

Developathon Surge Problem Statements

Problem 1:

1. EdTech 3.0: Personalized Learning

In this challenge, participants will design an AI-driven learning environment that tailors education to each student's unique style, pace, and interests. The system should integrate multimodal inputs such as natural language interactions (using LLMs), vision-based attention tracking, and even biometric or emotion-sensing wearables to gauge engagement and understanding. It should use generative AI to create and adapt lessons, quizzes, and interactive content on the fly based on real-time feedback. By employing federated learning and decentralized computation, the platform can continuously improve from many learners' data without compromising individual privacy.

- **Real-time personalization:** An AI tutor that analyses a student's questions, expressions, and performance to adjust difficulty, format, or subject matter dynamically.
- **Immersive interfaces:** Use AR/VR or interactive visual aids powered by computer vision and LLMs for hands-on learning (e.g., simulating science experiments or historical events in virtual space).
- **Scalable collaboration:** A decentralized network where classroom devices share anonymized learning analytics to collectively refine educational models (federated learning) and unlock tailored recommendations for diverse learning needs.
- **Offline/edge capabilities:** Ensure core learning modules can run on low-cost devices without constant internet, with updates syncing later to a central repository.
- **Inclusivity and multilingual support:** Employ language models to translate content, voice assistants for learners with disabilities, and culturally relevant examples to support global classrooms.

By the end of the hackathon, teams should aim to have a prototype (app or platform) demonstrating a personalized lesson or tutoring session. The solution could be a smart app or AR experience that adapts content in real time, helping students learn more effectively in a fun, engaging, and privacy-conscious way.

Problem 2:

2. Affordable & Reliable Medical Solutions

Teams are tasked with creating AI-powered medical tools that bring healthcare to remote and low-resource settings without sacrificing accuracy. Imagine a portable diagnostic kit or mobile app that combines computer vision, speech and signal analysis, and generative models to perform screenings and provide guidance. For example, an affordable device could use a smartphone camera for medical imaging (like analyzing skin spots, or using a small add-on to look at blood samples), and a custom LLM to help interpret symptoms and suggest next steps based on global health knowledge.

- **Multi-modal screening:** Use vision systems and sensor data for diagnostics (e.g. image-based analysis of rashes or audio analysis of breathing sounds) combined with LLM-driven symptom checkers to suggest likely conditions and next steps.
- **Local inference and edge AI:** Ensure essential diagnostic algorithms run on smartphones or simple hardware offline; they can later synchronize with the cloud to receive updates or refined models.
- **Generative health assistant:** A conversational AI (chatbot) that provides personalized health advice and education, potentially in local languages, based on the latest medical guidelines.
- **Autonomous logistics:** Design concepts for autonomous robots or drones delivering testing kits and medicines, especially in post-disaster or rural scenarios where regular supply chains are disrupted.
- **Community data collaboration:** Implement federated learning so that hospitals and clinics can train shared AI models on symptoms and outcomes collectively, improving reliability across regions without revealing private records.

By the end of the hackathon, teams should present a working prototype—for instance, a mobile app paired with a simple sensor or camera demo—that highlights at least one medical application (like remote skin screening or symptom triage). The solution should be demonstrably low-cost and robust, offering an innovative path to healthcare accessibility and resilience.

Problem 3:

3. Beyond AI: Read, Think and Revolutionize

This challenge asks teams to push AI from narrow tasks toward creative, human-like innovation. Participants should build a system that not only reads and summarizes information, but also synthesizes ideas and proposes breakthroughs. For example, a platform might ingest scientific articles, patents, or data sets across fields and use generative and reasoning models to spot unexpected connections or invent new solutions (e.g. combining principles from biology and engineering to solve a problem). The AI should function like a virtual think-tank or research partner, reading content and taking the next step to propose truly novel concepts.

- **Cross-domain knowledge fusion:** Use LLMs and knowledge graphs to merge insights from disparate domains. For instance, have the AI learn about a disease and about materials science, then suggest a novel material for a medical device.
- **Generative ideation:** Implement creative generative AI (text or even 3D modeling) that drafts new concept prototypes, research hypotheses, or product ideas that have not been directly present in the training data.
- **Reasoning and critique:** Equip the system with mechanisms for critical thinking (like multi-agent debate or recursive prompting) so that it can refine its ideas by arguing pros and cons internally.
- **Human-AI collaboration interface:** Design an interactive UI (text, voice, or AR) where users can feed more information, ask the AI to elaborate, or tweak generated ideas in real time.

- **Data-driven brainstorming:** Incorporate data analysis or simulation: for instance, allow users to provide data sets (e.g., climate models) and have the AI propose algorithmic or policy solutions.

