Along with the increasing number of motor vehicles on the road, there has also been increases in the number of traffic accidents in Surabaya every year. Traffic accidents on the road can be caused by several factors. Among of those factors are the human factor or the driver (93.52%), vehicle factors (2.76%), road factors (3.23%), and environmental or weather factors (0.49%). Five programs have been done by Kepolisian Resor Kota Besar Surabaya to prevent traffic accidents are mapping the potential area of traffic accidents, the Global Road Safety campaign, the establishment of the traffic forum, revitalization of the traffic rules, and the Road Safety Partnership Action. However, these five efforts have not been able to reduce the number of traffic accidents significantly. In conclusion, the research on human error of motorcyclists needs to be done in order to know the most influential human error against road traffic accidents.

This research focuses on the motorcyclists as the cause of accidents (human error) that can be divided into two, namely the dangerous behavior and the fatigue. Examples of dangerous behavior are disorderly driving, high speed driving, driving while intoxicated, careless driving, and improper use of technology. Meanwhile, fatigue is a case where the driver is drowsy, distracted, or having a disease. Bayesian Networks (BNs) is used to predict the number of traffic accidents as results of human error during 2014.

Based on the calculation result using Bayesian Networks, it is predicted that most traffic accidents in 2014 involve motorcycle and pedestrian(s) or motorcycle and tractor(s) or truck(s). In both cases, motorcycle drivers suffer minor injuries. Traffic accidents involving pedestrian(s) are mostly caused by disorderly driving (85.01%) and improper use of technology (11.59%). While traffic accidents involving sidewalk(s) are mostly caused by disorderly driving (68.40%) and careless driving (21.75%). To reduce the number of traffic accidents and the number of driver injuries each year, the recommendations given are to improve the Global Road Safety campaign and revitalization and the usage of prediction templates to predict the traffic accidents in the future.

**Keywords:** Bayesian Networks, Dangerous Behaviour, Fatigue, Human Error, Traffic Accidents