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Project report for HackHarvard Hackathon

Learn It (Education track)

“College taught you how to climb a mountain,

We’ll show you which mountain to climb”

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Github link:- https://github.com/Anshul2166/Harvard_Edu_Portal
Site link:- https://harvardhacklearnit.herokuapp.com/

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Abstract

Technology is growing by leaps and bounds throughout the world, and with the advent of new technologies almost every moment and the simultaneous outdating and updating of the existing technologies, many working professionals and students find it difficult in keeping themselves continuously relevant in the ever-changing and demanding job market, which also leads to increased unemployment and job dropouts. This also presents a peculiar problem since even with high unemployment reported, there are also reports of several vacancies going unfilled, and now in the digital age, with online learning gaining foothold and acceptance everywhere, some may find it hard to acknowledge the simultaneous existence of both. Our project tries to solve this particular problem by trying to bridge the gap between both paradoxical situations and present an adaptive, community-driven, skill-based approach to empower the students and working professionals alike to face the dynamic and complex sounding job market.

Team ID : abcd1234

Motivation and Background

According to a Recent survey by Economic Times[1] , 94% of engineers in India are ‘unemployable’, meaning they can’t be considered for employment opportunities in their desired job market. This problem is even more serious because many of these engineers are degree holders from prestigious universities with good academic backgrounds. As unbelievable it may sound, it is also true that despite all this, many of them don’t have the required skills and knowledge, due to outdated academics, lack of awareness regarding job market, lack of access to resources and many more. Most of these reasons may be a bit tough to imagine in the digital world, since with many employers accepting online learning and the boom of internet available throughout the world, particularly the 4G revolution in India, started by Jio, the lack of skills, knowledge, and resources sounds strange, since a plethora of them are available in the world wide web.

On further inspection, we realized that a large part of the problem is attributed to the fact that most of these resources are scattered, have no linkages, no aftermaths and most of the users may find it hard to grasp, as some might feel like ‘being dropped in center of pacific ocean to learn swimming’. There exist some sites which provide free quality content but they merely serve as a gateway, upon entering which the user is on himself and unguided to the options inside and the possibilities that may come up as a result of those consequences, and this is why MOOC’s haven’t yet stepped up to its true potential, since they lack the university structure and curriculum, which leads to a lack of clear path for the users.

Another problem that we felt is the lack of implementation of the learned skills. True learning can be attained after knowing the topic theoretically and then practicing it regularly. However, most people focus on tutorials in name of online learning only, hence doing the former part of knowing only. Many never build projects in their learning phase and after some point, they reach a point of stagnancy in learning, and never achieve mastery in that field. This problem may sound easy to resolve by just asking users to build projects; however it isn’t, since many don’t know what they should build, lack community support, and most importantly lack feedback on their work, if they ever produced, which is why many don’t consider building projects as some investment because of the lack of returns from it.

Methods

Our initial stage of data collection was through a narrative-based approach, where we interviewed some of our friends and colleagues from different academic backgrounds, to gain their opinion on skills and the other issues mentioned previously. We used a mixed sample of people, based on university, financial background, academic performance, projects and online learning for the study, which helped us to gain a lot of insights into the problem.

Next, we decided to expand our area of study to entire globe and started to study some surveys, report and articles on similar topics from across the world. We delved into problems with MOOC's, online learning, reasons for skill gap and furthermore we went to study some of the interviews available online, given by some of the professionals who have started their careers through online learning and exclusively focused on how they managed to overcome the hurdles.

Following this, we moved on to compile all the data we got from online sources (articles, surveys and reports), and then grouped them according to their respective topics. Thereafter, we moved to finding data patterns or themes among them, regarding issues, problems and possible solutions. Also, we have also put some emphasis on interpreting the words and phrases used by the these sources to gain few more insights.

Next, we compiled the data we received from the interviews(mentioned in the first paragraph) and compared them to the ones received from internet sources, to get an estimation of the effect of locality, area and country had on the issues. This helped us in estimating the effects of problems that our friends faced (which we considered local data) and the one which are faced in other parts of globe (international data).

