



HACKTRAIN

3.0 CASE STUDY

Thank you
to all our
amazing
sponsors!



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Foreword from the founder, River Tamoor Baig!

The Hack Partners team led an action packed weekend, bringing 80 developers, designers and entrepreneurs together to hear industry challenges from our sponsors and partners. With unique access to a combination of data, hardware, industry expertise and mentoring, participants were able to dive deep to the heart of the challenges and develop some of the most innovative ideas and solutions the industry has ever seen.



One of the factors that sets the HackTrain hackathon apart from all others is its immersive nature. Within two hours from hearing about the industry's challenges, participants were asking passengers what their problems were at St. Pancras International Station, talking with their train guard on the way to Paris and learning from station staff in Lyon. The participants gained real time insights into what these challenges meant for the people on

the ground. As we are sure you will all agree, this kind of interaction is invaluable in developing solutions that create genuine impact for the industry.

But HackTrain doesn't stop here! After pitching their ideas at the hackathon and post-event, the HackTrain will help these early stage teams implement their technology in the railway by working with TOCs, the DfT, ROSCOs, Network Rail and others. We will be running

fast paced trials in stations, trains, websites and apps that see technology placed in the hands of passengers and rail staff in just 4-12 weeks via our T.R.I.A.L. Framework.

We are incredibly grateful for the support we've had so far in making HackTrain what it is. But we're even more excited about what it will be, a RailTech revolution. We look forward to pioneering this RailTech movement together with you.



Department for Transport

"I am really excited to see the innovators from around the world participating, working throughout the weekend creating new prototypes that improve customer experience and operational efficiency."

I look forward to see some of these innovations in the hands of passengers and rail staff in the very near future."

- Paul Maynard,
Rail Minister



"I am always excited to work with HackTrain.

I think it is a fantastic movement that is bringing together some huge talent that normally doesn't work in the rail industry."

- Beth West,
Commercial Director, HS2



"HackTrain has proved that the private sector can help drive innovation and rapid delivery of new technology in the rail industry, and BAI Communications is looking forward to doing the same."

With decades of experience providing wireless telecommunications networks for the public and transit authorities in New York, Hong Kong, and Toronto, BAI Communications is excited to be working with forward-thinking private sector partners like HackTrain to support the rail industry's evolution to a new digital era."

- Malcolm Keys,
UK Director, BAI Communications

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HACKATHONS

WHAT IS A HACKATHON?

Hackathons are endurance events which challenge small teams to intensively build products in an extremely short space of time. Teams of programmers, designers, and entrepreneurs come together in a weekend to build working prototypes from scratch, innovating on a specific themes or industries.

Hackathon's are crucial to the tech industry! With the Facebook Like button and other features having been created at hackathons, other corporate industries have taken to using the model to facilitate and deliver unparalleled innovation that the format entails.

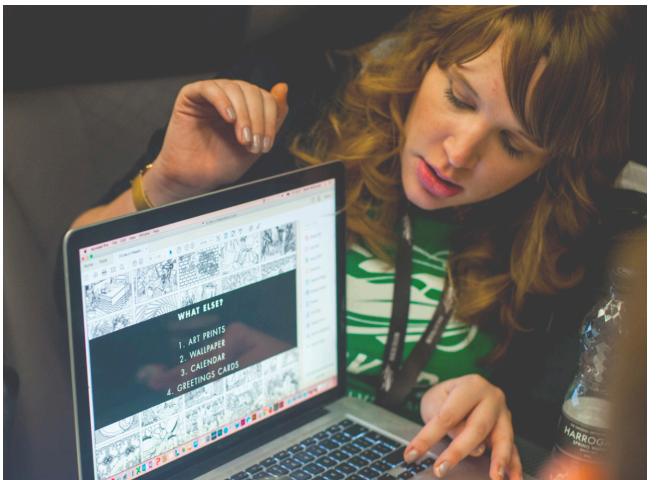
WHAT DOES THE TERM "HACKING" MEAN AT HACKATHONS?

By definition, "a hacker is one who enjoys the intellectual challenge of creatively overcoming and circumventing limitations of programming systems, and who tries to extend their capabilities". In the context of a hackathon, it means taking a piece of technology, and extending its functionality – making it do things it was not originally intended for.

Unlike the "hacking" that you normally hear about in the news where individuals steal personal information, "hacking up ideas" is what hackathons are all about – building revolutionary products and services that solve problems in innovative, unique ways.

ATTRACTING EUROPE'S TOP TALENT

The key to a successful hackathon is ultimately talented participants. The Hack Partners network drove 300 applications from across the world this year. We also provided travel reimbursements for talent travelling from across the world. We interviewed over 150 developers, designers, and entrepreneurs over three months, selecting 80 participants, providing a balance of skillsets and pedigree. Participants included data scientists, machine learning experts, mergers & acquisition specialists and UI/UX professionals. The quality of talent at HackTrain was unprecedented!



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HackTrain 3.0

The HackTrain hackathon was a 48-hour, immersive startup competition. Some of the greatest developers, designers, and entrepreneurs from all around the world came together to build mobile apps, websites, products and services to solve problems in the railway industry. During the course of a weekend, the "RailTech innovators" created projects from scratch that now have the potential to bring innovation at the railway industry.

