



K D Polytechnic, Patan

SSIP Cell

Problem Statement Booklet

Hackathon 2021

Problem Statement – List

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Discipline Wise Classification

Sr. No.	Discipline Name	Problem Id
1	Civil	H01 to H05
2	Computer	H06 to H10
3	Electrical	H11 to H15
4	Mechanical	H16 to H20
5	Electronics & Communication	H21

Problem Id- H01

Problem Statement	Affordable accommodation facility for labors works on construction site
Challenge Description	<ul style="list-style-type: none">● Accommodation fits for all season like, summer, winter and monsoon.● Proper sanitation facility.● Temporary structure.
What exact problem is being solved?	<ul style="list-style-type: none">● In current scenario most of the construction site doesn't Provide proper facility for labor housing, so here we want some solution to overcome this problem. It should be fulfill following criteria:<ul style="list-style-type: none">➤ Affordable housing➤ Temporary structure➤ All weather protection➤ Water and sanitation facility
Users	Labors works on construction site
Expected Outcomes	<ul style="list-style-type: none">● Innovative solution from conventional tents● Easy to install and remove
Impact	<ul style="list-style-type: none">● Improved quality of living● Improve health quality● Increases efficiency of worker

Problem Id- H02

Problem Statement	Cleanliness and Solid waste management (Paper & Vegetation waste)
Challenge Description	<ul style="list-style-type: none">• Easy way to clean campus.• Paper and vegetation waste scattered in the college campus.• Proper disposal facility.
What exact problem is being solved?	<ul style="list-style-type: none">• More manpower required for expanded campus.• Due to educational campus the most of the waste includes paper waste.• Our Green campus always having a issue of vegetation waste• Improper disposal facility.
Users	Sweepers (Cleaners)
Expected Outcomes	<ul style="list-style-type: none">• Smart mob to clean the campus• Proper disposal facility• Recycle the waste
Impact	<ul style="list-style-type: none">• Decrease manpower• Recycle waste used as fertilizer• Increase the campus cleanliness

Problem Id- H03

Problem Statement	Curing of building components with optimum use of water
Challenge Description	<ul style="list-style-type: none">● To reduce heat of hydration in cement, curing is required.● RCC, Masonry, plastering etc. activities required curing for several days.
What exact problem is being solved?	<ul style="list-style-type: none">● For curing the mainly used method is water curing, which required much amount of water and also much wastage water found on site. So any non-conventional method to optimize water usage● With alternate method, we can optimize use of water● The alternate method should not affect the strength of component
Users	Contractors/Builders/Engineers etc. related to civil works.
Expected Outcomes	<ul style="list-style-type: none">● Alternate method for curing● Optimize the use of water and waste water● Moderate hydration process
Impact	<ul style="list-style-type: none">● Decreased the quantity of water● Structures becomes economical with desired strength

Problem Id- H04

Problem Statement	Efflorescence due to seepage in existing walls
Challenge Description	<ul style="list-style-type: none">● Efflorescence problem due to seepage.● Efflorescence issue occurs on walls effect on plaster and wall paint.
What exact problem is being solved?	<ul style="list-style-type: none">● To prevent capillary action from ground● Alternate plaster and wall paint method which sustain against efflorescence
Users	House owner / Engineer / Contractors
Expected Outcomes	<ul style="list-style-type: none">● Remove moisture content form wall● Optimize capillary water● Increase life of plaster and wall paint
Impact	<ul style="list-style-type: none">● Increase hygiene in environment● Structure become more sustainable

Problem Id- H05

Problem Statement	Smart Water supply system
Challenge Description	<ul style="list-style-type: none">● IOT based water supply system, which monitor water supply as per need● Optimize waste of water due to leakage
What exact problem is being solved?	<ul style="list-style-type: none">● All the water resource is inter connected with moderate the use● Identify the leakage or water wastage● Prevent overflow issue and manage it● Utilize waste water by proper system
Users	General (Every individuals)
Expected Outcomes	<ul style="list-style-type: none">● Manage water by proper IOT based system which gave details about water resource, supply, leakage, usage etc.● Develop system that manage single drop of water
Impact	<ul style="list-style-type: none">● Save Water● Minimize water shortage

