AAA College of Engineering & Technology
Sivakasi

FreshVoice
by Ekalaiv

# *Techathon Problem Statements*

| Problem Statement # 01 | Sponsor: TechGenzi Private Limited |
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| Title | Digital Image Face Analyzer |
| Technology | Artificial Intelligence & Machine Learning |
| Description | Build an Android mobile app or an algorithm using person's face image meta data analysis and error level analysis to<br>a) report out image metadata including File Size, Image Width, height etc<br>b) find the given image real or fake (authenticity of the given picture)<br>c) Report whether given image meets image size criteria (image height and width and inside face height and width)<br>d) Find the gender, age range, hair colour, eye colour and other features if any<br>e) provide the list of edits if the image is photoshopped<br>f) This app or an algorithm should accept at least JPEG image file formats and other file formats can be optional - gif, png, tiff, etc<br>g) Restore original image if the image is photoshopped<br>**Fake Image**<br>The fake image is one that is altered using image manipulation software like Adobe Photoshop, Gimp etc.<br>**Error Level Analysis (ELA)**<br>ELA works on the basis that, an image when altered or tampered the compression ratio of the modified part will change when compared to the rest. By having a closer look at the ELA image, one can determine whether the image has been tampered with or not.<br>**Metadata Analysis**<br>Once you take a photo with your camera, a lot of information is embedded into the image (Like the name of camera, date of capture etc.) which is known as Metadata, i.e. Data about Data. Metadata is altered when tampered with any image editing software. This anomaly can be detected using metadata analyzer. |

| Problem Statement # 02 | Sponsor: Ekalaiv Tech Private Limited |
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| Title | AI Based Talent Recommender System |
| Technology | Artificial Intelligence & Machine Learning |
| Description | Many organizations use talent or job portal to hire best talents for their organization. These talent portals serve as a marketplace for employers and as well for job seekers to find career opportunities. A key mechanism to help achieve these goals is the AI based Talent Recommendation System, which helps recruiters and hiring managers source suitable talent and enables them to identify "talent pools" that are optimized for the likelihood of making a successful hire. <br><br> These talent portals provide a ranked list of candidates corresponding to a search request in the form of a query, a job posting, or a recommended candidate. Given a search request, candidates that match the request are selected and then ranked based on a variety of factors (such as the similarity of their work experience/skills with the search criteria, job posting location, and the likelihood of a response from an interested candidate) using machine-learned models in multiple passes. <br><br> The proposal is to develop AI-based talent recommendation systems that address the following 3 critical challenges, compared to traditional search and recommendation systems. <br><br> 1. Mutual job interest by both recruiters/hiring managers and the candidates. <br> 2. Higher-order matching list with ranking. (aka effective ranking and scoring algorithm) <br> 3. Personalized talent search system, where both intent and preferences of both recruiters/hiring managers and the candidates are to be modelled. |

| Problem Statement # 03 | Sponsor: TechGenzi Private Limited |
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| Title | Single Vendor Ecommerce App |
| Technology | E-Commerce Mobile App Development |
| Description | Develop a single vendor ecommerce store Android app. This is a simple marketplace app where a single seller sells his/her products to multiple customers.  These app enables listing of maximum 5 products and services.  This app should include following functions. <br> 1. Product and services list <br><br> 2. Ordering with subscription feature (daily, weekly, and specific days frequency of the month) <br><br> 3. Option to cancel subscription and order <br><br> 4. Cart with offers and coupons <br><br> 5. Payment gateway integration <br><br> 6. View order status, total orders and monthly reports for both vendor and customers. <br><br> 7. Option for SMS and/or WhatsApp integration with customers. <br><br> 8. Admin panel for configuration of vendor customers <br><br> 9. Recommended to use HTTPS, REST and NOSQL database. Event sourcing pattern solution is preferable. |

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| Problem Statement # 04 | Sponsor: Ekalaiv Tech Private Limited |
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| Title | Face Recognition System |
| Technology | Artificial Intelligence &Deep Learning |
| Description | Facial recognition is constantly improving thanks to scientific advancements in Artificial Intelligence (AI). Improvements include increased accuracy in detecting complexion, age, gender, and ethnicity, even in poor lighting. Significant improvements in power, cost, and hardware size allow for a wide range of use cases across multiple industries of all sizes.  Picture: Face Detection system<br><br>The proposal is to develop facial recognition system that detects faces, extracts features, and creates a facial template to compare against an existing database to verify a person's identity. This system should include the following functions.<br><br>1. This system should work on Android based handheld devices and must render the image of identified person in the video such that the face orientation changes dynamically with the body movement. The prototype model must work on live video feeds.<br>2. The facial recognition system accuracy should be greater 99%. Please specify AI/ML model and it should be license free.<br>3. This system should detect faces in each image/frame, should scan for unique features to match with pre-enrolled faces in a database to confirm identity. Considering privacy. We recommend highly encrypted template for storing face images and, no actual face images are stored on the platform, ensuring full privacy protection.<br>4. This should detect face attributes such as age, gender, facial expression, and head orientation. |