All of this, whilst on a moving train!



INNOVATING THE RAIL INDUSTRY TOGETHER

HackTrain was defined by its mission statement: to enhance customer experience, improve operational efficiency, and change the rail industry for the better. Excited partners are important for an exciting hackathon, and our sponsors made this mission even more achievable through their deep expertise, support and technology.

Real solutions require real data and this year was bigger than ever! We were provided with over 11 datasets from seven of our fantastic partners, some of the data being released exclusively for the HackTrain!

- ✳️ Great mentors help build great products and we were lucky enough to have had 16 mentors on both trains from SILVERRAIL, DfT, TfL, SNCF, BAI COMMUNICATIONS, EY and ANGEL TRAINS!
- ✳️ EUROSTAR and SNCF provided transportation for the weekend, taking participants on a first class journey to Paris and Lyon on the EU train!
- ✳️ TRAINLINE provided mentors and participants for the journey with both rail industry and tech domain knowledge, advised the teams, and finessed products for increased market fit.
- ✳️ SNCF released 3D point cloud datasets of stations and train lines acquired by drones, helicopters, and trains. They also provided their API of planned and real-time train timetables including itineraries by train, stop stations, scheduled lines and automatic search of stations.
- ✳️ EUROSTAR provided real-time train events such as train positioning, station information and check-in data.
- ✳️ ARRIVA provided datasets from National Rail Enquiries and DARWIN.

✳️ TfL provided several months of data about tram performance including number of passengers, tram timetable, and actual tram running schedules.

✳️ NOMAD DIGITAL released sample datasets which show the WiFi activity on a set of real train journeys. The data included information regarding the amount of data passengers used, the time they spent using WiFi, and the connectivity that was available on the train. In addition, geo-data was also provided that allowed the analysis to be mapped onto the actual location of the trains.

✳️ ANGEL TRAINS provided data on high speed train fuel consumption and electricity usage through one day. They also provided data on a Class 180 Engine to show how the engine performed during the day!

✳️ BAI COMMUNICATIONS provided WiFi association data which shows devices associating and disassociating to the WiFi network throughout the subway system.

✳️ We are also proud to be sponsored by BAE SYSTEMS, RAZORSECURE and HS2!

