung 40154, Indonesia

*nanintrianawati@upi.edu

Abstract. The phenomenon of language variation often occurs in border areas and can be visualized by a Geographic Information System (GIS) application that has the ability to visualize linguistic conditions in a region. Geospatial shows the location, place, and position of an object that is below, on, or above the surface of the earth expressed in a particular coordinate system. The method used in this study is descriptive analytical with the application of GIS as a supporting analysis tools. Field surveys were used to assess the accuracy of the results of the models applied. The initial stage of the study was carried out an inventory of isolates. In this case, 208 data are obtained from gloss and berian. The study sample consisted of 41 villages spread across Cirebon Regency. Gloss and cryptic data are tabulated into the database using the MS Excel application, which is the GIS input data. After filtering the data, it can be seen that there are 28 villages in minimum noise conditions from 41 villages which were originally determined to be research samples. Visualization of isolates is presented in two types, namely analog maps (printed) and digital maps in scale of 1: 220,000.

1. Introduction

Cirebon Regency is one of the regencies in West Java Province which is located in the east and directly borders with Central Java Province. This condition causes the emergence of several language variations. This variation is still being debated. Language variation status is called the term isolect [1]. Study of isolect as part of dialectology.

Up to now progress in dialectology has been much hindered by the limitation of spatial abilities and background knowledge in handling spatial information. Points of data collection have always been roughly marked. Map making and cartographic display have usually been created manually on paper maps. Usually, overlay technique i.e. for the comparison of dialect change has been done manually by superimposing a bundle of paper maps using different scales of map sources and so on. These limitations, to some degree, impact the accuracy and quality of data recorded and analysis which will probably result in the creation of unreliable map results [2].

The emergence of the Geographic Information System (GIS) in the 1960s [3] has been proven a very powerful tool to handle spatial data, mainly for data storage, database management, spatial analysis, and cartographic display. Details of its capabilities are given extensively elsewhere, e.g., the textbooks of Tomlin [4], Maguire et al. [5], Longley et al. [6]. However, the applications of GIS to linguistics have been done just over the last few decades, e.g., the work of Lee and Kretschmar [7], Luo et al. [8], Wang et al. [9] and Ayad and Luthin [10], etc.

In this study, mapping of isolects was carried out with a computerized system of GIS. In this case the isolect mapping is modelled using the ArcMap 10.5 application. Through the application, linguistic

conditions in a region can be visualized geospatial. Geospatial shows the location, place, and position of an object or event that is below, on, or above the surface of the earth expressed in a particular coordinate system.

2. Methods

The method used in this study is descriptive analytical with the technique of applying GIS functions as a supporting tool for analysis. This research was conducted in Cirebon Regency as a multilingual community. The instruments used in the form of a basic core vocabulary modified by previous research which amounted to 208 words [11]. The technique used in the form of a field survey to assess the accuracy of the results of the model applied and the technique of referring, engaging, competent to obtain linguistic data. In this case the language mapping is modelled using the ArcMap 10.5 application.

ArcMap 10.5 is one of the features of the latest version of ArcGIS Desktop. ArcGIS is an application developed by ESRI (Environment Science & Research Institute). ArcMap has the ability to visualize, edit, create thematic maps, manage tabular data (Excel), choose (Query), use the Geoprocessing feature to analyse and customize data or create map designs [12].

The research flow consists of the following activities. 1. Provision of data consisting of spatial data and attribute data. Spatial data in this study consisted of (1) Cirebon Regency administrative boundary map; (2) contour maps; (3) observational centroid data. Attribute data consists of (1) the name of the sub-district and the name of the village in Cirebon Regency; (2) data on gloss and content. 2. Data processing, which consists of integration of spatial data and attributes; map editing; visualization of isolects; and map layout.

3. Results and Discussion

Mapping comes from the basic word map. Map in general is a conventional description of the earth's surface which is delivered in a two-dimensional form that has certain features such as scale, legend and so on. The initial addition of the addition and suffix -an makes the change in meaning become the process of making maps, which makes the surface of the earth curved and beresfield flat with a certain scale.

Along with technological advances, especially in the field of computers, resulting in a map not only being presented in real form (on a piece of paper, real maps, or hardcopy), but also can be presented in digital form (on a monitor screen known as virtual maps or softcopy) In this study, regional language mapping was carried out through digital mapping, namely making maps with the help of computers In addition to digital mapping, the advantages in this study were the application of the GIS function as a supporting analysis tool in two types of data, spatial data and attribute data.

Spatial data contains the location of an object on a map based on the geographical position of the object on the surface of the earth using a coordinate system. Attribute data contains characteristics or information from an object contained in a map that is not at all related to the geographical position of a particular object.

