A QGIS Plugin for Visualizing Open Traffic Accident Data Using PyQGIS

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(1) Introduction: In order to propose some effective countermeasures to prevent traffic accidents, it is crucial to investigate the characteristics of its attributes. This study aims to develop a QGIS plugin to visualize the aggregation results easily, which might be used by officers in the government for safety analysis. Here, QGIS is a free GIS tool, which has been used by more and more researchers and engineers due to its low cost, good extended development ability, and diversified community. This developed QGIS plugin can draw various charts quickly and avoid time-consuming work processes using Microsoft Excel or other tools.

(2) Method: Firstly, the open traffic accident data were converted and stored in the QGIS as shapefile format as a geospatial vector data format, by which we can visualize the location of traffic accidents easily. Secondly, a QGIS plugin was designed by QT Designer and PyQGIS language. To visualize the traffic accidents, we mainly utilized three libraries of Python languages, Matplotlib library, Seaborn library, and Pandas library, which were integrated into the QGIS system. This visualization plugin is highly interactive and autonomous, which might be extended easily using PyQGIS language. Thirdly, this visualization tool was testified using the traffic accident data provided by Fukuoka Prefecture, Japan.

(3) Result: Figure 1 shows the interface of this QGIS plugin. Users can select the type of charts, including bar, box, broken line, and scatter. The vector layer of traffic accident data can be chosen considering the choice of drawing all points or selected points. The attribute of x field and that of y field are set freely in this interface, which can use different charts to visualize aggregation results. Here, two example charts are shown in Figure 2 and Figure 3, respectively. Figure 2 shows the bar chart for the aggregation result for occurring time and accident counts, which indicates that 5 p.m has the largest number of accidents. While, Figure 3 shows the bar chart for administrative regions and accident counts, which suggests that there are more accidents in the administration region 401 in Fukuoka Prefecture. Next step, this plugin will be revised following suggestions of officers working for safety analysis and management to make it more applicable.

(4) Data:
- Traffic accident data (2016~2018) of Fukuoka Prefecture, Japan Open data Site of Fukuoka Prefecture, Japan.

(5) Reference：
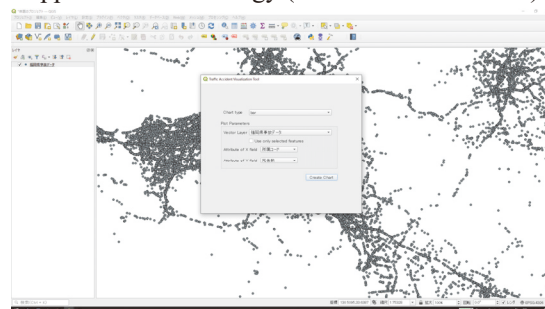Joel Lawhead. (2015) QGIS Python Programming Cookbook, UK: Packt Publishing Ltd.

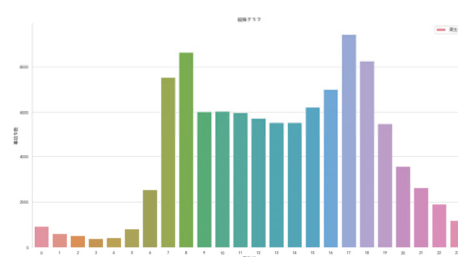Figure 1: Interface for drawing charts
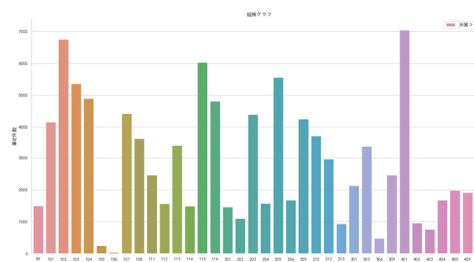

Figure 2: Bar chart for occurring time and accident counts

Figure 3: Bar chart for administrative regions and accident counts