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LAUNCH

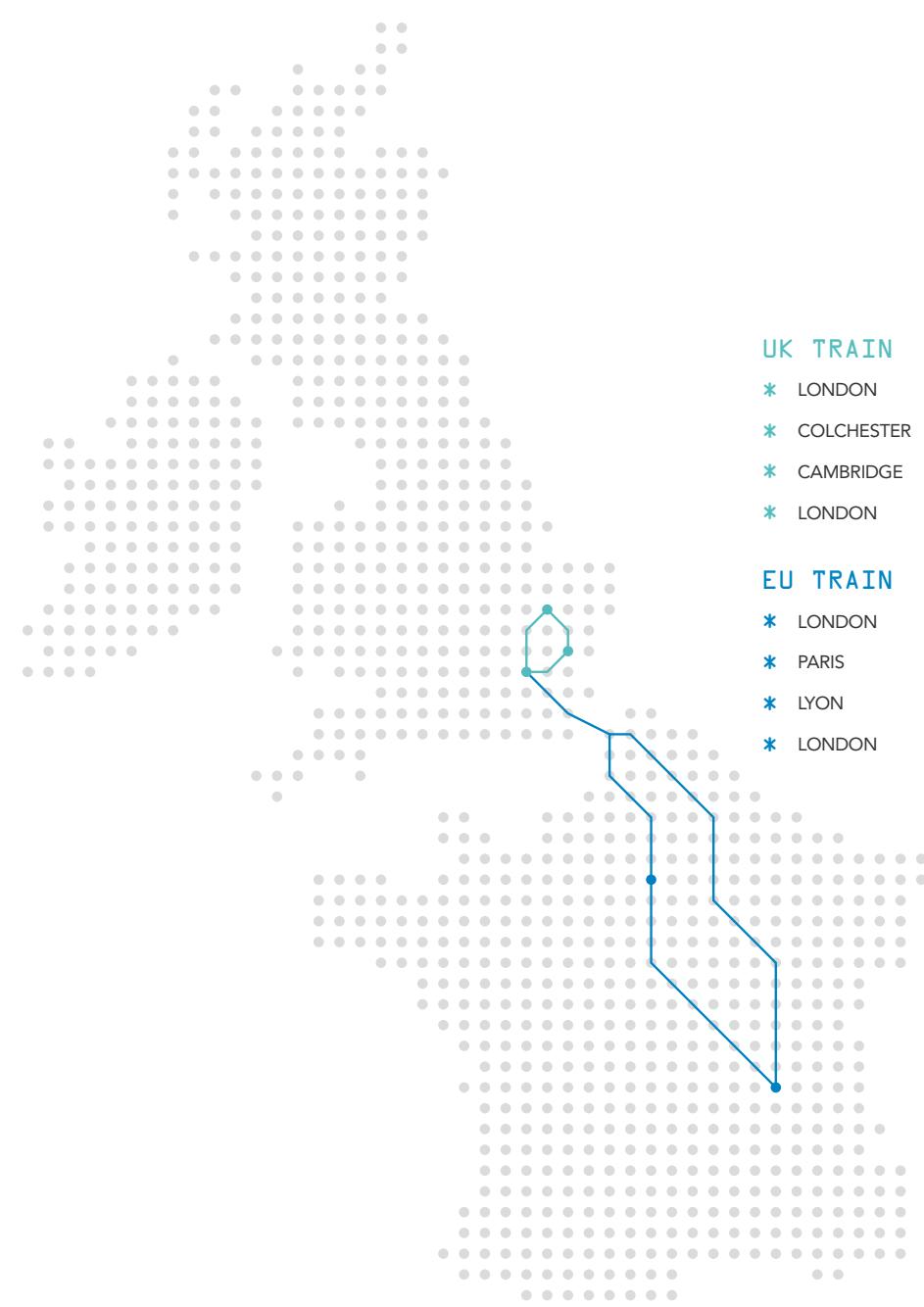
WHEN TECH AND RAIL UNITE

For HackTrain 3.0 we launched once again at the beautiful St. Pancras Renaissance Hotel. Participants attending the HackTrain had a chance to meet more than 100 railway professionals throughout an afternoon full of energy, innovation and disruptive thinking! Speakers at the HackTrain launch event included:

- * Paul Maynard MP - UK Rail Minister of DfT
- * Beth West - Commercial Director of HS2
- * Michael Hurwitz - Innovation Director of TfL
- * Malcolm Keys - Managing Director of BAI Communications
- * Dave Slocombe - Mobile Product Owner at Trainline
- * Euan Smith - Head of Product Management of Angel Trains
- * Laurent Bellan - CIO of Eurostar
- * Thomas Joindot - Deputy Director of Engineering & Projects of SNCF

JOURNEY DESTINATIONS

HackTrain 3.0 consisted of two different journeys, each going to a different route, the initiative expanded into the European market with one train travelling to Paris and Lyon thanks to Eurostar and SNCF.



CHALLENGES

Our attendees were divided into the two different trains based on their skills and areas of interest, giving us 20 teams of innovators. Each train aimed to tackle a different set of problems:

EU TRAIN CUSTOMER EXPERIENCE & DATA	UK TRAIN INFRASTRUCTURE & DATA
Real-time timetable broadcast	3D point cloud management
Personalised customer experience	Fuel & electricity consumption efficiencies
Crowd congestion	Train maintenance & predictive solutions
Smoother door-to-door journey	Train schedule optimisation
Cloud service connectivity	WiFi accuracy
Customer communication during disruption	Passenger loading

LAUNCH - CHALLENGES AND DATASETS FROM THE INDUSTRY

RailTech innovators heard about the challenges faced in the industry by domain experts. Our innovators were given access to real operational datasets, many of which were released for the first time ever! Executives in the railway industry shared their experience with the young hackers. Challenges included:

SNCF: Broadcasting planned and real-time timetables via new channels, new usages, and new technologies.

SNCF: Producing an automated system to detect and classify objects in order to create a 3D environment of the rail network.

ARRIVA: Passenger information during disruption (PIDD).

EUROSTAR: Providing passengers with personalised experiences.

TfL: Analysing and calculating optimum timetabling and passenger loading with existing tram data.

DfT: Utilising smart cities to create smart transport experiences to improve door-to-door journeys.

Nomad Digital: Providing passengers more information about cell coverage across the rail network

EY: Automatically adding asset data of objects such as overhead wires, signalling, buildings, tracks etc. to registries.

Angel Trains: Pre-emptively identify failures of vehicles and improve driving styles with fuel & electricity consumption data between vehicles.

BAI Communications: Identifying users' behaviours using WiFi.

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HACKING PROCESS

IDEAS AND TEAM FORMATION

The participants pitched their ideas for solutions to the challenges posed at the start of the event. They each had a chance to share a 60-second informal pitch consisting of the problem they want to tackle, the solution they want to propose, and the team members they needed to make it happen. The top ideas were chosen and participants formed teams organically, choosing whichever idea they were motivated to work on the most.



At the close of the launch event participants divided into their trains, transported by SNCF and Eurostar, and departed for their journeys around UK and Europe.

RESEARCH

Our participants had the unique opportunity to discuss their ideas with railway professionals throughout the event. Participants came to the hackathon with drive and energy to build fully functional products, however, it was the [inside knowledge](#) from the industry that [made the difference](#) between just building "something cool" to actually building something that truly solves a problem.



BUSINESS PREMIER

HACKING PROCESS



CUSTOMER VALIDATION

Within two hours of hearing the industry's challenges, participants were marching up and down station platforms and train carriages, validating their hypotheses with real passengers. The immersive nature of the HackTrain hackathon meant that participants had a chance to gather immediate customer validation by demoing their apps and services to their future users.



EXECUTION - HACKING, BUILDING, AND CREATING

Once innovators found the root of the problem and outlined their solution, they got to work building their apps, websites and algorithms to demo to our expert judges. They used a range of technologies from SNCF's API, iBeacons, camera drones, raspberry PI's, smart phones and a whole lot of hacking - the teams' did whatever it took to get their products off the ground! For the finals, teams put together pitch decks presenting their solution, business plan, and go-to-market strategy to wow our judges.