The mapping process is grouped into three main processes, namely:

a. Measurement or data collection

   This process is carried out by making measurements directly in the field and remotely. In the research an inventory of isolects in Cirebon District was carried out. Inventory is done by recording oral data. Oral data is obtained from people's daily conversations and oral literature, which exists. This language data becomes attribute data that supports the development of GIS. Specifically, attribute data consists of (1) the name of the sub-district and the name of the village in Cirebon Regency; and (2) gloss and data. Besides attribute data, spatial data is also needed. Specifically, spatial data in this study consisted of (1) Cirebon Regency administrative boundary map; (2) high resolution satellite imagery; (3) contour maps; (4) observation point centroid data.

b. Processing measurement data

Data processing is carried out in order to change the measurement data into reliable or necessary data in presenting data.

Figure 1 shows Cirebon Regency administrative boundary map. It is one of the spatial data inputs obtained from the Geospatial Information Agency.

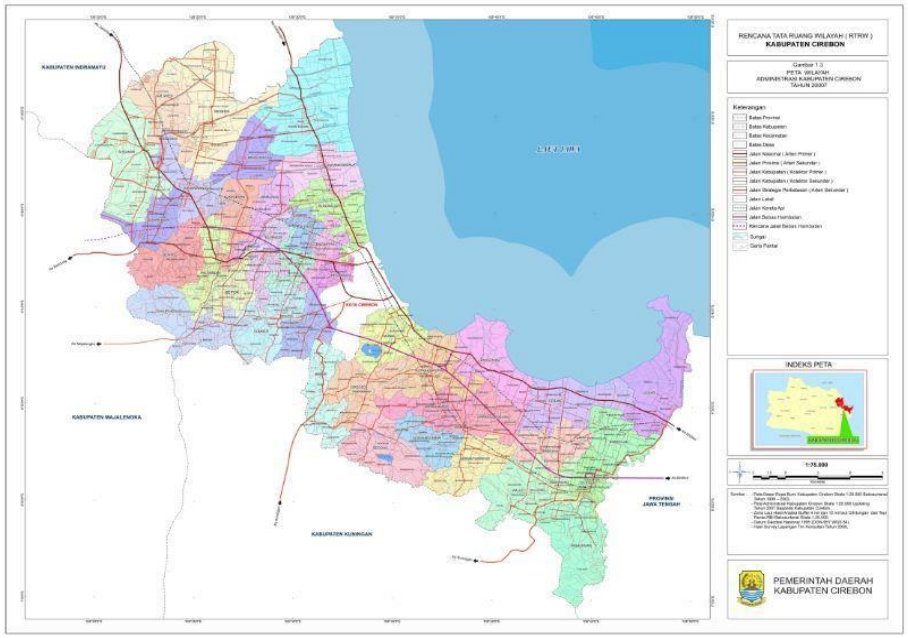

Figure 1. Map of Cirebon Regency administrative boundary.

Icon satellite image data becomes spatial data input. Figure 2 shows icon satellite images that have a spatial resolution of 4 meters for multispectral modes. In this study, icon satellite images were obtained from the National Institute of Aeronautics and Space. The following is the visualization of icon satellite image data.

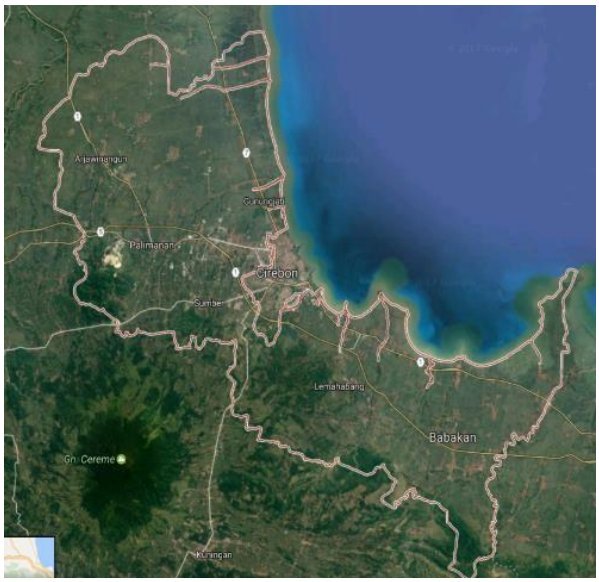

Figure 2. Cirebon Regency in High Resolution Satellite Image.

Contour maps become input data in this study. Contour maps are maps that describe the height of a place using contour lines. Contour lines are lines on a map that connect dots that have the same height. Map of the contour obtained from Geospatial Information Agency. Contour maps can be visualized in 2 dimensions and 3 dimensions. Figure 3 is a visualization of 2-dimensional contour maps.