By the end of the hackathon, teams should present a prototype that takes a body of knowledge as input and outputs a novel proposition or design. This could be a web app where one pastes in research snippets and the AI returns a creative new hypothesis, or an AR demo where AI-generated prototypes appear in 3D. The key is demonstrating an AI “thinking” in an innovative way, effectively acting as an autonomous idea-generator.

Problem 4:

4. AI vs Fake News and Dealing with DeepFake

This challenge confronts misinformation and AI-generated fraud on a new level. Teams will create AI systems that actively identify and counter fake news and deepfakes in real time. Consider building a smart assistant or browser extension that scans news articles and videos as users encounter them. It could apply computer vision to spot signs of visual tampering (like inconsistent facial landmarks or unnatural lighting in a video) and use LLMs to analyze text. The system should cross-reference with fact databases or search results immediately to flag dubious claims or edits.

- **Multi-modal verification:** Integrate vision algorithms that detect manipulated images or video frames with language models that check the credibility of written content. If a video shows a public figure speaking, the AI cross-checks the audio transcript against known speeches; if news text cites an event, the model searches multiple sources for validation.
- **Real-time source analysis:** Use generative AI to summarize and compare coverage of a breaking news story across diverse, trusted outlets versus questionable sources, highlighting contradictions or absence of coverage in reputable media.
- **User-level fact-checking agent:** A friendly chatbot interface where users paste claims or links and receive an AI analysis, including supporting evidence or flags.

The chatbot could also educate users by explaining why something seems dubious.

- **Edge AI and privacy:** Run detection on-device (phones or browsers) so private browsing behavior stays local. Leverage federated learning so improvement in fake-news models happens without uploading users' raw data.
- **Adversarial training:** Optionally, teams can use generative methods to create small deepfake examples to improve the robustness of their detector within the hackathon timeframe.

By hackathon's end, teams should demonstrate a prototype application that helps people distinguish real news from fake. This could be, for example, a browser plugin that highlights questionable claims on a news feed, or a mobile app where you upload an image/video and see a report of its authenticity. The focus is on practical tools – the product should guide end users to more reliable information and expose manipulations effectively.

Problem 5 :

5. Smart Finance: Reimagining Money with Tech

This theme challenges teams to invent the future of finance by blending AI with economic systems. Participants should propose AI-driven tools or platforms that transform how money is managed, spent, and valued. For example, one idea is a smart wallet app with a built-in AI economist: it visually scans purchases (using computer vision on receipts and products) and uses LLMs to analyze spending habits, then automatically reallocates micro-budgets (savings, investments, charity). Another could be a decentralized investment advisor that uses machine learning to allocate community funds to vetted local projects.

- **AI Financial Advisor:** A generative chatbot that learns a user's financial goals and constraints and then autonomously creates budgets, savings plans, or investment strategies. It can even write or negotiate financial documents or offers (e.g., loan applications or insurance claims) in clear language.

- **Automated trading and budgeting:** Edge AI agents that monitor multiple markets (stock, crypto, commodity) and perform micro-trades or currency exchanges with minimal human input. Also, smart systems that realign spending when they detect wasteful patterns (e.g., cancelling unused subscriptions).
- **Vision-driven expense tracking:** Use computer vision to log expenses by scanning bills or shopping scenes. The AI learns user preferences and can suggest purchase optimizations (like hunting for cheaper product variants via AR).
- **Alternative currency concepts:** Prototype a new kind of digital currency or reward system. For instance, *sustainability coins* earned by eco-friendly actions, managed by an autonomous network, or a time-banking platform where contributions are tracked by AI.
- **Federated finance network:** Ensure privacy by processing financial data on-device while sharing insights anonymously. Teams could simulate collaborative fraud detection or credit scoring models trained across institutions using federated learning.

By the end of the hackathon, teams should produce a functional demo. This might be a smartphone app with an AI-powered budgeting dashboard, or a web platform for community-based currency exchange. The product should showcase innovative use of AI—like an autonomous finance bot or a visionary currency mechanism—offering users smarter, more inclusive ways to handle money.

Problem 6:

6. Disaster Resilience: Adapt, Recover

This challenge revolves around building AI tools for preparation, response, and recovery in disasters. Teams should imagine and prototype systems that use AI to sense danger, coordinate relief, and help communities bounce back faster. For instance, you might create an edge-AI sensor network that detects early signs of floods, forest fires, or earthquakes using low-cost devices. Or an autonomous drone team that, guided by vision systems and path-planning AI, scouts damaged areas and delivers supplies where

roads are blocked. Another idea is a smart decision-support center that aggregates data (satellite maps, social media posts, sensor feeds) and uses LLMs to summarize urgent action items to responders.