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HACKING PROCESS

FINALS AT RUNWAY EAST FINSBURY

Fuelled by sheer determination, comradery and the odd energy drink(!), teams wrote and practised their pitches throughout the night. Semi-final pitches were conducted between the teams of each train and the participants faced challenging questions fielded by our panel of top judges. The top five teams from each train were selected to go through to the finals for the chance to win a trip to Hong Kong and compete in our first ever international hackathon, HackTrain HK.

FINALS JUDGES

The finals brought together a high profile panel of partners and rail industry experts. Judging was carried out based on the team demos, presentations and responses to judges questions. Judges included:

- * Neil Roberts, Head of Digital at Eurostar
- * Malcolm Keys, Managing Director at BAI Communications
- * Kuldeep Gharaty, Head of Technical, Strategy & Innovation at TfL
- * Guillaume Foeillet, International Business Manager for Engineering & Projects at SNCF
- * Sarah McDonald, Senior Director at SilverRail



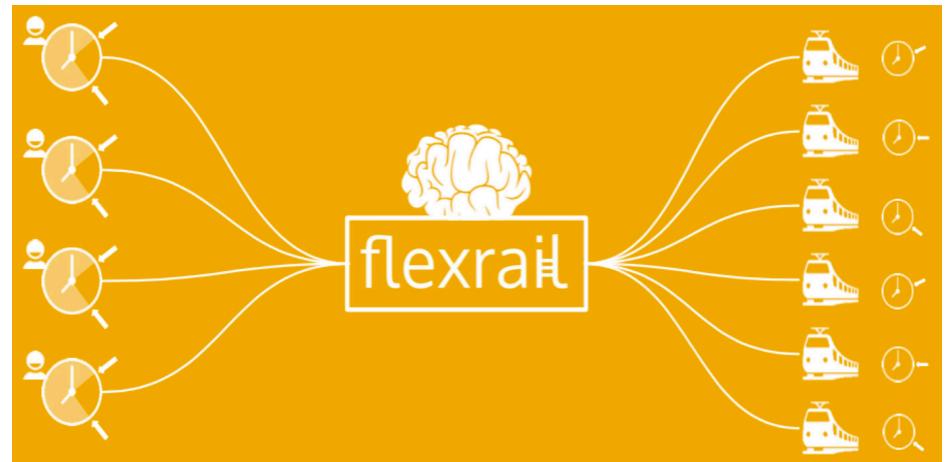
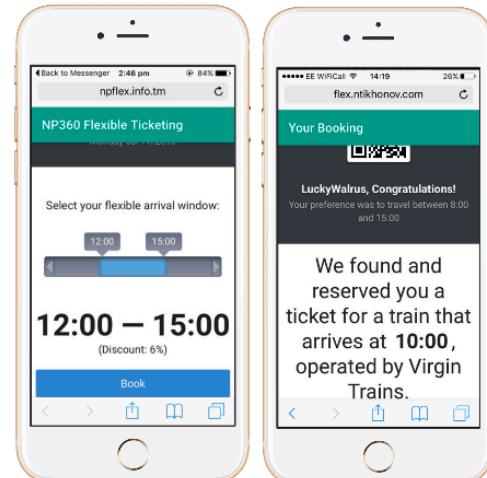
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1ST PLACE FLEXRAIL

One of the problems that many train companies face is managing [crowd congestion](#) during [peak times](#). Flexrail built a [booking engine](#) to help avoid overcrowding through dynamically assigning passengers to trains for [optimal crowd distribution](#). Passengers simply specify a time range they are able to travel during with [discounted incentives](#) to choose wider [time ranges](#). Each passenger is then assigned to the least crowded train that is within the times they specified.

Flexrail member, Sina Sh explains that "instead of buying a ticket at 9am during the most congested hours, our engine allows passengers to do select a range of times that they're able to travel on, say between 9am and 1pm,. Then 24 hours before they travel the system notifies what train they will be on. This allows the train operators to distribute the number of passengers evenly across several services giving passengers a more comfortable experience and increase satisfaction levels."

