**I. Line Chart**

A line chart


Description automatically generated

To start off with, the line chart consists of three attributes which are: confirmed cases, recovered cases, and active cases. These attributes are the type of common knowledge that people from all classes want to know, therefore it is the most noticeable chart. The first date on this chart is February 13th, 2020, this is the milestone when Vietnam started the twenty-two-day period of not recording any new case, therefore, all of the three attributes did not fluctuate much in this period, until March 7th, 2020, when the 17th patient is recorded. This patient came back to Vietnam on March 2nd from a Europe trip and had experienced symptoms but refused to voluntarily have a COVID-19 check. After the event of recording the 17th case, the three attributes shared the same trend of increasing dramatically until April 1st, when the Prime Minister’s instruction of quarantining the whole society was activated. After that, the number of active cases started to have a trend of declining, and as this report been written (June 19th, 2020), there are only 11 active cases left in Vietnam.

To see this line chart with interactive tools, please download the link below and open it with a browser: <https://raw.githubusercontent.com/justhoaian/RegressionAnalysis/master/line-chart.html>

**II. Bar Chart**

A bar chart


Description automatically generated

Secondly, the stacked bar chart analyzes the number of cases in terms of gender and age. From the chart, it is clear that the ratio between males and females who are Coronavirus infected are approximately equal. This can be easily understood because 6 out of 9 age groups (from 10 to 69, except for the age group from 40 to 49) are almost balance between male’s versus female’s numbers of confirmed cases. For the exceptional age group 40 to 49, the number of recorded female cases is 32, approximately 1.5 times as much as that of male, which is 19 cases. For both genders, the number of confirmed cases peaks at the 20 to 29 age group in the latest record (male: 67 persons, female: 61 persons). It is noticeable that the working-age age groups (from 20 to 59) have higher number of confirmed cases comparing with the youngsters and elders. A reasonable reason for this is that many of them still had to go to work during social quarantine because they are their families’ main source of income; therefore, it was easier for them to be exposed to the virus. The difference between the number of infected people who are 10 to 19 and 60 to 69 years of age is negligible. In the latest record, is the approximate ratio of confirmed cases between the 70+ age group and the total number of that of the other age groups.

To see this bar chart with interactive tools, please download the link below and open it with a browser: <https://raw.githubusercontent.com/justhoaian/RegressionAnalysis/master/horizontal-stacked-bar-chart.html>

**III. Parallel Coordinates Chart**

Parallel coordinates chart

Description automatically generated

Next up, the parallel coordinates chart provides more details about which provinces the Coronavirus spread from in Vietnam based on the number of confirmed cases, recovered cases, F0 who were quarantined immediately after entering to the country, F0 found in society, F1, and Fn. It can be seen from the chart, Ha Noi records the highest number of confirmed cases with 121 cases and this figure is twice as much as that in the city having the second-highest number of confirmed cases: Ho Chi Minh City (60 cases). Likewise, the numbers of F0 (quarantined), F0 (social), and F2 recorded in Ha Noi are the highest in all of the three attributes. Therefore, the government decided that the Coronavirus status in Ha Noi should be raised to Alter 3. On the other hand, even though Thai Binh is ranked third in terms of confirmed cases, all cases were quarantined right after the patients’ entrance to the country. Only 9 cases are found in Binh Thuan province, but all the 9 were found in society (with 1 F0 case and 8 F1 cases - the highest record of F1 attribute). Only 1 out of the top 10 provinces having the highest confirmed cases belongs to Central Vietnam: Da Nang.

To see this parallel coordinates chart with interactive tools, please download the link below and open it with a browser: <https://raw.githubusercontent.com/justhoaian/RegressionAnalysis/master/parallel-coordinate.html>

**Conclusion:**

To put it in a nutshell, this lab project delivers a general view about the COVID-19 epidemic in Vietnam using real-time charts, combined with regression models. The data clearly points out that with only 24 active cases left out of the 349 confirmed cases, SARS-COVI-2 pandemic is now under control in Vietnam, thanks to the government’s and Ministry of Health’s efforts, combined with Vietnamese residents’ cooperation. Hopefully the models constructed in this lab assignment can precisely predict the trend of COVID-19 in the future, so that Vietnamese can gain enough understandings about the virus outbreak to overcome the panic wave created by fake news and show equivalent appreciation to the Vietnamese government and Ministry of Health.