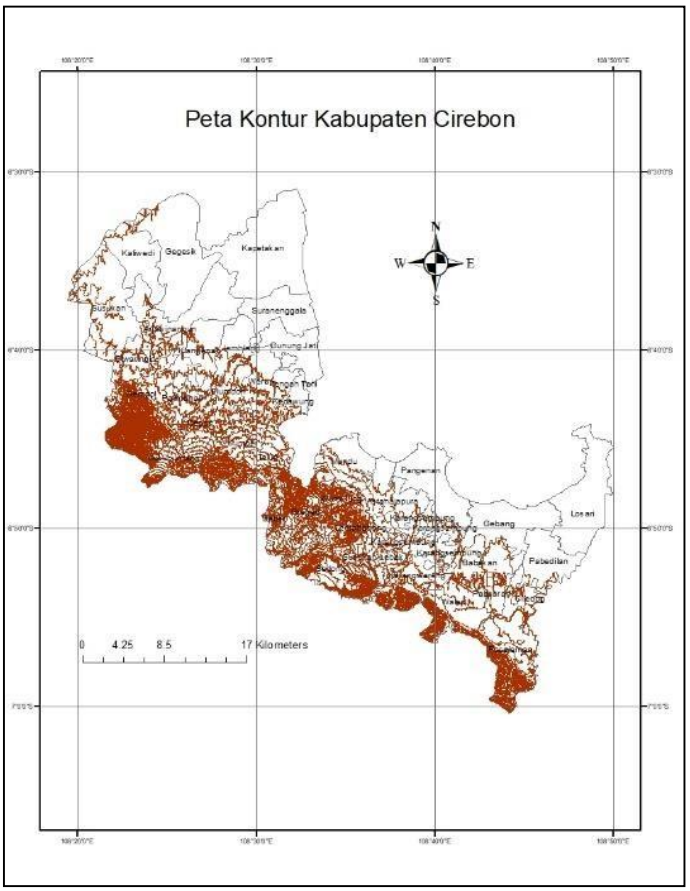

Figure 3. Cirebon Regency Contour Map.

Contour maps can also be visualized in 3 dimensions in the form of a Digital Elevation Model (DEM). DEM is a form of digitally presenting the surface height of the earth. Figure 4 shows the visualization of the DEM of Cirebon Regency.

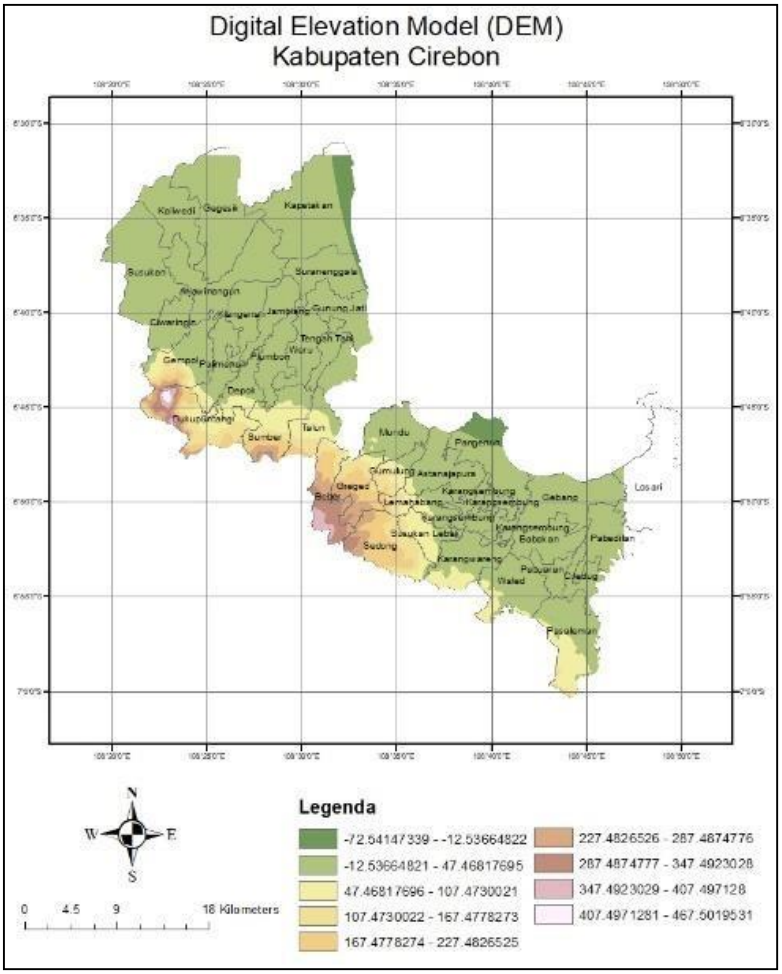

Figure 4. DEM Cirebon District.