USER INTERFACE



TRAIN OPERATOR INTERFACE

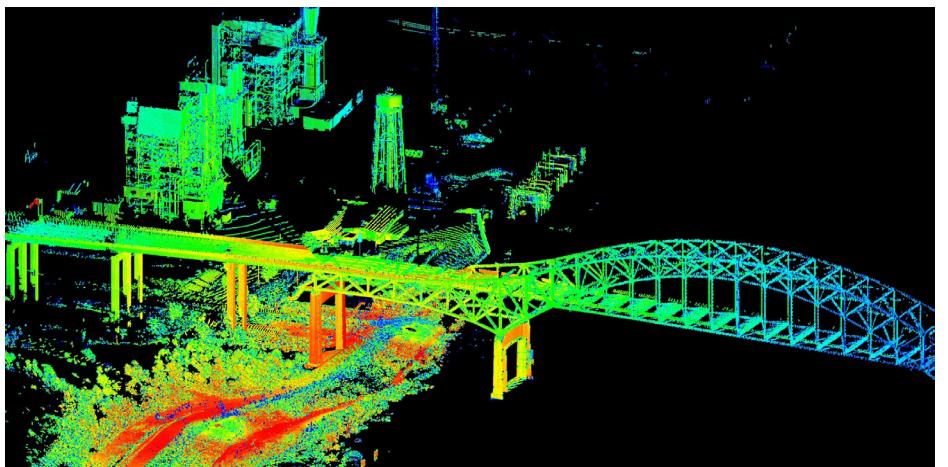


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2ND PLACE AUTOMAPPR

New LiDAR measurement techniques offer [3D data](#) used by SNCF RESEAU to monitor its network (accelerometers, measurement trains, topography, GPS, etc.). This data needs to be [classified](#) into categories such as wires, tracks, and platforms, a task currently completed [manually](#). This is [costly](#), [time-inefficient](#) and introduces [user error](#). [Automappr](#) took on the hardest challenge in the entire hackathon, coming up with a solution to detect and classify wires in the data through [crowd-sourced categorisation](#).

[Automappr's Tina Gogna](#) explains, "What we've done over the weekend essentially is create an [algorithm](#) that is able to analyse the LiDAR data and automatically identify objects within the network and [assign a name](#) to them. The technology is so cutting edge that only Google and Mercedes have been able to really get it working effectively in a real environment."



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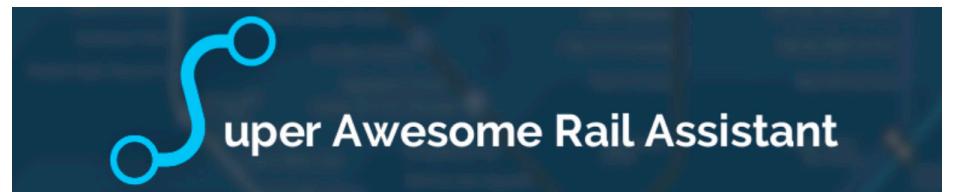
3RD PLACE

SARA (UK)

Passengers are increasingly expecting a more [personalised experience](#) from service providers and be kept up to date about any disruptions before and during their journeys. [SARA](#) which stands for Super Awesome Rail Assistant is a [natural language processing bot](#) and a [voice recognition interface](#). SARA can provide information such as train times, carpark locations, disruption updates, indoor navigation, ticket sales and more via [messaging](#) and [speech](#). The [SIRI of rail!](#)

Additionally, Sara can be used to connect with other [service providers](#) such as Google Maps, Eurostar, TfL, Expedia, DfT and Twitter.

[SARA team lead, Daniel Gorgonia](#) shared his thoughts behind why his team built SARA, "we naturally communicate to each other verbally so why is it that we don't use this same approach for checking train times, booking tickets and receiving directions? That is why we created SARA."



The image displays four smartphones showing the SARA app's interface across different scenarios:

- Live Train Schedules:** Shows a conversation where the user asks about disruptions and receives a response about train times from London to Cambridge.
- Ticket Bookings:** Shows a ticket booking screen with a QR code for a train from London King's Cross to Cambridge at 12:14 PM.
- Carpark Locations:** Shows a map of central London with several green dots indicating nearby carpark locations.
- Disruption Updates:** Shows a map with red and yellow markers indicating signal problems, along with a message from a user named Jack.

Live Train
Schedules

Ticket
Bookings

Carpark
Locations

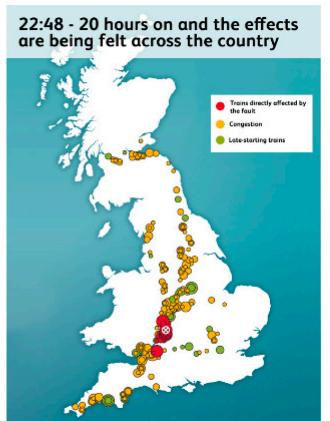
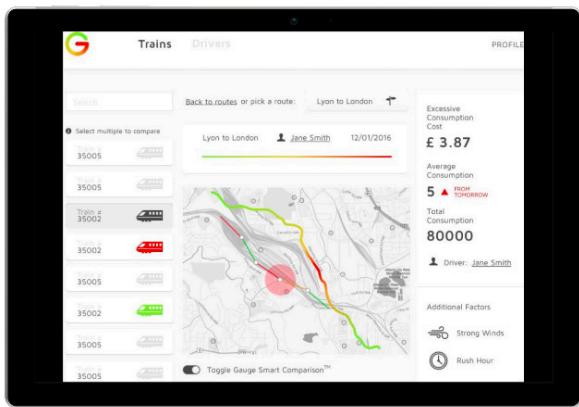
Disruption
Updates

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OTHER FINALISTS

GAUGE

With Angel Trains electricity usage and fuel consumption datasets, Gauge can detect infrastructure failures to [increase safety](#) and [reduce railway operational expenses](#). Using this data, the team were able to understand just how much energy is consumed during specific points of a journey allowing operators to [optimise and tailor driving styles for specific routes and geographies](#).



CLOUDY WITH A CHANCE OF DELAY

With [historical real-time rail \[is it historical or real time?\]](#) network data, Cloudy has created tools to analyse the impact incidents have on the rest of the network. Over the weekend, they created a [prediction algorithm](#) that detected how a freight rail delay at 2:48am would impact services across the network at 6, 9 and even 12 hours later. This will provide customers with answers to the questions like 'will my train be on time?' and 'how delayed will it be?' before they arrive at the station.