Afterwards, we compiled all our findings and started to analyse the results we got. After analysis, we drew some findings and conclusions based on them and then went back to internet and searched on some literature[5] regarding those issues. We discussed and compared our findings to their's and compiled the difference and similarities among them. After compilation, we once again reviewed all our data and findings and prepared a final draft based on it.
This helped in gaining a good understanding of problems, parameters affecting them, possible solutions and outcomes on implementation of those solutions. In the following sections, we will

discuss the analysis we drew from our findings and later on we will discuss how we implemented it in our project.

Analysis

In the previous section, we have discussed on our methods of data collection and analysis. Now, we will move on to our findings based on them, and how we observed different parameters affecting those issues and outcome. First, we had interviewed on our friends and colleagues, to gain a first-hand understanding on the issues at local level. Most of the responses shared a lot in common, particularly regarding the outdated academics, lack of structure in online learning, problems faced by continuous outdating of skills in dynamic job market and lack of project opportunities (ideas, review, feedback) available. However, the most surprising result was that many acknowledged that they don't have the skills required in the current job market, even though many of them are from highly prestigious universities and have strong academic background and grades.

Later, when we studied some of the online sources and reports, we saw the same issues being mentioned by many across the world, which gave us an understanding that the issues mentioned are mostly global and faced by many people, irrespective of country, university and academics. Though, we also noted that even though similar problems are being reported, but the effect it has on the individual does vary on basis on(of) academics, universities and grades, since it is quite intuitive to understand that a student from prestigious university may have better chance at job market than a student from an average university.

We also studied some of the reports on problems of online learning and compared it with our own experiences and from the narratives of our friends, to find some similarities and differences and common themes emerging from them. We observed that, much of the problems mentioned were similar between ours and their findings, particularly the lack of structure, lack of guidance and some pointed out lack of community and groups as major reasons also(as well). We also noted that many people often get confused on the right course to take and also on how to reach their career objectives through e-learning due to lack of clarity and resources available on this topic, which also results in many people reaching stagnancy at some phase in learning, since they have no idea of where to start and where to go next.

Finally, we compiled all this findings and observed that there is a definite skill gap present due to outdated academics, lack of structure in MOOC, lack of guidance, lack of proper community in online learning and issue of stagnancy in online learning.

Plan of Action

After realizing the issues mentioned previously, we started to think of a solution to the problems. First, there is a clear lack of guidance in online learning and a lot of unnecessary complexity and ambiguity that arises due to it. Universities have professors to guide students, to prevent this issue, but the vastness of the online resources make it tough and unviable to put mentors in each of them. Instead, we suggest that the users become their own guide and fight through the phase not as single individuals, but as a community. This helps solve problems of getting feedbacks, reviews and most importantly, gives users assurance that they are together in this. This requires a community-driven approach, compared to a professor driven approach, common in universities and some open coursewares. Secondly, we need to solve the problem of stagnancy in the learning phase. That problem arises due to lack of aftermaths in many of the courses and users feel confused regarding their next goal after completion of one course/specialization. We propose developing curated list and paths of learning which the user may follow to achieve their objectives and since a good number of people share some common objectives like becoming a web developer or becoming a designer, a large number of objectives can be fulfilled by only some roadmaps. Though we promised that this is a community-driven solution, drawing precise curated lists and paths requires some experience and knowledge, hence we have thought of restricting the additions and updations of paths to admin experts only, since giving it to the entire community can lead to imprecision, lack of clarity and reliability of the paths

Solution

With the plan of action developed and finalized, we now move onto the actual implementation of our idea. We have already discussed on possible solutions to the problems in the previous sections and now, we will have a look at our solution in response. First, as we had promised that this is a community driven approach, we have introduced discussion forums and channels in the app(Fig:1.1). Here, the user can ask questions, give feedback, reviews, comments on posts, or they may create a new one. Also, like-minded people, say people, who are enrolled in certain course want to have a group together, we have built channels for it. Anyone interested can enroll in it and will be totally driven by the community. This helps solves the problem of getting help, reviews and doubt clearance regarding certain issues.