| Problem Statement # 05 | Sponsor: TechGenzi Private Limited |
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| Title | LinkedIn Job Board Integration |
| Technology | APIs and 3rd Party Integration |
| Description | This project is to integrate LinkedIn Application tracking system and Job board for a small sized software company (TechGenzi). |
|  | Companies across the globe are taking advantage of application tracking system for improved quality hiring and decreased cost. An ATS is a hiring system of record that streamlines the entire recruiting process from receiving applications to hiring employees. They come in all shapes and sizes, offer a variety of features, and can be appropriate for any type of growing organization that values efficiency. This project is to integrate LinkedIn services and its APIs for following functions.<br>1. For posting job and job board syndication<br>2. Retrieve applicants from LinkedIn<br>3. Keeping Candidate profile/digital resume sync'd up<br>4. Keeping Company profile sync'd up<br>5. Integrating Job board<br>6. Providing hiring dashboard |

| Problem Statement # 06 | Sponsor: TechGenzi Private Limited |
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| Title | Prediction of Admission & Jobs in Engineering & Technology with respect to demographic locations |
| Technology | Machine Learning& Deep learning |
| Description | India as we know is a densely populated country and Every year more than 6 crore of Indians graduate from diverse backgrounds and with diversity in education. An almost similar number of students enter colleges for taking various education to help them in seeking jobs. With the advent of time technology and the requirement of the job sector have changed drastically as compared to 10 years back.<br><br>Many sectors have experienced tremendous growth in employment and thus masses opt for those sectors whereas in many sectors there is huge unemployment either due to low job availability or the demand for skilled workers is required. Thinking of each and every branch and when comparing it with the current employment in India and abroad, we will definitely find some points that will help in predicting the admissions and job scenarios in the fields of engineering and technology, management, and pharmacy.<br>The project is to build an algorithm/system that provides the Prediction of Admission & Jobs in Engineering & Technology /Management/Pharmacy with respect to demographic locations. This system should have the following functions.<br>a) This system is not one time application or data base system, rather it should estimate or forecast job opportunities for various academic streams.<br>b) This should be able to forecast admission for a particular institution for particular branch of education in a given year based on market trends, job opportunities and infrastructure etc<br>c) These services of job opportunities prediction and admission prediction should be available as APIs for institution to consume.<br>This system can analyze past years job opportunities and admissions if required. |

| Problem Statement # 07 | Sponsor: TechGenzi Private Limited |
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| Title | Tracing IP Address behind VPN/Proxy Servers |
| Technology | Cybersecurity |
| Description | **Background**<br>Cybercriminals often operate using proxy IP addresses to mask their actual IP addresses for enhanced anonymity. Build a solution that can determine if an IP is actual or a proxy/VPN IP address. In addition to it, the solution should be able to trace the actual IP address as well as provide details of the VPN service provider. Use of external third-party services is not recommended.<br>**Summary:**<br>1. Cybercriminals sitting in any corner of the world can unleash significant damage through different types of cyber crimes such as hacking, identity theft and ransomware. The anonymity offered by the internet encourages them to commit these attacks without any fear whatsoever.<br>2. Hackers use various techniques to hide their digital footprint making it difficult for law enforcement agencies to catch and prosecute them.<br>3. One common technique is to not access the target computer directly but rather through a "proxy" server or a VPN server, which essentially acts as a layer between them and the target computer. As far as the target computer is concerned, it would only see requests coming from the "proxy" or the VPN server. There are a lot of free and paid proxies, and VPN service providers, available.<br><br>**Objective:**<br>The primary objective of this problem statement is to trace a cybercriminal's actual IP address hidden behind a proxy or VPN IP address, if used.<br>1. Build a solution that can take an IP address as input and determine if it belongs to a "proxy" or VPN service provider.<br>2. If a "proxy" or VPN service provider has been used, details of the same should also be provided.<br>3. The solution should also be able to trace the actual or real IP address behind the "proxy" or VPN IP address.<br><br>Participants may consider a simple browsing scenario, with and without a "proxy" or VPN, for demonstrating their solution. Note: Use of external third-party services is not recommended." |

| Problem Statement # 08 | Sponsor: TechGenzi Private Limited |
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| Title | AI Based Intelligent Data Extraction Engine |
| Technology | Artificial Intelligence& Machine Learning |
| Description | Intelligent data extraction from structured and unstructured documents with > 99% accuracy forms the foundation stone of Industrial digital transformation. With this advanced technology, the industries and companies can move away from manual paperwork and enter into digitization process.  The companies are looking for document processing, data extraction, and Optical character recognition (OCR) technology to increase document processing speed, to digitize information, to automate workflows and to reduce dependencies on manual labor.  A solution that leverages artificial intelligence, advanced machine learning principles (AI/ML) and natural language processing (NLP) can help organizations ease the burden of processing documents and extracting information manually.<br><br><br><br>**Intelligent Data Extraction Engine**<br><br>The project is to build intelligent parser and scale up as generic intelligent document extraction engine. This project should include following functions.<br>● The intelligent parser should accept an input document, parse the whole file and output specified fields as determined by reference schema. The reference schema is an configuration item that codes the structure of input file.<br>● Preferable is have APIs for extracting the structured data.<br>● This intelligent parser should support parsing of input document containing up to 100+ data fields in real time. This should report confidence index (probability of success) of algorithm for each extracted data field.<br>● These input document can be in PDF, .doc and .docx file formats.<br>● The outputs of this modern parser can be in Excel (Xls), JSON and XML. |

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| | ● The performance requirements of this modern parser should be **less than 1 second** for parsing the input document. <br> ● The preferred technology for machine learning algorithm would be Natural language processing (NLP) and the implementation can be in Python. |