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OTHER FINALISTS

PUSH

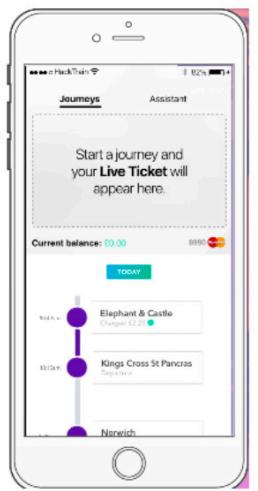
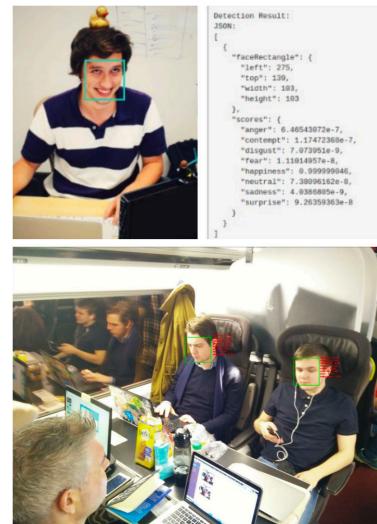
Call shortage
We're entering a tunnel in 5 minutes, you won't be able to make calls
push.wifi.com

Sightseeing!
Check out the Eiffel tower on the right
push.wifi.com

Food incoming
We're bringing your food in 5 minutes
push.wifi.com

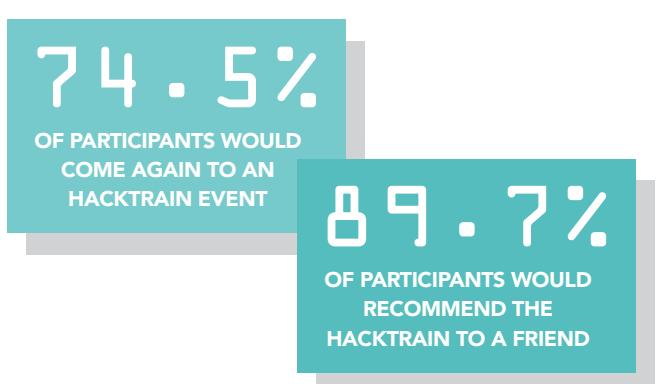
E-MOTION

Delivering exceptional customer experience is becoming ever more important in today's world. Customers' want a more [personalised experience](#) that accommodates their needs. eMotion is addressing this challenge by providing train operators with a real-time [customer sentiment analysis tool](#) that analyses passengers happiness levels using [facial and body recognition algorithms](#). The tool then recommends to front line staff how they can proactively or reactively deal with the customer.



TRAINGO

With demand for public transport rising year-on-year, [ticket barriers](#) will become a bottleneck for train stations throughout the world increasing congestion and slowing down passenger throughput. TrainGo alleviates this issue by providing train operators with a seamless [wireless ticketing network](#) that allows passengers to "start" and "finish" a journey by simply entering and exiting stations.



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MEDIA EXPOSURE & IMPACT

PRESS COVERAGE

Media coverage included feature pieces in Forbes, European Railway Review, SmartRail World Railway-News, Trainline Blog and International Rail Journal.



FlexRail, the winning idea for HackTrain 3.0 was featured in this piece with a quote from HackTrain's co-founder, River Tamoor Baig: '...by using data and new technology we can finally work towards solving some of the challenges that have been plaguing passengers and the rail industry for decades. This is our chance for a RailTech revolution.'

Forbes

Just a week after the hackathon, we were featured on Forbes with an amazing write up by the Forbes team. The article outlines the successes of HackTrain 3.0 from November and also The HackTrain Accelerator from March!

NOV 15, 2016 @ 05:10 AM 912 VIEWS

All aboard The HackTrain

Turning Hackathon Ideas into Startup Opportunities

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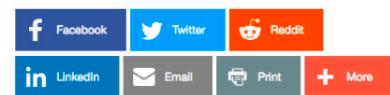
 **Trevor Clawson, CONTRIBUTOR**
I am a UK business journalist, specializing in fast-growth companies. [FULL BIO](#) Opinions expressed by Forbes Contributors are their own.

There are worse ways to spend a long weekend than catching a Eurostar train from London to Paris and connecting onwards to Lyon before returning home a couple of days later.


Preparing For The Hackathon

You are here: Home » Rail industry news » Flexible booking engine wins HackTrain 3.0

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SHARES



Flexible booking engine wins HackTrain 3.0

16 November 2016 • Author: European Railway Review

The third annual HackTrain saw rail and technology experts join forces on 4-6th November to drive innovation and tackle the industry's biggest challenges. FlexRail, a flexible ticketing system, was named winner at this year's event.

Related rail topics

- Digital Railway
- Railway Modernisation
- Railway Technology



Our third feature on Smartrail World News - 'HackTrain 3.0 - Hacking the Rail Industry Once Again!'. The article features the launch of HackTrain 3.0 at St. Pancras Renaissance Hotel in London with over 15 speakers representing different stakeholders in the rail industry.