Team ID : abcd1234

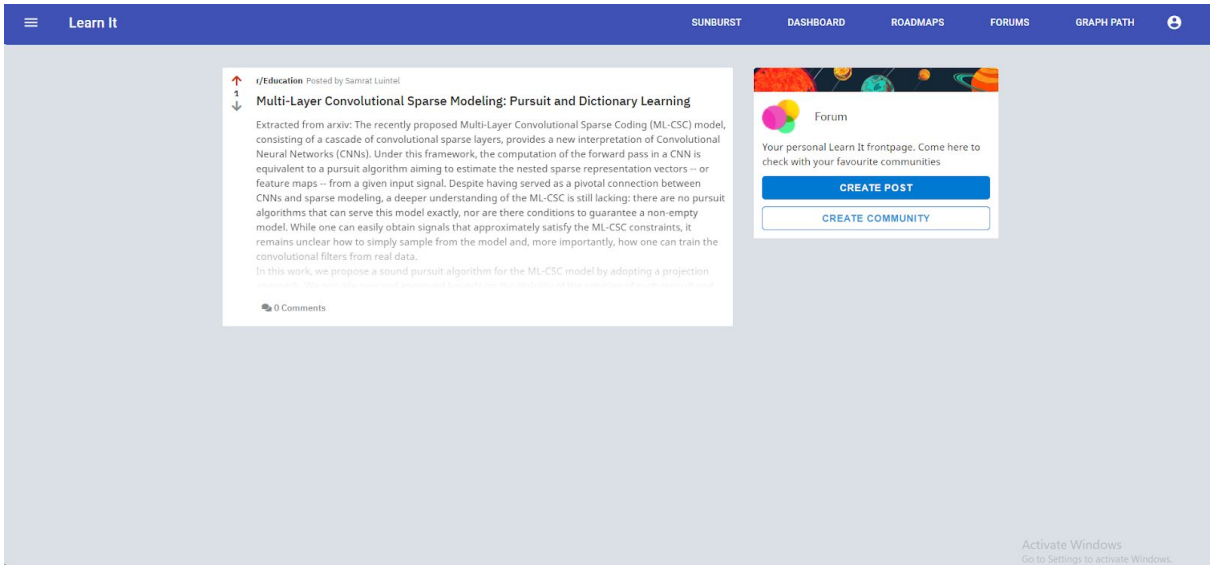

Fig:1.1:- Forum page

Secondly, we have provided data visualization tools in form of sunburst(Fig:1.2) and tree graph, which helps a user better visualize the data, and we have made it super interactive for the users to follow and have also added additional links in each of them, if the user is interested in looking at that element. Also, we have a flowchart tree which lists out the data in form of a tree, if the user wish to see the data in tree graph format, rather than sunburst.

Fig:1.2:- Sunburst

Thirdly, we have introduced roadmaps or curated paths(Fig:1.3), which features the possible paths a user may take to get to his/her goal. We have developed some roadmaps like web developer, game developer which a user may follow, if they wish to. This provides a well-structured curriculum and provides a definitive guide to user regarding their objectives. This helps to solve the problem of lack

of aftermath after completing course and give users confidence, as they would not stuck in fog of doubt. The contents are taken from github[8] and github.[9] and are their property.

