



Challenge 2:

MOBILE BASED APP WHICH USES MOBILE SENSORS & OBDII VEHICLE DATA FOR OBJECTIVE ASSESSMENT OF RIDE, HANDLING AND PERFORMANCE

Late one evening in April 2019, at her desk in Pune, **Shweta contemplated the solution of creating a mobile based app for the objective assessment of ride, handling & performance of Duke 390** at the R&D center of Bajaj Auto Ltd, a Fortune India 500 company of which she was a Lead Design Engineer. During her stint at Bajaj, over the last five years, multiple products had seen major innovation. Bajaj Auto's product portfolio had more than doubled with new categories of vehicles catering to diverse customer sets.

Shweta was aware that the spectacular success of Bajaj Auto was credited to an emphasis on innovation, sharp brand focus, dynamic leadership team and Lean Manufacturing – The TPM way of working.

ABOUT BAJAJ AUTO LTD

Bajaj Auto Ltd (BAL), one of the leading manufacturers in India, is the largest exporter of two and three-wheelers in the country. Three decades ago, the 'Hamara Bajaj' advertisement which became a quintessential part of all Indian households, encapsulated what the Bajaj brand meant to its users. For India of the late 1980s, the Chetak was the first choice for mobility. In the process, it set the roots for Bajaj Auto's brand identity - value, trust, reliability, credibility, etc.

HISTORY OF THE BAJAJ AUTO LTD

In 1948 Bajaj Auto started selling imported two and three-wheelers in India. In the year 1972, the company started manufacturing its own scooters under the brand name Chetak which pushed Bajaj to the top of the Indian market and made it market leader in the scooter industry for a long time in India. **The entry of Chetak was a turning point for the company, catapulting Bajaj into a household name. It was during this time when Bajaj Auto weaved the evergreen tagline, 'Hamara Bajaj' - making it synonymous with the sentiments of the country, evoking a wave of patriotism every time it was aired. It became so popular that at one point in time, the scooters had a waiting list of almost 10 years.**

In 1971 Bajaj Auto launched the three-wheeler goods carrier, while in 1977 the company launched Rear Engine Auto rickshaw. In India, Bajaj Auto sells its

intracity products under two brands – Bajaj RE and Bajaj Maxima. Over 58 million passengers travel in a Bajaj RE vehicle across the world every day. Including India, Bajaj RE is sold in over 25 countries across the globe.

In the late 1990s, a team of engineers came together to build a product which worked wonders for Bajaj Auto Ltd. This was a time when the Indian two-wheeler makers were still basking in the first flush of foreign love. Bajaj Auto commissioned a market research agency to survey how a newly-developed bike would be accepted in the marketplace. A mechanical engineer from a National Institute of Technology, who joined Bajaj Auto in 1989 as a Graduate Trainee Engineer was part of the team who met the agency for feedback.

"The tank and exhaust are too big," droned the agency chief. "Reduce the size of the tank or else it will limit the relevance of the bike," he forewarned. The engineer patiently heard out the agency honcho. And ignored his advice.

The very same tank and its character lines became the signature of Pulsar. The masculine styling and DTSi technology helped in positioning Pulsar as a powerful bike. The engineer in the above context is Abraham Joseph, now Bajaj Auto's Chief Technology Officer, who has gone on to develop a series of wildly successful Pulsars – ranging from 125cc to 220cc – along with other thriving models like the Discover range.

Bajaj Auto became the first Indian two-wheeler manufacturer to deliver 4-stroke commuter motorcycles with sport-oriented performance for the Indian market. Bajaj achieved this with the 150cc and 180cc Pulsar, giving Indians the first taste of performance biking. By 2006, Pulsar crossed 1 million in sales - the only bike with a digital speedometer and LED tail lamps. In only 17 years since the launch of Pulsar, Bajaj Auto Ltd has become the third-largest motorcycle manufacturer in the world, ahead of several Japanese and European brands that have been around for much longer.

Bajaj Auto also has a 48% stake in KTM Austria. Currently, several KTM models are manufactured at the Bajaj plant in Chakan and are distributed by the two partners globally. These include the 125 Duke, the 200 Duke, 250

Duke, 390 Duke, RC 125, RC 200 and RC 390. KTM's 125 cc models are also made exclusively in India. KTM had acquired Swedish brand Husqvarna Motorcycles from its former owner BMW Motorrad which will also be manufactured in the Chakan Plant, Pune.