0 HackTrain 3.0 – hacking the rail industry once again!

Posted on Nov 8, 2016

in It's hard to believe it's already been a whole year since the last HackTrain hackathon rolled out of St Pancras International station in London. For those who may not be aware, put out of your mind hacking as being a bad thing. A hackathon is an event which gives tech experts and creative thinkers the chance to innovate and improve specific industries. Typically held over a 48-hour period on the weekend hackathons bring together software developers, designers and industry experts for the purpose of solving challenges and creating new technologies.



Railway News has been a popular follower of ours with over eight features of HackTrain on their site with the very first feature dated back to April 2015 when we started our #RailTech movement. The author for Railway News, Josephine Cordero Sapien, was invited to join us throughout the whole HackTrain 3.0 journey on the EU train around France and wrote a detailed piece of the entire journey.

HackTrain 3.0 – How to Hack the Rail Industry!

November 6, 2016

Along for the Ride



I've been following HackTrain with interest throughout my entire time at Railway-News. Their aim is to bring innovation into the rail industry and reduce barriers to innovation so that good ideas and solutions can be implemented, and in a sensible time frame too. This is vital not just for keeping customers happy and operations running smoothly but also for keeping rail as a transport option viable for the future.

HackTrain 3.0 LAUNCH

This year's HackTrain hackathon is bigger than ever as it got off to a



The HackTrain's global movement was featured on the international journal with audiences of managers, engineers and manufacturers of the world's railroads, commuter rail, metro, light rail and tram systems.

Friday, November 11, 2016

Flexible ticketing system wins third annual HackTrain hackathon

Written by Dan Templeton

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HACKTRAIN's third annual hackathon, which seeks to solve issues within the rail industry through innovation, took place from November 4-6 on two separate journeys, one across Britain and another across Europe.

The hackathon initiative is supported by the Department for Transport (DfT) and backed by companies within the industry including: Trainline, Eurostar, Angel Trains, EY, SilverRail, BAI Communications, Transport for London, French National Railways (SNCF), and MTR.

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SOCIAL MEDIA COVERAGE

Through various social media platforms like Facebook, Twitter, and Snapchat, the weekend's activities made 351,000 impressions in total reaching 19,000 unique internet users!

Tweets	Top Tweets	Tweets and replies	Promoted	Impressions	Engagements	Engagement rate
 HackTrain @TheHackTrain · Nov 4				6,318	104	1.6%
Bringing the rail industry together at #HackTrainUK!!! pic.twitter.com/uexKWHbYr6						
View Tweet activity						
 HackTrain @TheHackTrain · Nov 2				6,187	226	3.7%
HACKTRAIN is departing in 2 days. CHOO CHOO. Don't miss your train! pic.twitter.com/PFYEe68YMX						
View Tweet activity						
 HackTrain @TheHackTrain · Nov 5				4,434	225	5.1%
Bonjour, je m'appelle #HackTrainEU!!! @SNCF_infopresse @SNCF_Digital pic.twitter.com/zg0pUEx2zx						
View Tweet activity						
 HackTrain @TheHackTrain · Nov 4				2,895	58	2.0%
Massive thank you to the entire @Eurostar team for all of their support so far! Can't wait to #HackTheRails with you this weekend!! pic.twitter.com/03gvDNk6Rv						
View Tweet activity						
 HackTrain @TheHackTrain · Nov 5				2,706	198	7.3%
Not bad for an office. #HackTrainEU pic.twitter.com/1xGqZmHMmh						
View Tweet activity						

trainline

Trainline Talent @TrainlineTalent

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Take a look at the world of @TheHackTrain through a mentors eyes with @daveslocombe >

Hacktrain 3 - A Product Owner's Adventure - Trainline Blog

Hacktrain is a three day Hackathon on a train. Around 80 software developers, designers and entrepreneurs from across the world gather together to imagine a better travel experience... blog.thetrainline.com

TWITTER

Just in November we reached 142,000 tweet impressions with 11,000 profile visits and 477 mentions from unique Twitter accounts with our official hashtags #HackTrainEU and #HackTrainUK for each train.

Our Twitter audience insights show that our audience comes from different backgrounds with interests in business, tech news, technology and business news.



SNCF Newsroom @SNCF_infopresse · Nov 6

Equipe 7 - Cloudy #HackTrainUK permet de transparence sur retards grâce aux données en temps réel + envoi d'alerte avant départ.



Trainline Talent @TrainlineTalent · Nov 7

Winners HackTrain 2015 - FlexRail-UK Train @TheHackTrain #hacktherails #HackTrainUK



Nick Tikhonov @nick_tikhonov · Nov 6

What a weekend - we built a dynamic ticket allocation system and won 1st place at @TheHackTrain ! Forever team #HackTrainUK.