Problem Id – H06

Problem Statement		One Tap Emergency Services
Challenge Description with Context	:	Application provides the facility to send alarm messages to the users from the server by using social media to get notified about any emergencies/disasters.
What Exact Problem is being Solved?	:	It helps to spread news instantly on users' mobile. It has the facility to send instant emergency messages with current GPS location to their family members by using social media i.e. WhatsApp and Facebook
Users	:	Common public
Expected Outcomes	:	It helps users to find nearby emergency services around their locality by using GPS tracking.
Potential Impact	:	It helps the public sectors and non-public sectors to respond on a large scale during emergencies/disasters.

Problem Id – H07

Problem Statement	Job card & service history management at service station
Challenge Description with Context	: Owner of service station and managers of field service companies have various jobs to allocate and handle. This can be a tedious task. Not only scheduling, dispatching and managing employees and their jobs, but you may also need to handle all of these at once. Also need to keep all service history for any type of failure maintenance purpose. The combination of handling all jobs can be stressful process.
What Exact Problem is being Solved?	: Below Problem can be solved by this software: Your business can save time and improve cash flow with paperless, bulk invoicing. : You can track your field staff's time and also calculate wages. Instantly view various performance reports. Easily assign jobs, track timelines and receive notifications when projects are running late.
Users	: Business owner, manager, field staff and customers
Expected Outcomes	: Manager can control jobs, tasks and technicians. : Business can become cost effective and streamlined which increase profits.
Potential Impact	: This software can solve a lot of your business headaches and it can also make the working environment so much easier. This software improve efficiency and productivity in the office and on-site.

Problem Id – H08

<p>Problem Statement</p>	<p>Develop an e-commerce site for visually impaired people.</p>
<p>Challenge Description with Context</p>	<p>Now a day's many businesses including small vendors operate an e-commerce store to increase business and attract new customers. The e-commerce applications are very useful to the people who have difficulty in accessing the outside world. Most of the e-commerce applications are not designed to be used by visually impaired people. It is estimated that about 285 million people are visually impaired worldwide: 39 million are blind and 246 million have low vision. It is stated that "The power of the web is in its universality. Access by everyone regardless of disability is an essential aspect." A good web application should accommodate the needs of all users, including people with visual impairments. Development of an E –commerce site which is accessible by visually impaired people such as blind people, people suffering from colour blindness, people with low vision is much needed.</p>
<p>What Exact Problem is being Solved?</p>	<p>Providing web accessibility for ecommerce websites to people having visibility problem. The main problem right now is that visually challenged people are unable to take benefits of digital commerce and every time they need someone to purchase online. By enabling various accessibility controls in the e commerce website, one can help them to make purchases easily without help of anyone.</p>
<p>Users</p>	<p>: Visual impaired people who are suffering from color blindness, low vision, and blindness.</p>
<p>Expected Outcomes</p>	<p>: In this digital era, by solving this problem - we can enable e-commerce verticals for elderly and visually challenged people wherein they will able to find their desired products efficiently and able to purchase it online without any help.</p>
<p>Potential Impact</p>	<p>: Increase web accessibility for visually impaired people.</p>

Problem Id – H09

Problem Statement	Design an Alumni Portal
Challenge Description with Context	: There is a need to create an engaging, supportive alumni network which is crucial to an institution’s success. An effective alumni network assures the alumni as a significant stakeholder by making them actively participate in the institution’s developmental activities such as fund raising, placements, mentorship, scholarships, career guidance and network platform. Having understood the power of alumni network, we see a radical change in the way how educational institutions interact with their alumni. Universities have started to harness the power of alumni through various networking platforms like LinkedIn, Facebook, Twitter etc. by creating their alumni groups and profiles on them. However, with the presence of many alumni groups on various social networking platforms, the attention and time spent by the alumni on each of them gets dispersed. It, therefore, becomes important to bring them under one umbrella as it lets the alumni, students and college to collaborate and communicate on a single platform.
What Exact Problem is being Solved?	: Develop innovative ways to get all students to get engaged with alumni network constantly. There will be a single State Alumni Portal designed for all the State Universities and colleges, so that students will not waste their precious time in searching for different alumni groups created
Users	: Admin of portal, registered alumni students, unregistered users
Expected Outcomes	: Single Alumni Portal will be designed for all state level government colleges.
Potential Impact	: All alumni students of government colleges can easily interact with each other and get necessary guidance and help if needed

