CHAPTER 6
CONCLUSION

From this Bus Route Demand Prediction With Deep Learning study LSTM-Autoencoders-Bi-LSTM hybrid models and Bi-LSTM is created to get comparison from those 2 models, then ftom this research it can be concluded that :

1. with huge amount of data that the authors get, surge in demand for bus routes is predictable since all deep learning model created in this study could predict the bus route demand decently thanks to the LSTM layers, this time series problem could solved.
2. Many other data can be extracted from the raw data that can help deep leraning training stages, from this reseach the author could extract 'covid', 'dayOfWeek', 'Akhir Pekan', "NextDateisHoliday", "Next2DateisHoliday", "Next3DateisHoliday", out from the date time variable only, so the trainable deep learning models may have good results.
3. Autoencoders in their nature will do every job very well on extraxting features out from high dimensionality of the data, since the autoencoders it self is used to use on unsupervised learning problems. Autoencoders also done a good job for extracting feature from this study. The encoding step is missing some information, but the information that loss is information that doesent realy important for the prediction so the machine can get more information that more meaning full and drop the unwanted one automaticly. But in this study it shows that models with autoencoders when compared with models that dosent have autoencoders dosent differ that much. This happen probably because the data dimension in this study is not large enough so that without autoencoder the models can predict pretty well. Its also need to be noted that autoencoder have their own drawbacks due to its deeper network that hugely impact the training time.

And here is for the suggestion and adfice from the author for future research:

1. Due to the lack of resouce and time that the author have, then further research for this study is needed to prove more then from this research, probably adding more data variable to se how it will impact for the models.

2. Adding more deep learning models is needed so more than 1 models could compared each from each other, probably using 2d Convolutional neural networks, LSTM-CNN hybrid or even using machine learning method such as SVM.
3. Using more powerfull machine to hugely cut of the training time so more models could created for comparisons.