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Launch

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Other
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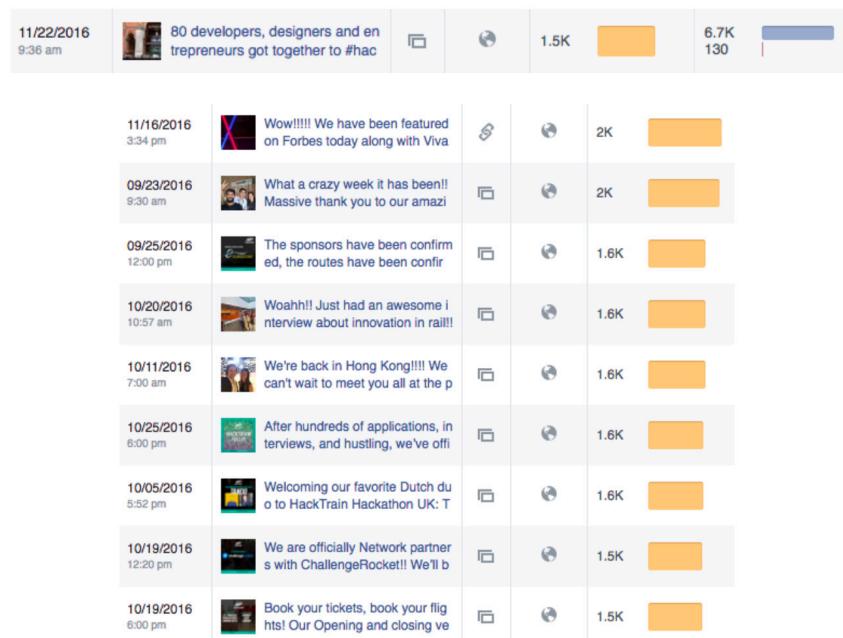
Media
Exposure
& Impact

Next Steps
T.R.I.A.L.S.

HackTrain
Team

FACEBOOK

With 1.2k followers on our HackTrain page, we actively update all our followers throughout the year with our HackTrain initiative. Our post reaches range from 1.5k to 2k a day, with the highest audience engagement of 6.7k!



SNA -



We created a Snapchat geofilter for the hackathon so anyone within the reach of the launch venue at St Pancras Renaissance Hotel could use it to share amongst their network. Our Snapchat filter reached over 1,000 views between 2-6pm during our launch event!

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CONTINUING MOMENTUM

T.R.I.A.L. FRAMEWORK

For 2017, we are focusing on bringing some of these innovations into the market. We're doing this by working with the HackTrain 3.0 participants and other innovators from around the world and helping them run face paced trials with train operators and rolling stock companies via our T.R.I.A.L. Framework.



For any business enquiries, get in touch now!

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HACKTRAIN TEAM



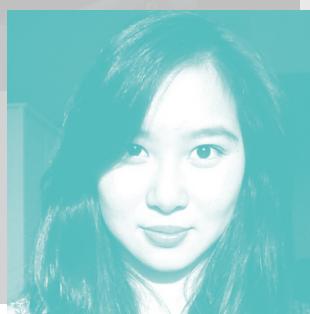
River
Tamoor Baig
CEO



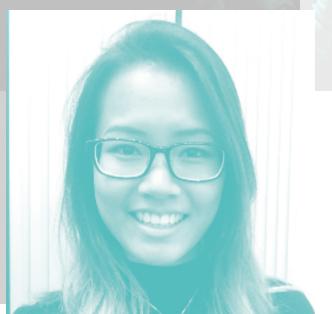
Damian
Kysely
Business Development



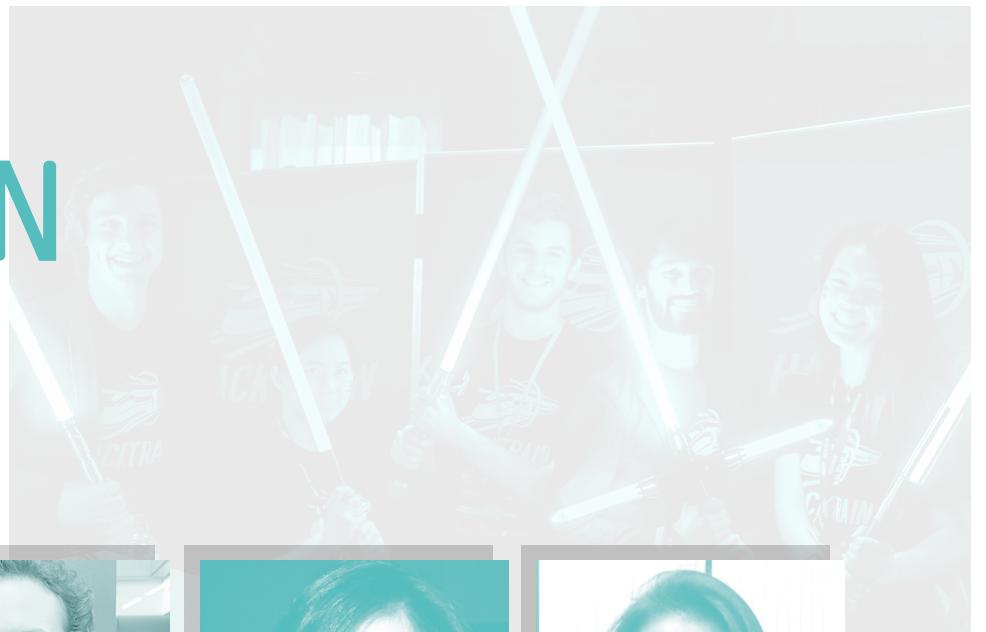
Josh
Gurnham
COO



Phoebe
Yiin
Operations & Marketing



Sarah
Chok
Hackathon Talent





3.0 CASE STUDY

THANKS FOR READING!