Problem Id – H10

Problem Statement		All in one app where we can have complete smart services for university related to cleanliness, lost & found, canteen orders, event notifications, etc.
Challenge Description with Context	:	Whenever any student/faculty requests for any service regarding cleanliness, lost & found, canteen orders, event notifications, etc., it should cover all the details in proper manner. So form for app should be designed properly and the respective authority should get notification for it. So that they can get all the information and provide the service efficiently.
What Exact Problem is being Solved?	:	If any students/faculty found an earphone and not sure where you're supposed to report it? Found dirt in classroom and don't know the appropriate authority to report? Could we just directly report this in the app and the appropriate authority will take care of the situation. Standing in the queue for ordering food and then waiting for the food to get ready is wasting time. So we could just order the food after (after the lectures/before reaching the canteen) itself and the food gets ready before you get there.
Users	:	Student/faculty/College authorities
Expected Outcomes	:	Students will get basic facilities on just a click away.
Potential Impact	:	Students can get clean surroundings, event notification, find their lost item and do not need to wait in queues

Problem Id - H11

Problem Statement		Digitally Controlled Home Automation Project
Challenge Description with Context	:	This project of home automation system that uses innovation to control the home appliances remotely. It overcomes the limitations of conventional wall switches that have to be operated by physically going near to then and switch on the button.
What Exact Problem is being Solved?	:	One can operate it from mobile phone. The system uses innovative technology that receives commands from phone and produces digital output which initiates relay driver to switch ON/OFF the load appliances. Technology allows the user to send commands to operate the appliances via a mobile phone and control home appliances
Users	:	home appliances users
Expected Outcomes	:	Energy saving, convenience to control different devices even when you are not home
Potential Impact	:	Energy saving through automation

Problem Id – H12

Problem Statement		Monthly Electricity Billing Display With Bill SMS Feature
Challenge Description with Context	:	This challenge provides a system that allows for consumed electricity reading in units as well as the amount charged over it to the user. System provides the electricity readings on an LCD screen as well as through sms this reading and cost in rupees to the user
What Exact Problem is being Solved?	:	The user know about his exact electricity units consumed and cost directly from his/her meter so that there is no chance of bill tampering. The project allows a two way reading. One on LCD display and the second on sms.
Users	:	Electricity users
Expected Outcomes	:	Bill tampering avoided and load operation can be controlled
Potential Impact	:	Fraud can be avoided in electricity bill and effective load usage possible to save electricity bill

Problem Id – H13

Problem Statement	:	Energy generation using gym equipment
Challenge Description with Context	:	Conventional equipment for physical exercise, which can convert the calories burnt to the electrical energy. To pump out the energy generated to the network, if equipment with converting the burnt calories in to electricity. The gyms, and there by its users, are increasing day by day in the urban and rural areas. The equipment are quite convertible to generating equipment.
What Exact Problem is being Solved?	:	The power generation through the exercise equipment is an innovative and substantial potential area, which can be exploited significantly. : Conversion of burnt calories to electric energy Weight to energy Time Conversion table Energy storage capacity Benefit calculation
Users	:	Electricity distribution network during the peak hours.
Expected Outcomes	:	Best fit with challenge
Potential Impact	:	Health clubs power Utility, corporate sectors, Public etc

Problem Id – H14

Problem Statement	Development of an intelligent baby cradle for home and hospital use
Challenge Description with Context	: As we are very well familiar with the hurdles faced by Parents to nurture their infant and especially in case if both the Parents are working. To give 24 hours of time in such cases is next to impossible. Thus, we need to develop something unique that can help Parents to have a continuous surveillance/watch on the Baby/Infant and can notify about the same.
What Exact Problem is being Solved?	: Thus, we have come up with an idea to design a Smart Cradle System using IOT which will help the Parents to monitor their child even if they are away from home & detect every activity of the Baby from any distant corner of the world.
Users	: This venture intends to help those moms who are excessively occupied and don't have a cleaning specialist or sitter to deal with their infants
Expected Outcomes	: To make cradle innovation that is more flexible and less expensive to market. User friendly- simple and complete with instruction
Potential Impact	: The device can be used to minimize the workload of the parents and nurses in home and hospitals respectively.

