Predicting leaf-fall

Challenge
Like most rail operators, Translink can experience weather related problems throughout the year – from track buckling in summer, to snow and ice in winter.

During autumn, leaves on railway tracks can contaminate rail heads, significantly increasing the risk of low adhesion and causing problems such as station overruns and wheel slip leading to service delays. Dry leaf film also acts as an electrical insulator which can stop track circuits operating correctly and result in Wrong Side Track Circuit Failures (WSTCF). Poor adhesion can also cause excess wear on wheels and tracks, as trains and tracks are put under more pressure through harder brake rates.

The volume of leaves falling and risk of causing contamination can vary significantly from day to day, depending on the weather and different types of trees along the rail routes.

The rail network can quickly be disrupted with serious and cumulative delays as trains are unable to maintain point-to-point timings. This costs rail operators, such as Translink, significant money each year – in terms of track and train management and penalties incurred from timetabling delays for passengers.

Solution
Working together with agricultural and environmental consultancy, ADAS, we have developed a leaf-fall prediction model to combat the leaf-fall threat.

The model takes into account forecast wind speeds, the volume of leaves remaining on the trees, accumulated leaf litter on the ground and the behaviour of different types of trees. The model also accounts for the effect of frosts and storms on leaf-fall rates.

Translink receives the service by email which shows colour coded leaf-fall risk and wind throw warnings up to five days ahead. The reports are sent three times a week during the off peak season and six times a week during the peak season. The service can also be received via a web portal.

Benefits
By using our leaf-fall prediction service, Translink can cut the time taken to treat the rail heads by two weeks. As a result, operating expenditure has reduced and efficiency increased, which Translink says has, “paid for the service”.

The adhesion forecasts also enable Translink to alert drivers on particularly bad days, stopping the amount of SPADS (signals passed at danger) during the season, increasing safety for crew and passengers. According to Translink, it was their, “best performance on record” since they started to use our prediction forecast service.