The results of the inventory of isolects were obtained as many as 208 gloss and berian data. The study sample consisted of 41 villages spread across Cirebon Regency. Gloss and cryptic data are tabulated into the database using the MS Excel application, which is the GIS input data. Through further processing using the Speech Analyser application, it can be seen that there are several berian data containing noise in the sample area. After filtering the data, it can be seen that there are 29 villages in minimum noise conditions from 41 villages which were originally determined to be research samples.

c. Presentation of data

Data presentation is the final stage of the mapping process sequence. Data that has gone through the processing process can be used as a source of information that contributes to decision making.

In this study, the data is presented in the form of an isolect map in Cirebon Regency. The isolect map features 208 gloss spread across Cirebon Regency. This isolect map uses Geogprahic coordinates, ie Degrees, minutes, seconds. The scale of the isolect map is 1: 220,000 which is visualized on a numerical scale and graphical scale. Making an isolect map using ArcMap 10.5. Insect maps can be presented in two types, namely analogue maps (printed / hardcopy) and digital maps (softcopy). Figure 5 shows an example of a visualization of the isolect map in Cirebon Regency.

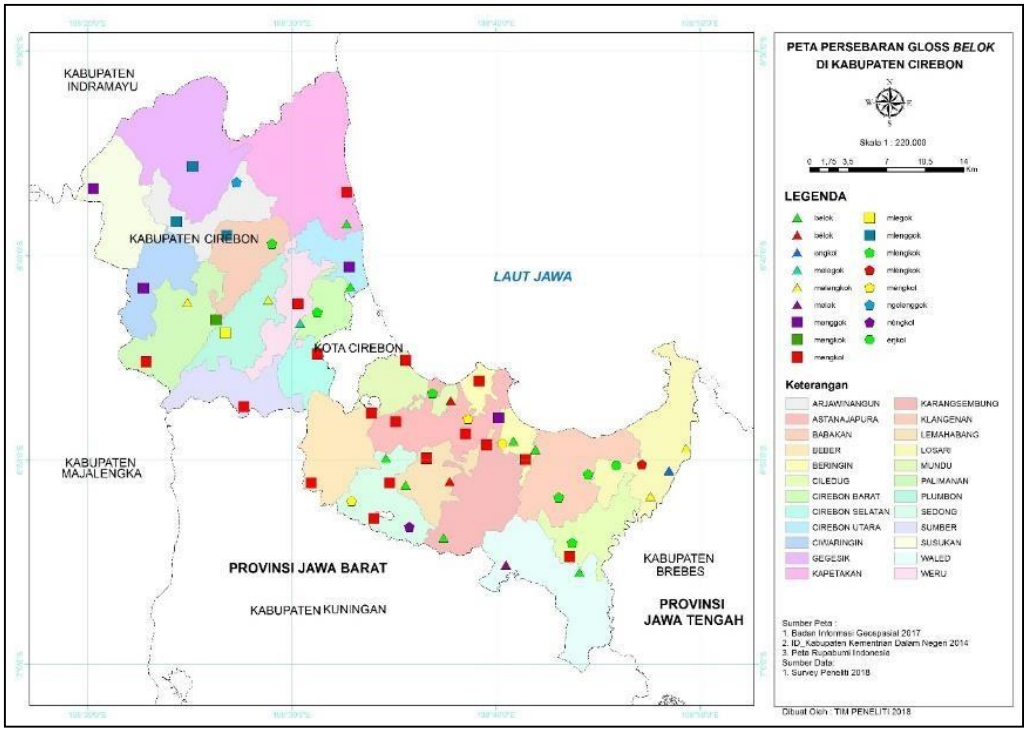

Figure 5 Glossy Gloss Distribution Map in Cirebon Regency

From the results of this study, it can be seen that mapping modelling through the application of Geographic Information Systems (GIS) can provide isolect information in Cirebon Regency.

4. Conclusions

Mapping is the process of measuring, calculating and describing the surface of the earth using a method and / or a particular method so that the results are in the form of ssoftcopy or hardcopy. Mapping modelling through geographic information systems can visualize various types of thematic maps, namely administrative boundary maps, contour maps, Digital Elevation Model maps (DEM), and gloss distribution maps. This geospatial based visualization will make it easier for users to get information on the distribution of gloss in Cirebon Regency. Through these mapping, linguistic conditions in a region can be visualized geospatial.

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