Problem Id – H15

Problem Statement		Intelligent Traffic Control System
Challenge Description with Context	:	This challenge aims to implement an intelligent based traffic control system using sensors and controller (Ex. PLC).
What Exact Problem is being Solved?	:	Photoelectric sensors detect the presence of vehicles on various junctions of the road and give the signals to the controller. Based on the program in the controller, it controls the traffic signals.
Users	:	Road & Transport ministry
Expected Outcomes	:	Time span adjusted based on traffic density and fuel saving possible. Human effort reduces
Potential Impact	:	Reduces pollution & saving of fuel & time

Problem Id - H16

<p>Problem Statement</p>	<p>The cleaning mechanism should be adaptable for different size of PV modules</p>
<p>Challenge Description with Context</p>	<p>Facing severe issues regarding cleaning of small-scale pv solar systems. so, we are in a requirement of a basic cleaning system that can get a customer free from the tedious work of cleaning them manually. points on focus: ? the basic requirement is the system designed should be cost effective and should work in every weather conditions. ? the cleaning system as well as its shadow shouldn't cover any part of the pv module. the dirt and dust deposition on solar photovoltaic module severally hampers the intensity of solar rays falling on the photovoltaic module resulting into reduced power output. being located on the roof, it is quite inconvenient for user to clean this system regularly. the challenge is to design and develop cost effective and maintenance free residential solar pv module cleaning system which can be easily and conveniently operated by residential user.</p>
<p>What Exact Problem is being Solved?</p>	<p>Keeping in mind the challenge description, the cost effective and maintenance free Solar Photovoltaic module cleaning system is highly required. The solution should be able to provide an access to the user for easy and convenient way to remove dust and dirt. The cleaning mechanism should be easy to get integrated with fabrication structure without directly or indirectly affecting the Solar PV performance.</p>
<p>Users</p>	<p>The solution should be able to cater small and medium sized systems i.e. upto 10 kW. The proposed solution can be extremely helpful for residential and small commercial purposes. This solution will also be helpful for other Solar PV module manufacturers.</p>
<p>Expected Outcomes</p>	<p>The proposed cleaning mechanism should be cost effective, maintenance free and easy to operate in all weather conditions. It should be in a position to cover entire surface area of Solar Photovoltaic system. Moreover, the cleaning mechanism should take care of future expansion in already installed existing Solar Photovoltaic system. To an extent possible, the cleaning mechanism should be adaptable for different size of PV modules.</p>

Problem Id - H17

Problem Statement	To develop a plant trimmer for road side way fencing.
Challenge Description with Context	: The plant maintenance shall include watering, manuring, fertilizing, protection from pests and disease, sweeping, weeding, cultivation and trimming. To perform all the operation at a same time it requires adequate manpower, machinery and time. Among all the operation, trimming of plants at required shaping and sizing are consuming maximum time. Optimization of the trimming operation can reduce overall time requirement and reduce the laborious task by great means.
What Exact Problem is being Solved?	: In the road plantation maintenance, many workers must work on the roads for trimming of plants, which is quite risky and dangerous. For trimming if we have an automatic trimmer for cutting plants at predetermine shape and size, number of workers are reduced, and time required for the operation is drastically minimize. At a same time, they can reduce the traffic created by the maintenance activity because it only required one or two workers for a operation. The size and shape achieved by automatic trimmer will be accurate.
Users	: It can be used by taluka panchayats/ gram panchayats/ nagar palika for regular maintenance of plants at roadways. It can be used by local industries and organization for regular maintenance of gardens or plants at roadways inside the company campus. It can be moderately used in schools, hospitals, universities and by local companies or organization who takes a contract for maintenance of plants at roadways
Expected Outcomes	: An automatic trimmer should reduce the operational time for maintenance. It also minimizes the manpower required for trimming of plants compare to manually operation of trimming. It increases the flexibility of operation and make less chaos on roads while working which ultimately reduced the traffic on the road. As an operation is optimized and required less time, it will increase the moral of the worker.
Potential Impact	: Use of automatic trimmer for road way plants will increase the profit for the company on a long run use. In the government organization like talukapanchayat, gram panchayat, nagar-palika, use of automatic trimmer will reduce lot of time for a worker and planning of maintenance will be flexible. Company can find more opportunities in scheduling operations of maintenance for workers. The uniformity in size, shape and accuracy achieved by automatic trimmer will bring nice aesthetic appearance to plants.

