INDERPRASTHA ENGINEERING COLLEGE | INTERCOLLEGE IPEC TECHATHLON ' 21

PROBLEM STATEMENTS

IMPORTANT NOTE : Students can also work on their own problem statements but those problem statements should fall under any of the following themes.

THEME 1 : HEALTH CARE

1) Over the last few weeks, India has reported 0.3 to 0.4 million COVID cases and 4 thousand deaths every day. We're all badly hit by this second wave, and it's not just numbers we are keeping an eye on. Every statistic has names and faces attached to it - of our loved ones, of the ones they loved. Running around the city to arrange for resources in times of scarcity and distress is unimaginable. Build a real-time tracker for the availability of vaccines, oxygen concentrators or cylinders, ICU or non-ICU beds in hospitals, recovery drugs, plasma/blood donors, and the likes in your city with map integration.

2) Bed management optimization is critical for the efficient functioning of hospitals especially for larger tertiary and quaternary care hospitals. Poor bed management can lead to a myriad of problems like increased waiting time for patients, underutilized operation theatres, overcrowded ERs. The need for automated bed management is the need of the hour.

3) During accidents, while we have sophisticated technology that opens airbags, we need a functionality that can start recording and inform the closest emergency service care of the incident by sharing location, the situation within the accident spot, broadcast images, videos during any impact in the vehicle, and calling out for emergency care such as the closest police station, hospital, fire brigade based on GPS location.

4) Lifestyle disease is a disease that can be caused by our choices of living. For example, it is contracted through the consumption of large amounts of unhealthy food. Besides that, having a sedentary lifestyle and unhealthy habits such as consuming huge amounts of alcohol and smoking also cause lifestyle disease. Using detailed demographic and vital stats about people who have a particular disease and those who don’t, create a Healthcare model to predict specific diseases in an individual on the basis of their lifestyle.

5) Quarantine and self‑isolation during COVID‑19 outbreak have caused a negative impact on one's mental health. Separation from loved ones, loss of freedom, boredom can cause a deterioration in an individual's mental health status. Develop a system that provides tracking of mood and suicidal thoughts, safety plan development, offering activities to deter suicidal thoughts, access to support networks, and quick emergency counseling with a nearby psychiatrist.

6) Insurance companies regularly get health check reports submitted by potential buyers of insurance. We need a way to digitize different kinds of printed lab reports / health check reports to discrete values of each parameter captured. Conversion to a standardized set of digitized values will help in automating a lot of backend approval processes. Ability to read and classify comments/observations for common parameters will be a big plus When a customer is uploading his health check report regularly, then also a trend chart can be plotted for key parameters.

THEME 2 : ED-TECH

1) Due to online classes the discipline which students had is diminishing and students are becoming more and more aggressive knowing the fact that the administration can`t punish them for this.

Develop a referral process platform that helps teachers to raise and escalate major behaviour issues in the classroom in real-time.

The platform would work like a classroom management tool that will help teachers to share real-time information on their student's classroom behaviours with students, other teachers, parents, and administrators.

The system should record all assessments made by the teachers for future reference and annual evaluations.

2) Due to an unforeseen shift to online education that most educational institutions were just not prepared for, there has been a lapse in providing a uniform experience to students. Additionally, numerous challenges such as outdated mode of delivery of lectures, non-interactive classes, and the like - have only caused more hindrance to the entire process. Build an Augmented Reality/Virtual Reality-based platform that provides a classroom experience to students online at home that are trying to learn.

3) College students juggle many problems. This includes finding an internship or a job, organizing their life around their work, online courses and navigating student loan debt. More colleges are also optimizing online schooling. Apps can help students organize their assignments, set deadlines, and help them keep track of their grades.Most modern college students are tech-efficient.

As tech professionals create an app that will help students improve their college experience.

4) The Internet has become a very useful tool in assisting many students in their education. Almost every student searches for the best colleges suited for him/her according to academic grades and ranks. But the Internet has a lot of inaccuracies and incomplete information. The existing college search websites only show selected high-profile colleges and overlook many other good colleges that take students of the same ranks. As a result, students are more likely to make poor decisions sometimes which may be regretful later on.

Develop an application that takes student's academic records, his/her interests, and future goals and recommends all colleges that are a good fit for them along with their ratings given by other students.

5) To avoid in-person contact altogether, some universities have opted to conduct the majority of their exams online. Online exams are still a new phenomenon at higher education institutions, so there's a lot to learn regarding the widespread implementation of these new Objective type exam processes. A major challenge is to check each and every submission manually.

Develop software that can be used to read as well as check the OMR answer sheets. The software should compare the answers marked by the students with the answer key and provide the total marks at the end. This is a great tool for exams that have MCQ type or objective type questions.