- **Early warning and sensing:** Deploy machine learning on distributed sensors (acoustic, seismic, weather) to identify anomalies (like precursors to earthquakes or sudden river-level changes) and alert people automatically, even if internet is down.
- **Rapid damage assessment:** Use satellite or drone imagery with computer vision to map out roads and buildings that are safe or destroyed, enabling quick decisions on where to send help.
- **Autonomous aid delivery:** Conceptualize simple robots or drones that navigate debris autonomously. For a hackathon prototype, simulate or visualize how these units would use AI (e.g. lidar and pathfinding) to locate stranded people or distribute medicine without direct guidance.
- **Smart coordination platforms:** Create an AI-augmented operations center: combine real-time data (social media, emergency calls, IoT) with predictive modeling to prioritize rescue tasks. A chatbot or dashboard could help relief workers by answering questions (“Which neighborhoods lost power?”) or optimizing logistics.
- **Resilient infrastructure planning:** Use generative models to design temporary shelters or supply-chain networks that can be quickly deployed post-disaster, and apply federated learning so different regions can share lessons learned without exposing sensitive data.

By the end of the hackathon, teams should show a working proof-of-concept. This could be a mobile/web app illustrating one key function (like a damage-mapping tool or an AI-driven alert system). The solution must be geared toward a product-level demo that aids real-world disaster resilience—for example, providing communities with smarter evacuations, faster relief, or more adaptive rebuilding strategies.

Problem 7:

7. Half Knowledge Crisis

This challenge targets the problem of superficial understanding and misinformation born from incomplete knowledge. Teams should create AI tools that detect when people know only part of a topic and then guide them to fill the gaps. For instance, an AI tutor could quiz a learner's explanation of a concept (via text or speech), identify missing pieces or misconceptions, and generate targeted follow-up questions or mini-lessons. Alternatively, build a browser plugin that monitors your web reading: when you read an article, the AI highlights statements that are often misunderstood or taken out of context, then provides concise clarifications or further reading.

- **Knowledge-gap analysis:** Use an LLM or semantic search to analyze a user's input (essay, tweet, or spoken answer) and identify if they have only covered the topic partially or incorrectly. The AI could compare against reliable sources or knowledge graphs to spot what's missing.
- **Dynamic Socratic questioning:** Implement an AI tutor that continually asks deeper questions, forcing users to justify or expand on their answers. For example, after a student answers, the AI asks "Why do you think that?" or "What about this related scenario?" to uncover half-truths.
- **Personalized knowledge paths:** Based on detected gaps, automatically generate a study plan or resources. This could use generative AI to create summaries, quiz questions, or analogies tailored to the specific gaps in understanding.
- **Collaborative correction:** Perhaps integrate a system where users share their learnings and the AI flags when group consensus looks shaky, guiding them to authoritative references to resolve uncertainty.
- **Engagement through gamification:** Encourage users to improve their depth of knowledge by turning the learning into a game or challenge, with AI-generated badges or narratives for mastering fuller understanding.

By the end of the hackathon, teams should demonstrate a prototype helping users recognize and overcome partial knowledge. For example, an educational chatbot that challenges answers, or a plugin that rates your written claims with a "confidence score" and offers expansions. The focus is on guiding users from half-understanding to solid comprehension through AI-driven interactions and content.

Problem 8:

8. Echo Chamber Effect

This challenge tackles the self-reinforcing bubbles that trap people in narrow viewpoints. Teams must devise AI solutions that identify and break echo chambers, exposing users to a diversity of ideas. For example, a personalized news feed app could leverage LLMs to analyze a user's reading history and automatically introduce contrasting perspectives. Or a chatbot companion might notice when a user repeats the same viewpoint and respond with carefully reasoned counterarguments. The AI solution could use sentiment analysis and network graphs to detect insularity and insert stimulating content.

- **Diverse content recommendation:** Use AI to map a user's interests and then recommend at least one alternative viewpoint every time they consume content. For instance, if you often read political news from one side, the AI might summarize a credible article from the other side and invite discussion.
- **Interactive debate bots:** Create conversational agents that can engage users in debate. These bots would be trained to respectfully present opposing viewpoints and challenge groupthink, effectively simulating a healthy dialogue partner.
- **Community insights and visualization:** Use graph analytics to expose echo chamber networks. Teams might build a feature that visualizes how insular a community is (for example, showing how many clusters of similar opinions there are) and how opinions flow. This could involve federated data so that users contribute anonymously to a global map of discourse patterns.
- **Algorithmic transparency:** Let the AI explain why it recommends certain content. For instance, "This article offers a different take on vaccination than what you've been reading." Use LLMs to generate brief justifications for recommendations.
- **Engagement nudges:** The system could gamify exploring outside opinions. Use reinforcement learning to personalize nudges like badges for reading multiple viewpoints or summarizing an article from the "other side."