Bajaj Auto had the vision and audacity to invest in things that were ahead of their time, staying on top of the market in R&D and having faith in young talent. This only reinstates the fact that for Bajaj Auto, strong in-house R&D capabilities have been instrumental in launching vehicles with higher fuel efficiency and performance. Thus, Bajaj Auto has been riding with us on the highway of our lives since the last 73 years.

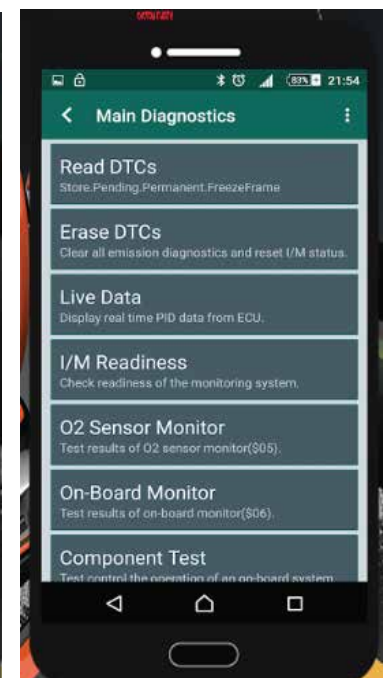
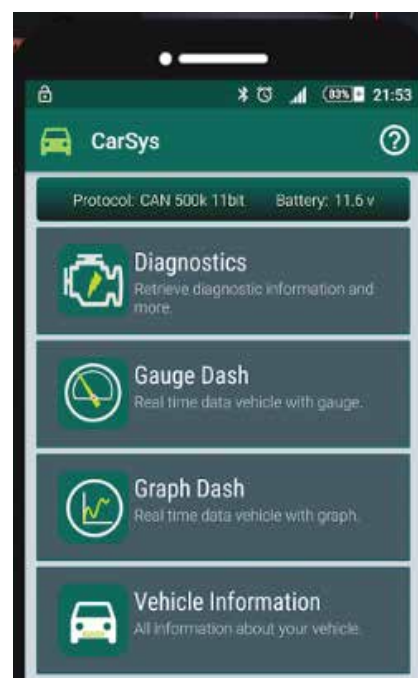
A walk down the history: Historical milestones of Bajaj Auto Ltd





Shweta and her team have been entrusted with the responsibility of designing a mobile-based application which uses Mobile Sensors & OBDII Vehicle Data for Objective Assessment of Ride, Handling and performance.

- The OBD protocol gives access to the basic parameters of the vehicle.
- Using a CAN based device we will be able to read all the useful parameters as well as the faults & freeze frames in the vehicle
- This data can be read by a bluetooth enabled phone which could then use the mobile internet to transmit the data to cloud
- Below is a list of the tools and available apps which do similar tasks



Switch 1:

Prepare an Approach Note of not more than 5 pages covering the following aspects:

- Make a visually interactive and appealing dashboard / cockpit which covers:
 1. Lean angle, elevation angle at static and dynamic vehicle speeds
 2. gg diagram
 3. Max lateral acceleration Vs throttle
 4. Plots of generic parameters to assist driver
- Ability to use more than one mobile/ sensor device to identify steer rate and yaw generated, dive and squat
- Fixing methodology to avoid erratic IMU readings / denoising techniques to get reliable IMU readings

Submission Guidelines: >>>

- > Register as a team of 3, 4 or 5
- > Only participants of Mechanical and Electrical related streams are eligible
- > Submissions are to be made in a PPT/PDF/Zipped format – 25 MB Limit
- > If shortlisted to Switch 2 , submit the solutions to Switch 2 of the challenge in a multi slide presentation which will be presented to the Bajaj Auto Leadership
- > The ideas, content & material emerging from the challenge would be solely owned by Bajaj Auto Limited
- > DO NOT post any content on any digital media platform or in print without prior approval from us
- > DO NOT denigrate any brands including those of our Competition
- > Pre-Final year and final year students of B. Tech and Dual Degree are eligible. Ph.D, M.S and M. Tech students are not eligible.

Rewards: >>>

- > MACH Campus Winner(s) receive PPOs/PPIs and a total cash prize of ₹ 1,00,000/-
- > MACH Campus Runner(s)-up receive PPOs/PPIs and a total cash prize of ₹ 50,000/-
- > All other teams are also eligible to be awarded PPIs and merchandise on the basis of the quality of submission

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For registration and submission, visit: <https://www.bajajauto.com/careers/mach>