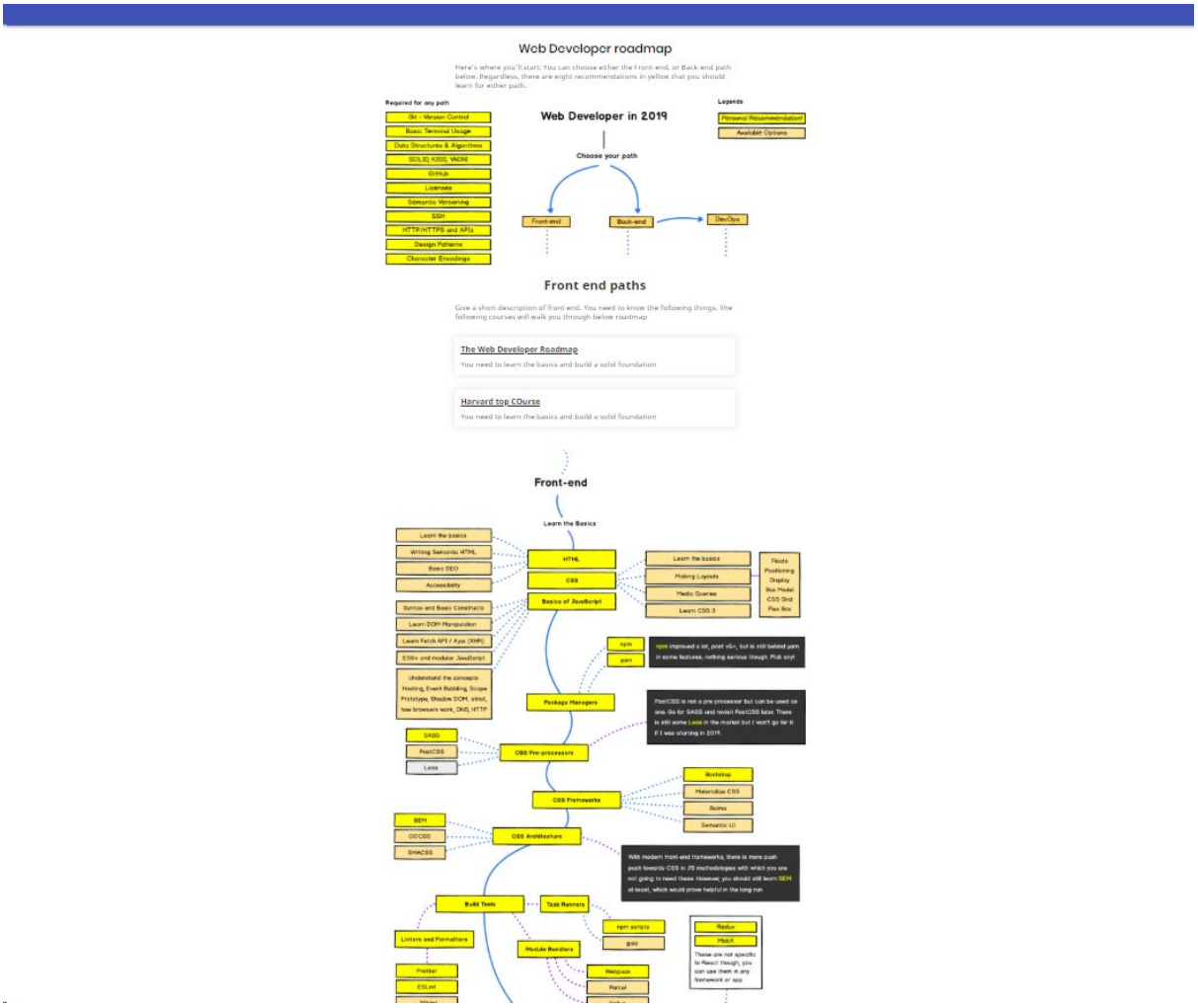

Fig:1.3:- Roadmap

Fourth, we have separate dashboard and course(Fig:1.4), specialization and degrees that are regarded as best of the best by many, and have provided them in our site. This helps the user to gain a starting point, in case they don't have one and additionally, we have a separate page for each of them, which lists out information about the instructors, ratings, overviews, topics learnt and much more to give the user an idea about the course.(see next page). Pictures have been used from google for display purposes.