By the end of the hackathon, teams should prototype an app or browser add-on demonstrating the idea. For example, show how an AI-powered sidebar could present opposing viewpoints next to social media posts, or how a news aggregator rebalances a personalized feed. The goal is a tangible product that helps users understand and escape their echo chambers, promoting a more connected and informed discourse.

Problem 9:

9. The Junk Habit Crisis

This challenge addresses the binge of wasteful and unhealthy habits in modern life – from junk food and consumer waste to mindless digital addiction. Participants will create AI-based solutions that help individuals kick these “junk” habits. For example, a mobile app could use computer vision to recognize foods on your plate and an LLM nutritionist to suggest healthier alternatives, or a smart assistant could monitor daily media consumption and propose meaningful activities instead. Other ideas include an AR shopping assistant that flags unhealthy product choices, or a wearable that detects stress-eating cues and intervenes.

- **Health and diet monitoring:** Use vision and sensors to log dietary choices (pictures of meals, wearable steps tracker). The AI could give real-time feedback (“Swap that soda for infused water”) and generate personalized meal plans or exercise routines.
- **Smart reminders and coaching:** Implement a chatbot or voice assistant that learns your tendencies (e.g., late-night snacking or endless scrolling) and uses generative dialogues to nudge better habits (motivational messages, quick guided meditations, or mini-games to resist temptation).
- **Waste reduction support:** Build a computer vision-powered recycling app or smart bin that identifies trash vs recyclable items, educating users and gamifying proper disposal. The AI could also suggest eco-friendly alternatives for common purchases.

- **Digital well-being:** Create an edge-AI system that runs on the user's device to track app usage and social media patterns. It can then proactively lock distracting apps for short periods, based on personalized rules learned by federated models, and guide the user toward productive tasks.
- **Community-driven challenges:** Use generative AI to design group challenges or competitions around breaking junk habits (e.g., collective steps goals, or meal-prep recipe swaps) that leverage social motivation and friendly AI moderation.

By hackathon's end, teams should present a tangible prototype. This might be a smartphone app with an AI habit-coach interface, or a simple hardware + app for healthier living (e.g., a smart fridge magnet that interacts via voice to suggest recipes). The focus is on fun, practical products that actually help users reduce harmful junk habits through AI-driven insight and encouragement.

Problem 10:

10. Cultural Amnesia Effect

This challenge focuses on combating the gradual loss of cultural heritage and memory. Participants should harness AI to preserve, revive, and share traditions and history. Imagine an AR app that you can point at a historic building, artifact, or piece of art, and instantly hear an AI-narrated story in a local dialect about its origin, significance, and the people who cared for it. Or a voice-enabled chatbot speaking an endangered language, trained on oral histories so that future generations can converse with AI-driven cultural guides.

- **Language and folklore preservation:** Use speech-to-text and large language models to record, transcribe, and even translate stories or songs from elders. The system could generate interactive storybooks or audio dramas in indigenous languages, keeping them alive.
- **Artifact recognition and AR storytelling:** Apply computer vision to identify cultural artifacts (textiles, instruments, monuments) and overlay digital

reconstructions or historical scenes through AR. For example, scanning an old family photo could bring characters to life or fill in faded details.

- **Virtual heritage tours:** Create an AI-driven virtual museum or tour guide. Teams might build a prototype where users walk around their neighborhood with a mobile app, and the AI pops up with historical facts or simulations of past events at each location, leveraging generative models for rich narration.
- **Collaborative memory vault:** Develop a decentralized platform where communities upload cultural data (photos, videos, recipes). The AI organizes and curates this vault, using federated learning so each community's data stays private while contributing to a global tapestry of culture.
- **Gamification of history:** Engage younger audiences with AI-generated games or quizzes based on cultural knowledge. For instance, an LLM could craft interactive "choose your own adventure" stories set in local history, making learning immersive.

By the end of the hackathon, teams should showcase a prototype that brings culture into the AI age. This might be an AR demo that tells a myth when you scan a landscape, or a mobile game in a traditional language with AI dialogues. The key is a creative, feasible product that helps people remember and celebrate their cultural identity using AI innovations.