Problem Id – H18

Problem Statement		To design a develop a solar desalination system which is capable is providing around 20 litre distillate output
Challenge Description with Context	:	Water connects every aspect of life. Access to safe water and sanitation can quickly turn problems into potential empowering people with time for school and work, and contributing to improved health for women, children, and families around the world.
What Exact Problem is being Solved?	:	Solar still is a simple device to convert the saline water into the potable water by use of solar energy. Generally it is not used as a potable water provider due to its average distillate output of 3 liter per day. Hence the solar still design and fabrication should be made in such a way that, it can produce distillate output of 20 litre per day and has cost is upto 20000 INR. Also it should has lower energy payback time less than 2 years and lower cost of water per day (CPL) less than 0.50 INR/Litre
Users	:	Potable water is a main requirement not only for the hould hold applications but also the industrial applications. All the living creatures require water for the drinking purpose. Here our main users are the " small family" consists of 2 adult and 2 children and solar still should produce water around 20 litre per day
Expected Outcomes	:	Safe drinking water is precious for healthy life but its availability is limited. Only 3% of total water on the earth is fresh water. Less than 1% of the available fresh water is suitable for human and animal consumptions. Demand for fresh water is increasing due to increasing population and change of life style. Water is equally required for agricultural and industrial applications. Therefore, it has become essential to get fresh water from the underground salty water reserve or the ocean through desalination process.Potable water is a main problem in todays world. Also the solar energy available freely and the plenty of water is available in the ocean as saline water. Hence, saline water is converted into the potable water by use of solar energy with higher distillate output then it will be a great innovation in todays world. The potable water problem can be controlled by use of solar still.
Potential Impact	:	Solar energy systems (photovoltaics,solarthermal,solar power) provide significant environmental benefits in comparison to the conventional energy sources, thus contributing, to the sustainable development of human activities. Sometimes however, their wide scale deployment has to face potential negative environmental implications. These potential problems seem to be a strong barrier for a further dissemination of these systems in some consumers. If this solar still is made with 20000 INR and 20 Litre distillate output per day then it will be best potable water provider for domestic applications