THEME 3 : FINANCE

1) Investment in the share market helps generate more profit than the other financial instruments but has the threat of market risk that might lead to a high loss. This risk factor refrains many potential investors from investing in the share market directly. Build a Portfolio Management System that avoids the risk of investment on individual/few stocks by investing in multiple stocks belonging to different business sectors. It is required to increase the return over a longer period but minimizing the risks.

2) The non-profit sector today is worth an estimated $2 trillion worldwide, yet headlines in recent times have seen the sector stumble between corruption scandals, gross inefficiencies, false expenses, and misuse of funds. Donor's trust in charities has been declining steadily. Develop a solution that uses distributed ledgers to track transactions, cryptocurrencies to transfer funds and smart contracts to ensure donations are spent correctly, to make the nonprofit sector more transparent, efficient and cost-effective.

3) Currently, currency notes that are in legal tender are used widely in the economy for different transactions and are accepted at various banking touchpoints like branches, ATMs, banking correspondents etc. as well as commerce touchpoints like retail stores, petrol bunks and for various utility/government services. Some touchpoints are more mature at detecting and eliminating counterfeit notes like note counters in branches and note accepting ATMs, but in a wide array of touchpoints cash handling is manual.

Develop a simple software that can be downloaded on a phone and can detect counterfeit notes that have been detected at other touchpoints then counterfeit detection can be vastly improved thus reducing the fraud.

4) Digital Wallets are secure systems that store payment information and passwords of users for a range of payment methods and websites such as credit cards, debit cards and Cryptocurrencies like Bitcoin, Etherium, Libra, Binance, etc… With the use of Near Field Communication (NFC) technology, Digital wallets can be used to complete purchases more easily and quickly. Develop a blockchain based Digital Wallet that allows users to pay for purchases directly from their smartphones and Users can also create secure passwords without worrying about having to remember them later.

5) Currently, there is a load of hype going on in the market with Cryptocurrencies. A couple of years back, we only knew the developers who were talking about cryptocurrencies. But today, almost everyone is talking about cryptocurrencies. The rise in the popularity of Cryptocurrency in the last couple of years was due to social media platforms' proactiveness. The cryptocurrency market highly depends upon the buzz going on Social Media websites and Search Trends all over the world.

Develop a Cryptocurrency Predictor software that predicts the growth of Cryptocurrency coins based on the buzz on Social Media websites such as Twitter, Reddit, etc., and Google Search Trends.

THEME 4 : CYBER SECURITY

1) The pandemic-induced lockdown and movement curbs marked an inflection point for e-commerce in India, pushing demand to record highs, nudging new buyers as well as sellers onto digital platforms. As the popularity of online shopping grows, so does the opportunity for cybercriminals and unscrupulous consumers to scam online businesses. The current Fraud Detection System (FDS) running at credit card issuing banks is ineffective as it reports positive transactions as malicious although they are genuine.

Develop a system which has capability to restrict and block the transaction performed by an attacker from genuine user's credit card details with the help of User spending patterns and geographical location. If any unusual pattern is detected, the system should alarm the bank authorities and require re-verification from the user.

2) Fake news (also referred to as hoax news) occupies a large sphere of cyberspace today worldwide. Publicity through such fake news on cyberspace has been adopted by States, institutions as well as individuals for various reasons and in varied forms. The problem is to identify the authenticity of the news and online content. Equally important problem is to identify the bots involved in spreading false news.

3) Online predators try to gradually seduce their targets through attention, affection, kindness, and even gifts, and often devote considerable time, money and energy to this effort. They are aware of the latest music and hobbies likely to interest kids. They listen to and sympathize with kids' problems. They also try to ease young people's inhibitions by gradually introducing sexual content into their conversations or by showing them sexually explicit material.

The solution will detect suspect profiles based on child grooming behavior patterns followers, hate speech provokers, stalking and bullying mentality profiles and explicit content explorers (postings, comments) on social media platforms and other websites.

4) Clients of permissionless blockchain systems, like Bitcoin, rely on an underlying peer-to-peer network to send and receive transactions. Many companies adopting cryptocurrency technology don’t implement appropriate security controls. As a result, decentralised blockchain systems are easily susceptible to Cyber attacks such as Eclipse Attack. In such an attack, the client is unable to reliably distinguish the canonical view of the blockchain from the view provided by the attacker.

During an eclipse attack, an attacker can convince a lightweight client to accept an inferior branch of the blockchain. However, to build such a branch the attacker will still need to control, either directly or indirectly, a considerable amount of mining power. Since the attacker cannot create blocks at the same frequency as the whole network, a sudden increase in the block creation times is likely. Develop a timestamp-based protocol that gets triggered by abnormally long block creation times and alarms the client that he/she is under an Eclipse attack.

5) Typically, malicious links are used to lure a victim into malicious bots that are used by cybercriminals to do their personal motives.

The solution will detect malicious SPAM and SPIM bots/Zombie Bots/Malicious File-sharing Bots/Fraud Bots on cyber space and provide advisory scanning or detection solutions to public/LEAs.