Team ID : abcd1234

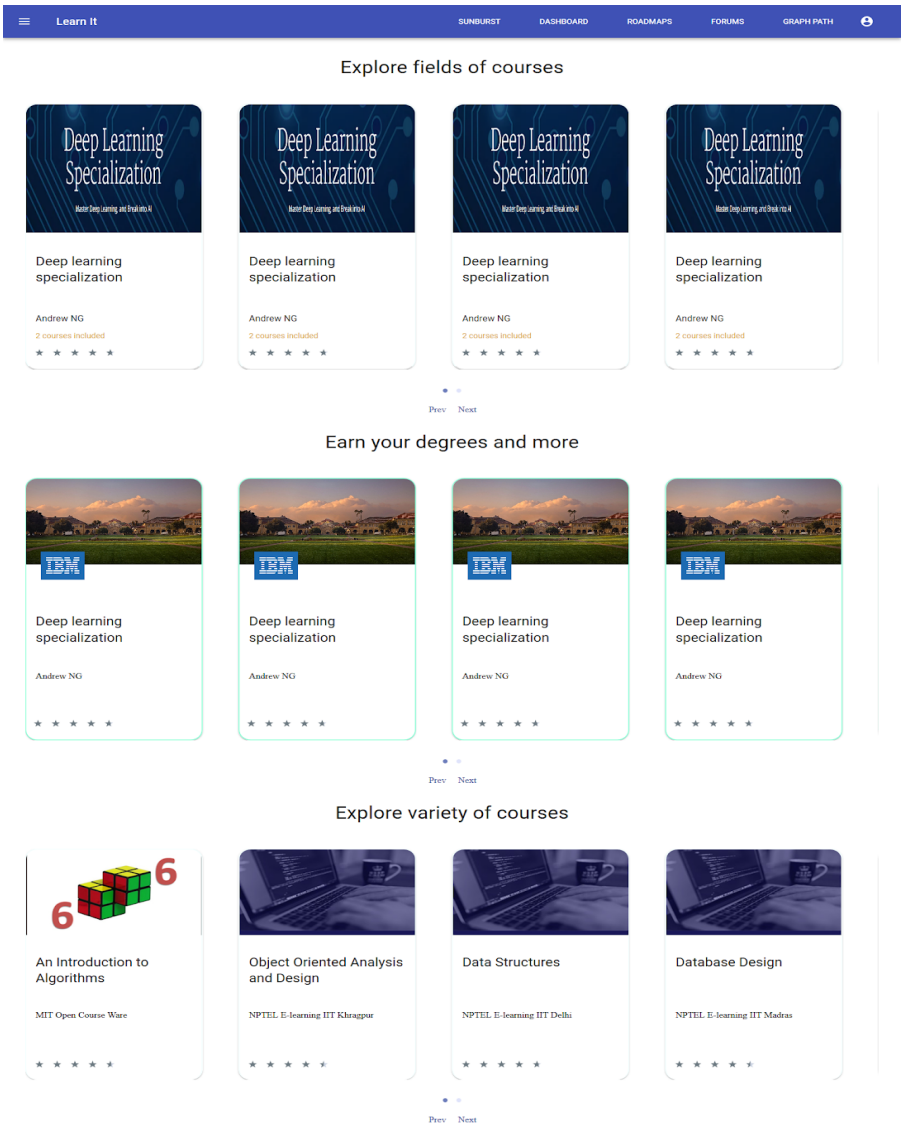

Fig:1.4: Specialization courses

Last but not the least, to try the problem of lack of opportunities arising due to low problem solving opportunities, we decided to form a list of top problems/assignments(Fig:1.5) from publicly available sources and have provided links in our webpage for it, along with topics and difficulty level to ease user's experience in question selection.

Team ID : abcd1234

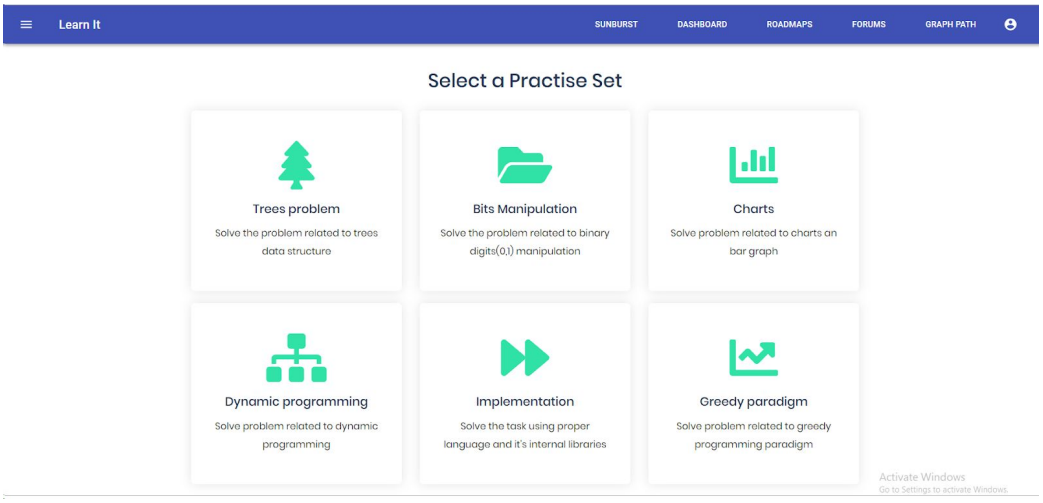

Fig:1.5:Practise sets selection

The questions(Fig:1.6) have been selected from top questions listed in top sites, and have been ensured by us to provide the best quality experience and solving them would give the users a good grasp of the topics involved.