Problem Id – H19

Problem Statement	Design and development of tricycle for handicaps by using steering propulsion
Challenge Description with Context	: aim is to style and fabricate a coffee value trike for the handicap folks to be propelled by the novel link mechanism hooked up to the steering column changing into cranking, victimisation the advantage of leverage, with correct balance and distribution of mass and centre of gravity to crank the wheel shaft for dynamical. As he will use each the hands on the steering, higher management of the vehicle is ensured. The user will go quicker and farther (in out of doors use).Levers area unit ergonomically higher for the user (less body stress induced by propulsion forces then for push rim) The chair is troublesome to take care of balance once the casters get caught in drains and potholes. dominant manual trike wheel chairs speed up and down inclines or fast speed changes on level surfaces may be safety issue. The mechanism being operated and thru links dominant the front wheel to result the correct steering PRN and controlled by hand-held wheel.
What Exact Problem is being Solved?	: The essential wheeled vehicle could be a simple machine style, pedalled by disabled persons at intervals the side and seat at intervals the centre for sitting arrangement. They use only 1 hand to steer the handle as a result of different hand is employed to rotate the pedal. Ouraim is to style and fabricate an occasional worth wheeled vehicle for the handicap people to be propelled by the novel linkmechanism hooked up to the steering column changing into cranking, victimization the advantage of leverage, with correct balance and distribution of mass and centre of gravity to crank the wheel shaft for propellant. As he can use each the hands on the steering, higher management of the vehicle is ensured.
Users	: It are often used in the field for the drive for the normal persons, to move within the campus in the smooth road : It is best helpful for the small town drive for anybody together with the handicap It are often used for material transportation without mistreatment fuel propulsion. It can be used by the handicap for the normal transport and even for the self utilized handicap persons for their daily resource.
Expected Outcomes	: Investigate the present driving systems for each wheelchairs and tricycles. Design and manufacture a chair trike attachment for higher accessibility and performance of a chair user. Test and assess the developed chair trike attachment.
Potential Impact	: This tricycle is made of material which is available easily in market. This tricycle is mostlyuseful for elder and handicapped people. It is simple in design and easy to operate. The efforts made for operating tricycleis less this is an advantages of this tricycle. The tricycle cost is less as compare to other tricycle. Even in rehabilitation,hand cycling is being advocated as a good training alternative in early rehabilitation of also frail individuals. Within thatcontext there is a need for further research into optimal hand cycle design and fitting for different user groups. Apart fromoptimizing the wheelchair- user interface, one needs to carefully consider maximizing overall work capacity of users andfurther reduction of the vehicle mechanical losses to ensure a real optimum level of mobility

Problem Id – H20

Problem Statement	Reciprocating compressor - Oil (Lubricant) carryover problem due to wear and tear of piston Rings.
Challenge Description with Context	: Generally Centrifugal compressor is used for low discharge and higher compression pressure. As the operating pressure is higher, heat generation is also higher which tends to damage piston, piston rings or compression rings critically. Due to wear and tear of piston ring (Compression ring and oil control ring), the lubricant oil is entering in cylinder which reduces compression ratio and decreases efficiency.
What Exact Problem is being Solved?	: Piston ring are used to ensure that by applying the correct pressure on cylinder wall or liner, a consistent layer of oil is maintained. Other ways in which piston rings are useful by preventing excessive heat building up inside the piston by transferring heat from the piston crown to cylinder. we can also increase strength of the piston rings by using various heat treatment process with different temperature.
Users	: Compressor is a machine which increases the pressure of a fluid by mechanically decreasing its volume. Reciprocating compressors are typically used where high compression ratios (ratio of discharge to suction pressures) are required per stage without high flow rates, and the process fluid is relatively dry.
Expected Outcomes	: Preventive maintenance is a routine process generally followed by any industry. It is very significant to follow the maintenance schedule on time without affecting the production cycle. By providing suitable solution we can avoid the wear and tear of piston rings, leakage of lubrication oil in cylinder and reduce the heat generated due to friction between piston and cylinder walls. It will ultimately increase the compression ratio.
Potential Impact	: By suitable solution the efficiency of reciprocating compressor is increased at the same time increase in compression ratio. The working cycle of compressor is increasing therefore the time interval for maintenance is increases. As heat produced is minimizes while working of compressor, the life of components used in compressor are increases. There will be reduction in noise production due to smooth and friction less working of reciprocating compressor.

Problem Id- H21

Problem Statement		Solar plate cleaning machine.
Challenge Description with Context	:	Dust on solar plates reduce power generation. So we require a solution / technology / machine which removes dust from the surface of solar plates.
What Exact Problem is being Solved?	:	Removal of dust on solar plates which ultimately increase the efficiency of solar plant.
Users	:	All consumers who have solar plant. (Individual, Private sectors, Government offices)
Expected Outcomes	:	<ul style="list-style-type: none">• Removal of dust on solar plates• Less use of water• Less men power requirement.
Potential Impact	:	<ul style="list-style-type: none">• Increase in wealth generation from solar plant.• Reduction in maintenance cost