PolyChord

Use Case for PolyChord Predictive Maintenance:

WM5G: West Midlands Metro

PolyTrack is a PolyChord application to train/tram infrastructure underway now in 2021, using state-of-the-art sensor technology aboard passenger trains and trams in the West Midlands to provide a suite of decision tools to enable faster, more efficient and pro-active track maintenance. The bogie-mounted sensors collect useful, but messy data which is then analysed by PolyChord.Using 5G, the aim of this project is to give almost real-time information on the health of the track, reducing downtime of service and the use of the expensive equipment and manual intervention necessary in more traditional track maintenance methods. West Midlands Metro are financially backing this project, and will pay PolyChord a licence fee for the first year on project completition.

Bogie-mounted sensors

ESR Technologies are working with PolyChord on this and are specialists in sensors for hazardous environments. Their bogie-mounted sensors measure vibration, shift and yaw in the train/tram axle and wheels. Two sensors are mounted on the axle of the train/tram. Using the data from these sensors, PolyChord explores the data landscape to make judgements about the **surface and texture** of the rail infrastructure, the findings of which are then compared against the "real world" physical geometry of the rail. Using **time-series data mapping**, PolyChord computes this data to make judgements about where similar faults will occur in the future.

Huge Savings for West Midlands Metro

PolyTrack will negate the need for tamping machines - an immediate saving of at least £30k per annum, plus increased asset life, as tamping damages ballasts. Asset life will be further extended through PolyTrack's near real-time intervention prompts. The revolutionary nature of the technology and the practicality of the approach has already prompted serious interest from TFL and Network Rail.

Track mounted sensors at points of transition

At the same time, working with Southampton University, a second set of sensors are mounted at points of transition in tramways – these mark moment where tram moves from traditional rail sleepers to embedded tracks in concrete and tarmac. Focussing on these points enables us to identify other moments of transition in the tramway interrogation.

5G

Icomera are also collaborating on the project, transmitting sensor data through 5G from a vehicle mounted ICU-router, allowing near real-time insights. This is then routed to our cloud-based server by our fourth collaborator, British Telecom (5G section).