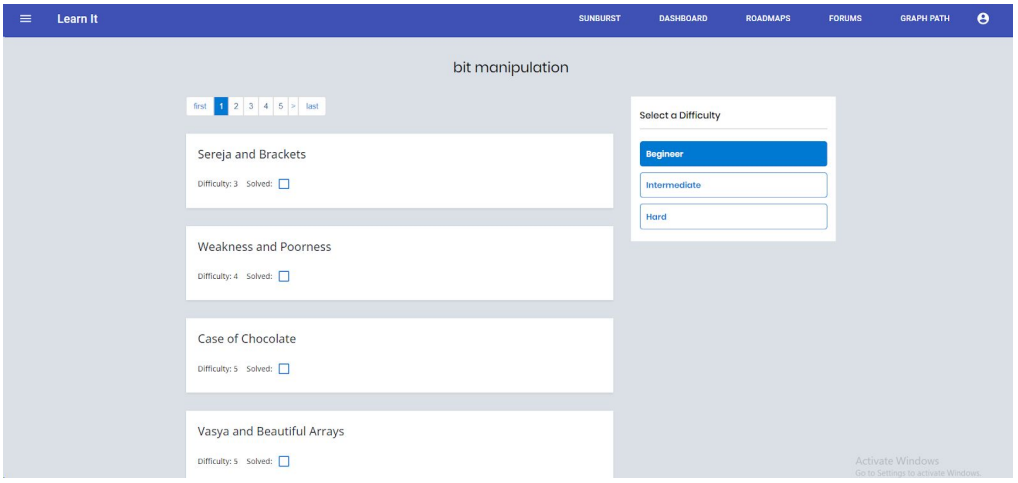

Fig:1.6::Practice questions

Discussion

Now, before heading to the final section of the report, let's summarize our issues again. We have found issues arising outdated academics, lack of market-required skills, skill-gap, problems regarding keeping oneselves updated with the advent of new technologies, coping with lack of online learning, problems with MOOC's, lack of guidance and lack of community in online learning.

Our project tries to solve the problem by dealing with not just the symptoms, but also the root cause involved in each of them. We have strived hard for adaptive, community driven platform to be able to

incorporate more users, more ideas and more of everything in it. We understand the problems faced by the users and the effects it has on each on them and hence the community driven approach is also a good mental relief point for users, since being in community empowers users, lets them know that there are people with them who have faced similar problems and those who are facing similar.

Next, the community also means that you are exposed to a wider variety of audiences from different cultures, nations, professions and perspectives, meaning a lot of indirect gain also from the interactions. The forums have been exclusively designed keeping in mind the needs of people, particularly their project requirement, and the forums could work as one-stop destination for code reviews, feedbacks and doubt clearances.

Moving on to our approach, we have valued skills as the most important factor in your job finding and this is why our entire project has been skill-based and our message is simple ‘Skills will get you jobs. It’s that simple’. Most of people fail to understand the importance of skill building, particularly the skills required for the their objectives and don’t treat it as high priority. Also, one more misconception that we would like to point out is that most students consider academics as their skills, but there is a significant difference between them. Both are important in their own rights for student, but most of the students fail to realize the difference and just keep preparing for academics and completely forget the skill sides, resulting in skill gap between the student and the industry. Here, we concentrate on providing skills, either through courses, specialization, degrees, forums, solving problems or any other way. It all comes down to skills.

Next, we would also like to point out another flaw in academic structure throughout the world, which is lack of emphasis on problem solving in practice. Most are in theory only, lack connectivity to practicals and mostly students pass away academics without having the problem solving skills in that topic. This problem is also in the e-learning world, where most students just take up one topic, watch few lectures on it and leave it as done, and they never practice their skills by putting them to test, resulting in lack of mastery in that skill. Here, we emphasize the need of problem solving, not just to boost up your skills but also allows to grow you up as individual. We encourage problem solving, doubt clearing, reviews or even just assignment completion, not just because they test you but they are something which will make you stand away from the crowd in technical interviews, where your problem solving skill is put to test.

Finally, we would like to admit that no project is complete, no idea is absolute and no solution is permanent. But, here we have tried to our best of efforts to put in what we analyzed and concluded in our findings and tried to convert it to an actual project. The project site url and github link have been mentioned in the report and can be checked, which contains all our work over the previous few months.

Team ID : abcd1234

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